

GSE AA Final Exam Practice**Multiple Choice**

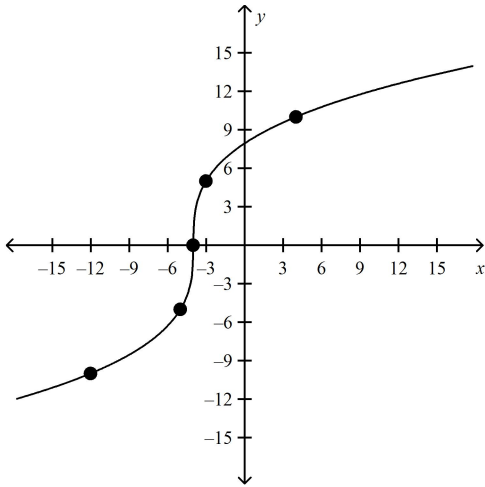
Identify the choice that best completes the statement or answers the question.

- _____ 1. Nadav invests \$6,000 in an account that earns 5% interest compounded continuously. What is the total amount of her investment after 8 years? Round your answer to the nearest cent.
- | | |
|-----------------|--------------|
| a. \$14,950.95 | c. \$9850.95 |
| b. \$327,588.90 | d. \$8950.95 |

- _____ 2. Multiply $\frac{8x^4y^2}{3z^3} \cdot \frac{9xy^2z^6}{4y^4}$. Assume that all expressions are defined.
- | | |
|-------------------------|-----------------|
| a. $\frac{3}{2}x^3y^2z$ | c. $6x^4yz^2$ |
| b. $6x^5z^3$ | d. $6x^5y^8z^9$ |

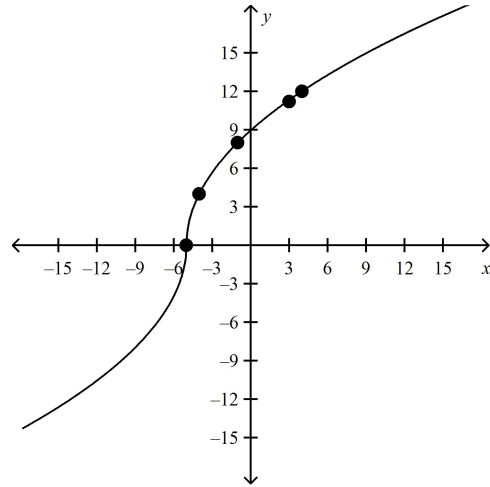
3. Graph the function $f(x) = 4\sqrt[3]{x+5}$, and identify its domain and range.

a.



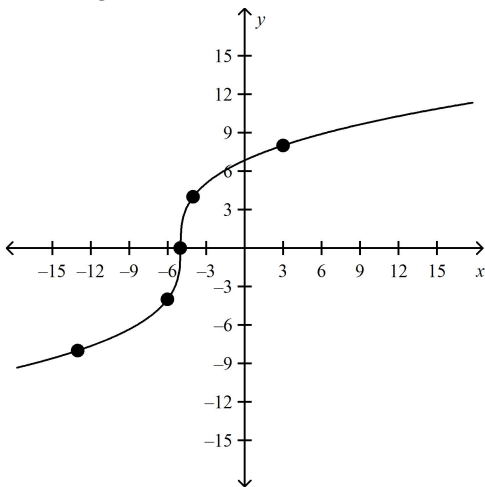
The domain is the set of all real numbers.
The range is also the set of real numbers.

c.



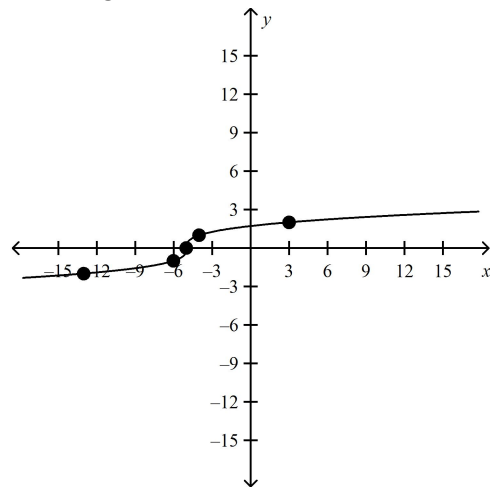
The domain is the set of all real numbers.
The range is also the set of real numbers.

b.



The domain is the set of all real numbers.
The range is also the set of real numbers.

d.



The domain is the set of all real numbers.
The range is also the set of real numbers.

4. Subtract $\frac{2x^2 - 48}{x^2 - 16} - \frac{x + 6}{x + 4}$. Identify any x -values for which the expression is undefined.

a. $\frac{x^2 + 2x - 72}{(x - 4)(x + 4)}$; The expression is undefined at $x = 4$ and $x = -4$.

b. $\frac{x - 6}{x + 4}$; The expression is undefined at $x = 4$ and $x = -4$.

c. $\frac{x - 6}{x - 4}$; The expression is undefined at $x = 4$ and $x = -4$.

d. $\frac{x + 6}{x - 4}$; The expression is undefined at $x = 4$ and $x = -4$.

- _____ 5. Suppose that a certain website claims that it averages 4.7 hours of downtime per month. (Downtime is time that the site is not available.)
In a random sample of 17 months, the average downtime was 4.9 hours per month, with a standard deviation of 0.5 hours per month. What is the z -value rounded to the nearest hundredth? Is there enough evidence to reject the claim?
- The z -value is 1.65.
There is enough evidence to reject the claim.
 - The z -value is 2.21.
There is enough evidence to reject the claim.
 - The z -value is 2.21.
There is not enough evidence to reject the claim.
 - The z -value is 1.65.
There is not enough evidence to reject the claim.

6. Determine if the set of rational expressions is closed under subtraction. Explain why or why not.

a. The set of rational expressions is not closed under subtraction.

One counterexample is shown.

$$\begin{aligned}\frac{3x}{3x} - \frac{2x}{2x} &= \left(\frac{3x}{3x} \cdot \frac{2}{2} - \frac{2x}{2x} \cdot \frac{3}{3} \right) \\ &= \left(\frac{6x}{6x} - \frac{6x}{6x} \right) = \left(\frac{6x - 6x}{6x} \right) = \frac{0}{6x}\end{aligned}$$

If $x = 0$, then $\frac{0}{6x} = \frac{0}{6(0)} = \frac{0}{0}$, which is *not* a rational expression, since it is undefined.

b. The set of rational expressions is not closed under subtraction.

One counterexample is shown.

$$\frac{3x+1}{3x} - \frac{2x+1}{3x} = \frac{x}{0}$$

Since division by zero is undefined, $\frac{x}{0}$ is *not* a rational expression.

c. The set of rational expressions is closed under subtraction.

Let $f(x)$, $g(x)$, $p(x)$, and $q(x)$ be polynomial expressions where $g(x)$ and $q(x)$ are not equal to zero. Then

$$\begin{aligned}\frac{f(x)}{g(x)} - \frac{p(x)}{q(x)} &= \left(\frac{f(x)}{g(x)} \cdot \frac{q(x)}{q(x)} \right) - \left(\frac{p(x)}{q(x)} \cdot \frac{g(x)}{g(x)} \right) \\ &= \left(\frac{f(x) \cdot q(x)}{g(x) \cdot q(x)} \right) - \left(\frac{p(x) \cdot g(x)}{q(x) \cdot g(x)} \right) \\ &= \frac{f(x) \cdot q(x) - p(x) \cdot g(x)}{g(x) \cdot q(x)}\end{aligned}$$

Since the product of polynomials is a polynomial, and the difference of polynomials is a polynomial, then the difference of two rational expressions is a rational expression.

d. The set of rational expressions is closed under subtraction.

Let $f(x)$, $g(x)$, $p(x)$, and $q(x)$ be polynomial expressions where $g(x)$ and $q(x)$ are not equal to zero. Then

$$\frac{f(x)}{g(x)} - \frac{p(x)}{q(x)} = \left(\frac{f(x) - p(x)}{g(x) - q(x)} \right)$$

Since the difference of polynomials is a polynomial, and the quotient of polynomials is a rational expression, then the difference of two rational expressions is a rational expression.

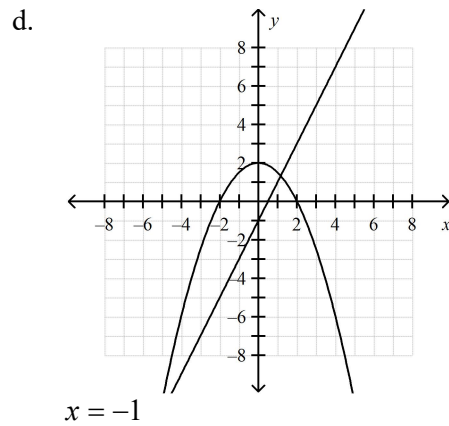
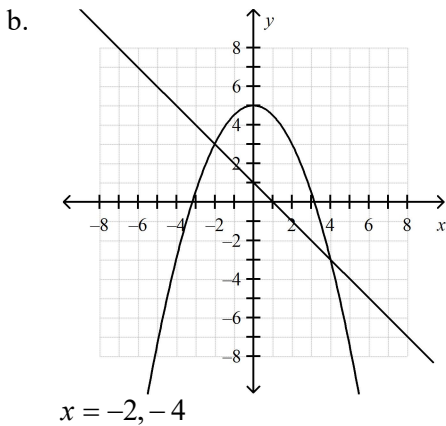
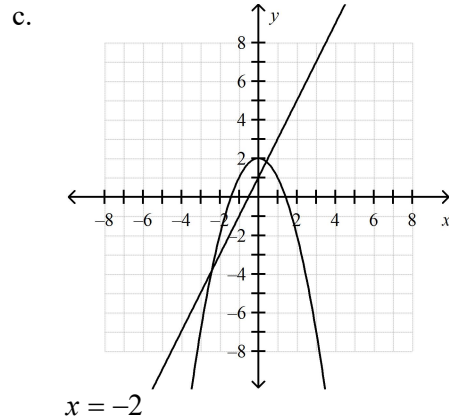
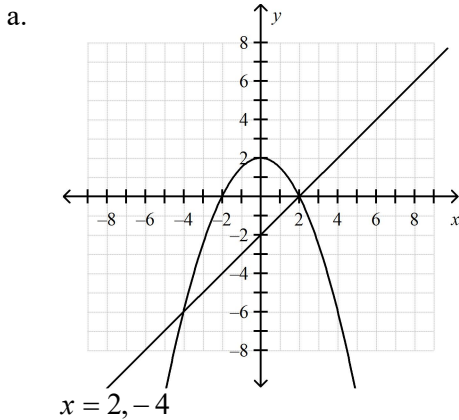
- _____ 7. The Soft Landing video game company is about to release a new flight simulator game. If the game is likely to sell to more than 10% of all video game buyers, the company will make 500,000 copies. If it is likely to sell to less than 10%, the company will make 200,000 copies.
Soft Landing sends an e-mail survey to everyone who bought their previous flight simulator game. Of 400 people who responded to the survey, 80 said they were “very likely” to buy the new game.
Based on the results of the survey, the Soft Landing company makes 500,000 copies of the game. Was this a good decision? Explain why it was a good decision, or, if not, suggest a better way to gather information to make a better information.
- This was a poor decision. The sample surveyed was biased, because it contained only people who buy flight simulator games. These people are more likely to be interested in a new flight simulator than are game buyers in general.
The company could make a better decision by surveying 100 randomly-selected video game buyers at several different store locations.
 - This was a good decision. Since 20% of the people surveyed are likely to buy the game, Soft Landing needed to make the greater number (500,000) of games.
 - This was a poor decision. The sample surveyed was biased, because it only includes people who bought Soft Landing games. These people are more likely to buy another Soft Landing game than one from a different company.
The company could make a better decision by surveying 100 randomly-selected flight simulator game buyers, not just their own customers.
 - This was a good decision. Since 20% of their current flight simulator customers are likely to buy the game, Soft Landing needed to make the greater number (500,000) of games.
- _____ 8. A manufacturer inspects 400 personal video players and finds that 399 of them have no defects. The manufacturer sent a shipment of 800 video players to a distributor. Predict the number of players in the shipment that are likely to have no defects.
- 798
 - 399
 - 780
 - 2
- _____ 9. The number of calls received by a technical support center during 18 randomly selected days is listed. Identify the outlier, and describe how it affects the mean and the standard deviation.

50	57	77	66	53	72
51	88	82	70	62	64
69	88	98	65	14	68

- The outlier is 14. The outlier in the data set causes the mean to decrease from about 69.4 to about 66.3 and the standard deviation to increase from about 13.7 to about 18.6.
- The outlier is 88. The outlier in the data set causes the mean to increase from about 66.3 to about 69.4 and the standard deviation to decrease from about 18.6 to about 13.7.
- The outlier is 14. The outlier in the data set causes the mean to decrease from about 18.6 to about 13.7 and the standard deviation to increase from about 66.3 to about 69.4.
- The outlier is 88. The outlier in the data set causes the mean to decrease from about 18.6 to about 13.7 and the standard deviation to increase from about 66.3 to about 69.4.

- _____ 10. The Fall Dance Committee surveys 20 eleventh and twelfth graders to see what music they would like to hear at the dance. Identify the population and sample.
- Population: All eleventh and twelfth graders at the school
Sample: The 20 students who were surveyed
 - Population: The 20 students who were surveyed
Sample: All eleventh and twelfth graders at the school

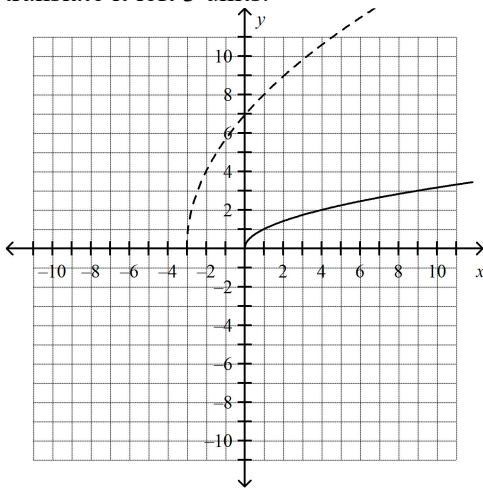
_____ 11. Solve $x - 2 = -\frac{1}{2}x^2 + 2$ graphically.



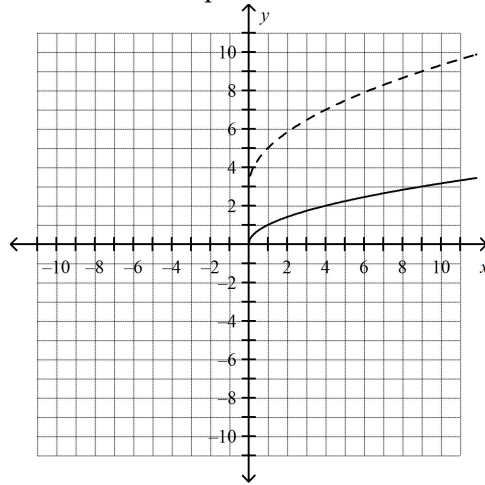
- _____ 12. Explain whether the situation is an experiment or an observational study.
- A nutritionist wants to know if taking vitamins keeps people from getting colds. She gives 100 people a vitamin supplement for 2 months, and compares the results to 100 people who do not take vitamins.
- This is an observational study. The nutritionist gathers data instead of applying a treatment.
 - This is an experiment. The nutritionist gathers data instead of applying a treatment.
 - This is an experiment. The nutritionist is applying a treatment (taking vitamins) instead of simply gathering data.
 - This is an observational study. The nutritionist is applying a treatment (taking vitamins) instead of simply gathering data.

19. Using the graph of $f(x) = \sqrt{x}$ as a guide, describe the transformation and graph $g(x) = 4\sqrt{x-3}$.

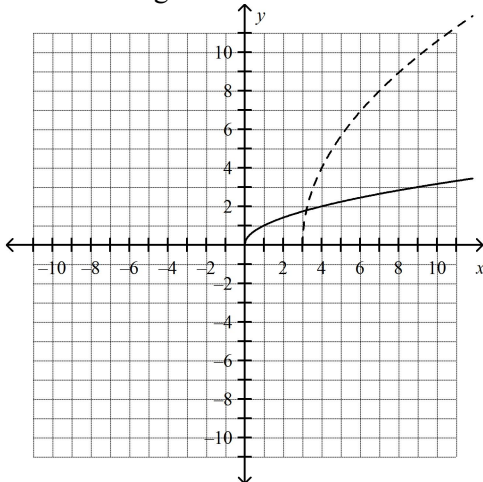
a. Stretch f vertically by a factor of 4 and translate it left 3 units.



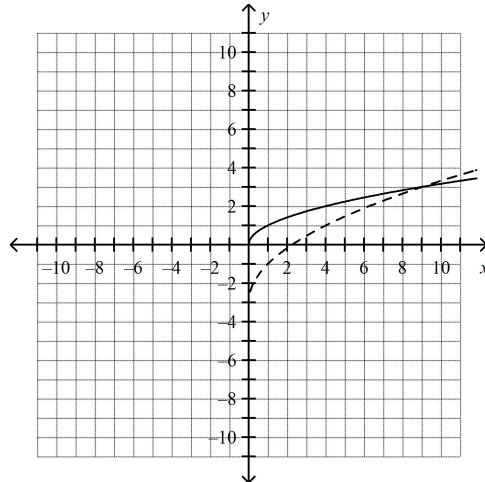
c. Compress f horizontally by a factor of $\frac{1}{4}$ and translate it up 3 units.



b. Stretch f vertically by a factor of 4 and translate it right 3 units.



d. Compress f horizontally by a factor of $\frac{1}{4}$ and translate it down 3 units.



20. The table shows the probability distribution for the number of people who contract a disease in a scientific study. Find the expected number of people who contract the disease. Round your answer to the nearest tenth.

Number of People	2	3	4	5	6
Probability	0.20	0.32	0.288	0.1536	0.0384

- a. 4.0 b. 3.0 c. 3.5 d. 2.5

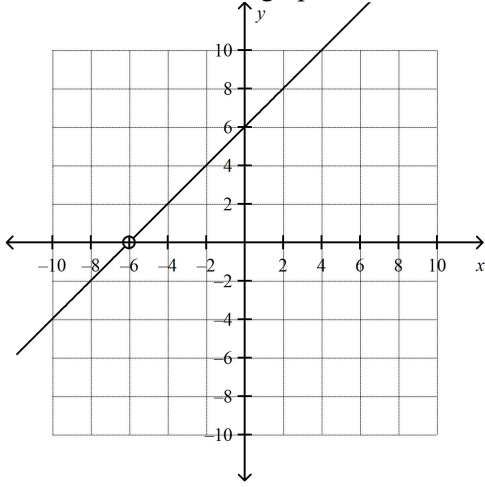
- _____ 21. Voters in Jackson County are going to vote on a half-percent sales tax increase to support music in local schools. According to a random survey, 40% plan to vote for the tax and 60% plan to vote against it. The survey's margin of error is $\pm 6\%$.

Determine whether the survey clearly projects whether the sales tax will pass. Explain your response.

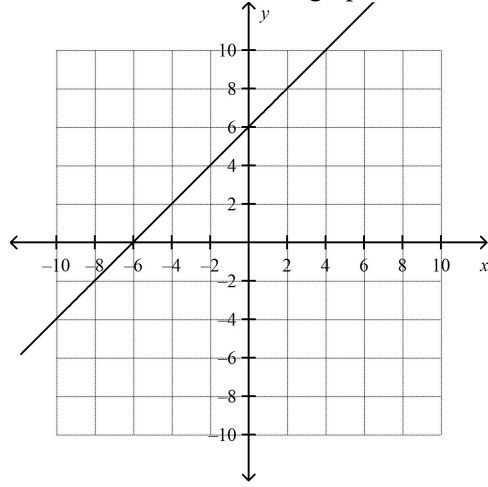
- a. The survey clearly projects that the sales tax will pass; $60\% \pm 6\% = 54\%$ to 66% plan to vote for the tax and $40\% \pm 6\% = 34\%$ to 46% plan to vote against the tax. The intervals do not overlap, so the survey clearly projects the outcome.
- b. The survey clearly projects that the sales tax will not pass; $40\% \pm 6\% = 34\%$ to 46% plan to vote for the tax and $60\% \pm 6\% = 54\%$ to 66% plan to vote against the tax. The intervals do not overlap, so the survey clearly projects the outcome.
- c. The survey clearly projects that the sales tax will not pass; $40\% \pm 3\% = 37\%$ to 43% plan to vote for the tax and $60\% \pm 3\% = 57\%$ to 63% plan to vote against the tax. The intervals do not overlap, so the survey clearly projects the outcome.
- d. The survey does not clearly project whether the sales tax will pass; up to $40\% + 12\% = 52\%$ might vote for the tax and only $60\% - 12\% = 48\%$ might vote against the tax. The intervals overlap, so the survey does not clearly project the outcome.

22. Identify holes in the graph of $f(x) = \frac{x^2 + 8x + 12}{x + 2}$. Then graph.

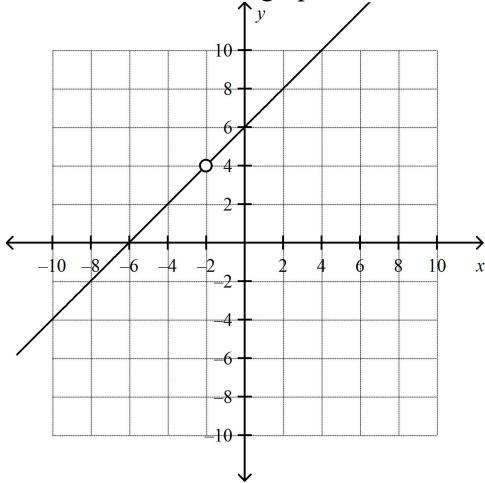
a. There is a hole in the graph at $x = -6$.



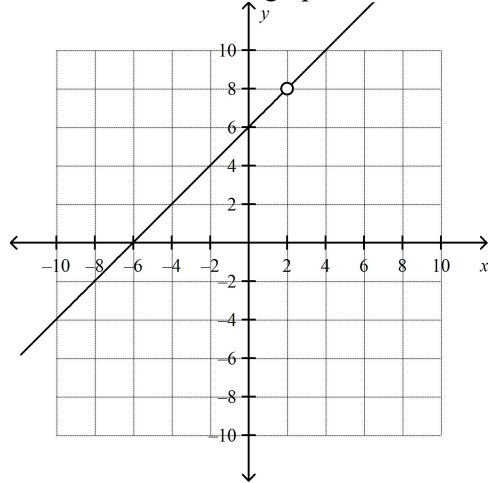
c. There are no holes in the graph.



b. There is a hole in the graph at $x = -2$.



d. There is a hole in the graph at $x = 2$.



23. A spinner has 8 equal-sized sectors, numbered 1 through 8. What is the expected value of one spin of the spinner?

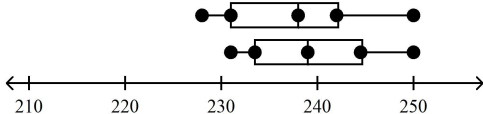
- a. 36
- b. 5

- c. 4
- d. 4.5

24. A sporting goods company is testing a new type of golf club. They want to find out whether the new club makes a golf ball travel a different distance than their old clubs. The results of a random experiment are shown. State the null hypothesis for the experiment. Then use box-and-whisker plots to compare the results for the control group and the treatment group. Do you think there is enough evidence to reject the null hypothesis?

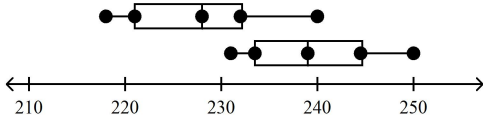
Old club (yards)	220	231	230	218	237	227	229	240	219	222	233	224
New club (yards)	234	247	231	233	246	240	250	240	243	232	235	238

- a. The null hypothesis is that the distances traveled will be the same for golf balls hit by the new clubs and the old clubs.



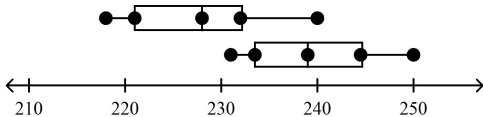
As shown by the box-and-whisker plots, there is not a large difference in the distances. We should accept the null hypothesis, which means the new clubs do not make golf balls travel a different distance than the old ones.

- b. The null hypothesis is that the distances traveled will be the same for golf balls hit by the new clubs and the old clubs.



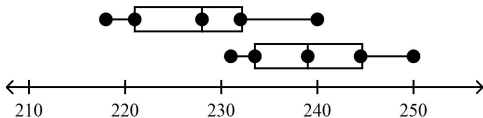
As shown by the box-and-whisker plots, there is a large difference in the distances. We should reject the null hypothesis, which means that the new clubs do make golf balls travel a different distance than the old ones.

- c. The null hypothesis is that the new clubs will make the golf balls travel farther than the old clubs do.



As shown by the box-and-whisker plots, there is a large difference in the distances. We should accept the null hypothesis, which means the new clubs do make golf balls travel farther than the old ones.

- d. The null hypothesis is that golf balls hit by the new clubs and the old clubs will travel different distances.

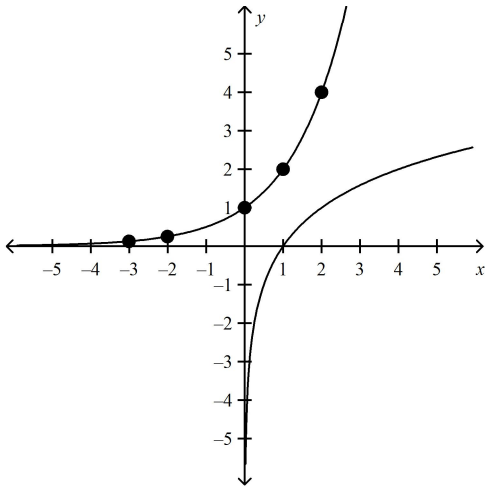


As shown by the box-and-whisker plots, there is a large difference in the distances. We should accept the null hypothesis, which means the new clubs do make golf balls travel a different distance than the old ones.

- _____ 25. The volume V of a cylinder varies jointly with the height h and the radius squared r^2 , and $V = 157.00 \text{ cm}^3$ when $h = 2 \text{ cm}$ and $r^2 = 25 \text{ cm}^2$. Find V when $h = 3 \text{ cm}$ and $r^2 = 36 \text{ cm}^2$. Round your answer to the nearest hundredth.
- a. 157.00 cm^3
 - b. 3.14 cm^3
 - c. 339.12 cm^3
 - d. 39.00 cm^3
- _____ 26. Solve the equation $\frac{6x}{x-3} = \frac{4x+6}{x-3}$.
- a. $x = -3$
 - b. $x = 3$
 - c. $x = -\frac{3}{2}$
 - d. There is no solution.
- _____ 27. According to a random survey, 56% plan to vote for candidate A in an upcoming mayoral election and 44% plan to vote for candidate B. The survey's margin of error is $\pm 7\%$. Determine whether the survey clearly projects the winner. Explain your response.
- a. The survey clearly projects that candidate A will win; $56\% \pm 3.5\% = 52.5\%$ to 59.5% plan to vote for candidate A and $44\% \pm 3.5\% = 40.5\%$ to 47.5% plan to vote for candidate B. The intervals do not overlap, so the survey clearly projects the winner.
 - b. The survey does not clearly project the winner; up to $56\% - 14\% = 42\%$ might vote for candidate A and only $44\% + 14\% = 58\%$ might vote for candidate B. The intervals overlap, so the survey does not clearly project the winner.
 - c. The survey does not clearly project the winner; $44\% \pm 7\% = 37\%$ to 51% plan to vote for candidate A and $56\% \pm 7\% = 49\%$ to 63% plan to vote for candidate B. The intervals overlap, so the survey does not clearly project the winner.
 - d. The survey does not clearly project the winner; $56\% \pm 7\% = 49\%$ to 63% plan to vote for candidate A and $44\% \pm 7\% = 37\%$ to 51% plan to vote for candidate B. The intervals overlap, so the survey does not clearly project the winner.
- _____ 28. Simplify the expression $\log_4 64$.
- a. 4
 - b. 64
 - c. 16
 - d. 3

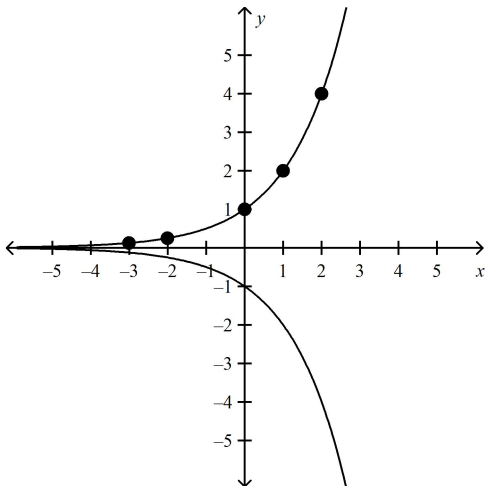
29. Use $x = -3, -2, 0, 1, 2$ to graph the function $f(x) = 2^x$. Then graph its inverse. Describe the domain and range of the inverse function.

a.



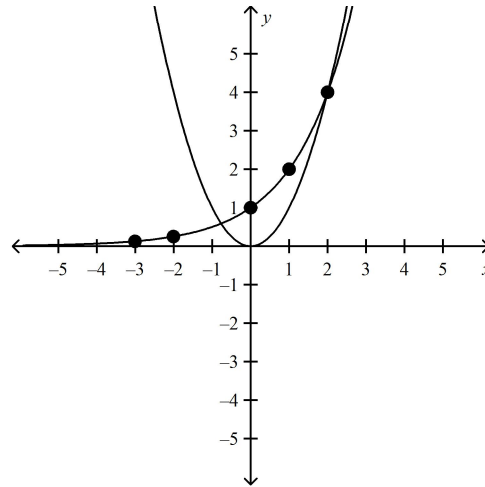
The domain of $f^{-1}(x)$ is $\{x|x > 0\}$, and the range is all real numbers.

b.



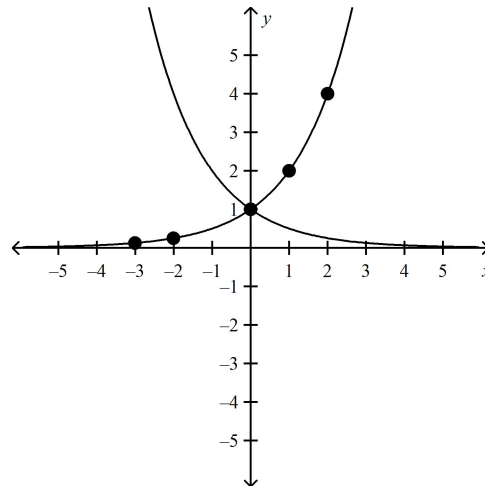
The domain of $f^{-1}(x)$ is all real numbers, and the range is $\{y|y < 0\}$.

c.



The domain of $f^{-1}(x)$ is all real numbers, and the range is $\{y|y \geq 0\}$.

d.



The domain of $f^{-1}(x)$ is all real numbers, and the range is $\{y|y > 0\}$.

30. A major university decides to survey the student body to find out their opinion about life on campus. All students are identified by their major field of study, such as education, mathematics, or literature. The university randomly chooses four of the eight majors offered at the university. The university sends the survey to a random sample of the students in these four majors. Classify the sample.

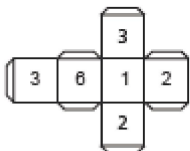
- a. systematic
- b. convenience
- c. self-selected
- d. stratified

- _____ 31. On an interstate highway under dry conditions, the maximum safe speed in miles per hour around a curve with radius of curvature r in feet is approximated by the equation $f(r) = \sqrt{1.6r}$. The corresponding function for the maximum safe speed under wet conditions is compressed vertically by a factor of about $\frac{5}{8}$. Write the corresponding function $g(r)$ for the maximum safe speed on a rainy day, and use it to estimate the maximum safe speed around a curve with a radius of curvature of 1000 feet.
- The maximum safe speed on a rainy day is represented by $g(r) = \frac{5}{8} \sqrt{1.6r}$.
The maximum safe speed around a curve with a radius of curvature of 1000 ft is 25 mph.
 - The maximum safe speed on a rainy day is represented by $g(r) = \frac{5}{8} \sqrt{1.6r}$.
The maximum safe speed around a curve with a radius of curvature of 1000 ft is 32 mph.
 - The maximum safe speed on a rainy day is represented by $g(r) = \sqrt{\frac{5}{8}(1.6)r}$.
The maximum safe speed around a curve with a radius of curvature of 1000 ft is 40 mph.
 - The maximum safe speed on a rainy day is represented by $g(r) = \sqrt{\frac{5}{8}(1.6)r}$.
The maximum safe speed around a curve with a radius of curvature of 1000 ft is 51 mph.

- _____ 32. Solve $8^{x+8} = 32^x$.
- | | |
|--------------|--------------|
| a. $x = -12$ | c. $x = -22$ |
| b. $x = 12$ | d. $x = 22$ |

- _____ 33. Solve the equation $-6 + \sqrt{x-5} = -2$.
- | | |
|-------------|-------------|
| a. $x = 11$ | c. $x = 21$ |
| b. $x = 16$ | d. $x = 9$ |

- _____ 34. What is the expected value of rolling the six-sided number cube represented by the net? Express your answer as a decimal rounded to the nearest hundredth.

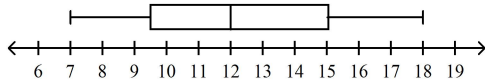


- | | |
|---------|---------|
| a. 2.83 | c. 2.67 |
| b. 3.33 | d. 2.50 |

- ____ 35. Make a box-and-whisker plot of the data. Find the interquartile range.

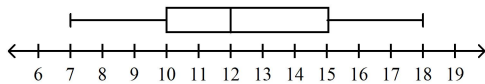
7, 9, 11, 12, 13, 15, 12, 17, 18, 12, 9, 7, 12, 15, 18, 10

a.



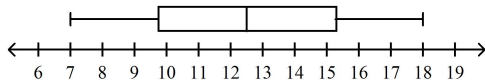
Interquartile range: 5.5

b.



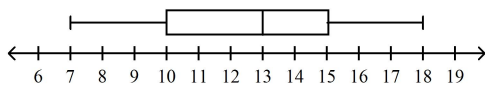
Interquartile range: 5

c.



Interquartile range: 5.5

d.



Interquartile range: 5

- ____ 36. Zelon Pharmaceuticals maintains a courier plane to transport company executives back and forth between the company headquarters and the main manufacturing plant 250 miles away. Today the pilot flew from headquarters to the plant, picked up the Chief of Operations, and returned to headquarters. On the first leg of the trip, the pilot flew against a headwind averaging 10 miles per hour. On the return leg, the average tailwind was 30 miles per hour. If the pilot spent a total of four hours in the air, what would the average speed of the courier plane be with no wind? Round your answer to the nearest mile per hour.

- 121 mph
- 118 mph
- 125 mph
- Cannot determine. To determine the average speed, you need the time it took for each leg of the trip, not the total time.

- ____ 37. The area of a rectangle is equal to $x^2 + 10x + 16$ square units. If the length of the rectangle is equal to $x + 8$ units, what expression represents its width?

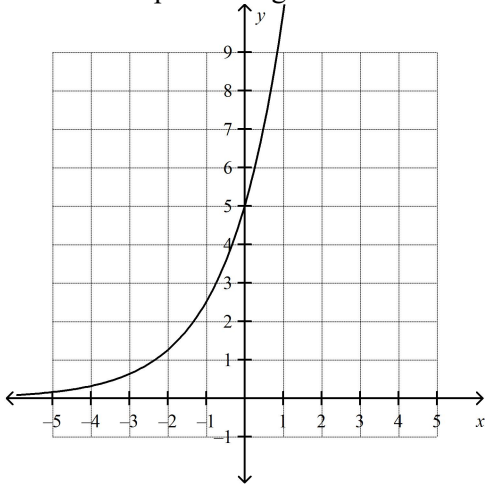
- | | |
|---------------|------------|
| a. $x + 4.00$ | c. $x + 2$ |
| b. $x - 2$ | d. $x + 8$ |

- ____ 38. Express $\log_3 27^{-3}$ as a product. Simplify, if possible.

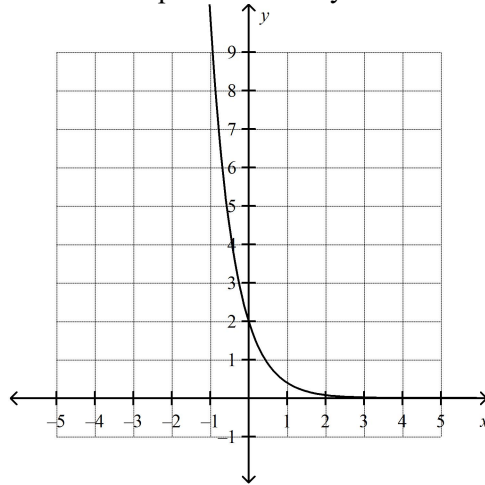
- | | |
|-------------------|-------|
| a. 3 | c. -9 |
| b. $\frac{1}{27}$ | d. 9 |

39. Tell whether the function $y = 2(5)^x$ shows growth or decay. Then graph the function.

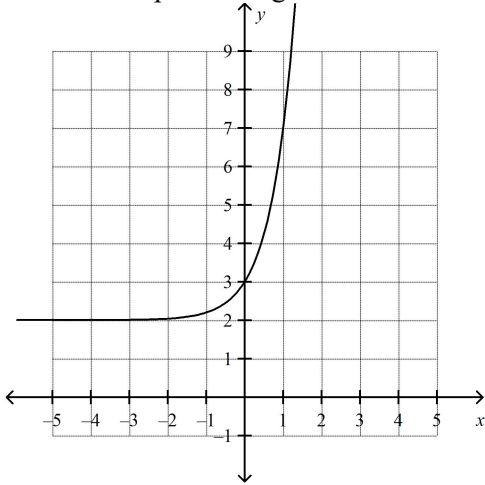
a. This is an exponential growth function.



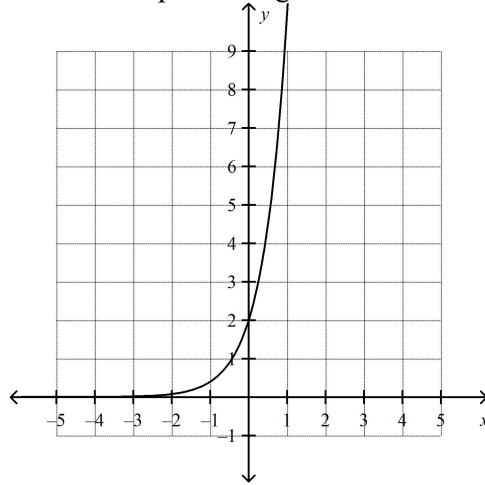
c. This is an exponential decay function.



b. This is an exponential growth function.



d. This is an exponential growth function.



40. Determine whether the set of odd whole numbers is closed under multiplication. Explain why the set is closed or provide a counterexample.

a. The set of odd whole numbers is closed under multiplication.

A whole number is odd if it contains no factors of 2. Therefore, if you multiply two odd whole numbers, the product cannot have a factor of 2, and the product is also an odd whole number.

b. The set of odd whole numbers is not closed under multiplication.

Counterexample: $6(5) = 30$, which is not an odd number.

41. Use a table and graph to solve $3^{2x} = 6561$.

a. $x = 8$

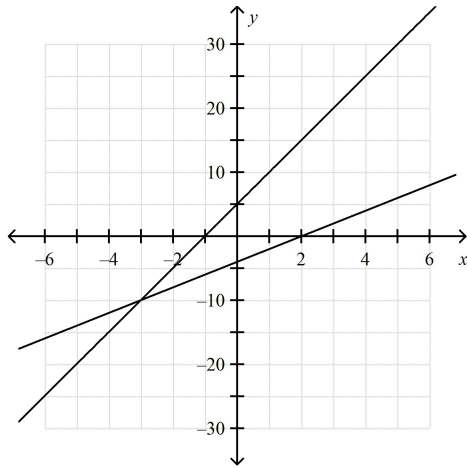
b. $x = 6.5$

c. $x = 4$

d. $x = 19$

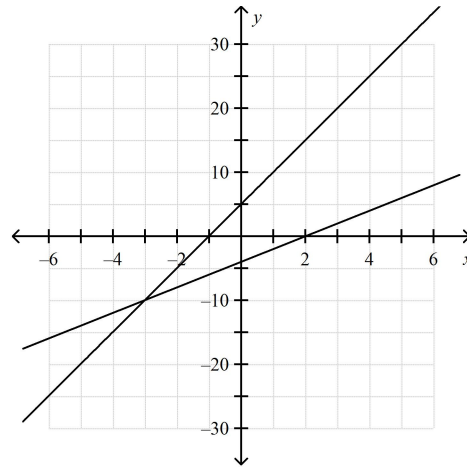
42. Solve $5x + 5 = 2x - 4$ graphically. Check your answer algebraically.

a.



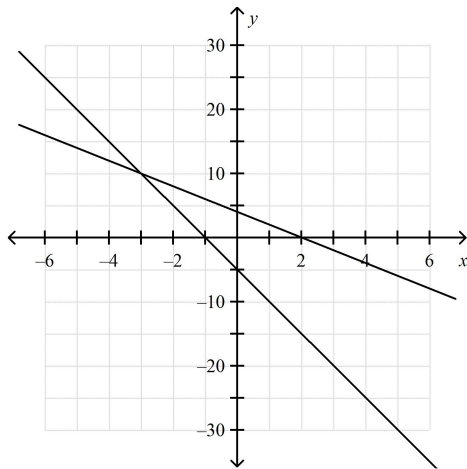
$x = -3$

c.



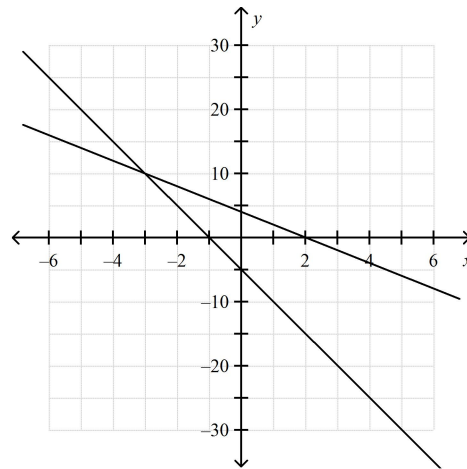
$x = -10$

b.



$x = 10$

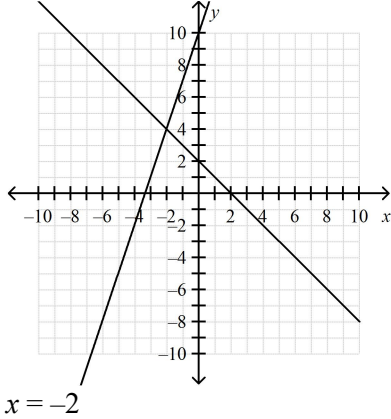
d.



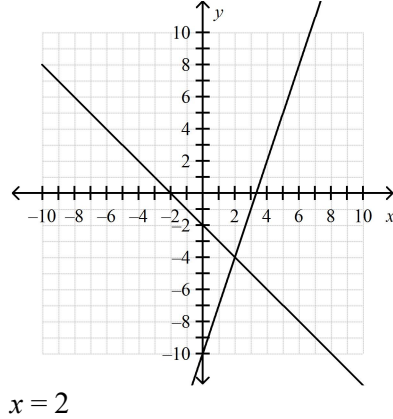
$x = -3$

43. Solve the equation graphically using technology.
 $2 - x = 3x + 10$

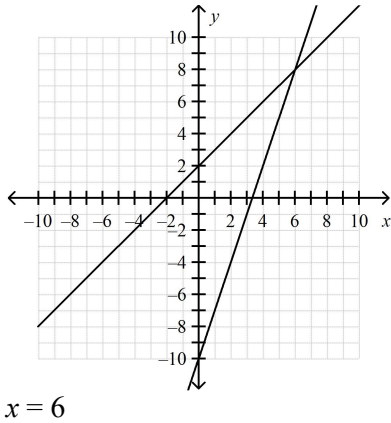
a.



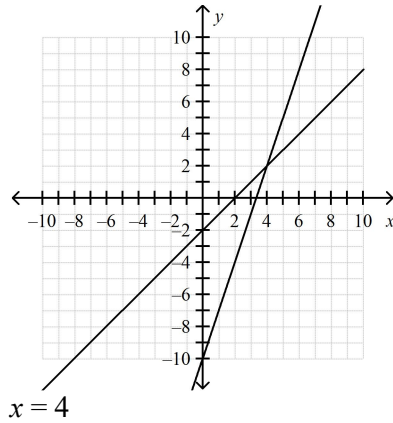
c.



b.



d.



44. A scientist studies a herd of mule deer to learn about their dietary habits. Identify the population and sample.

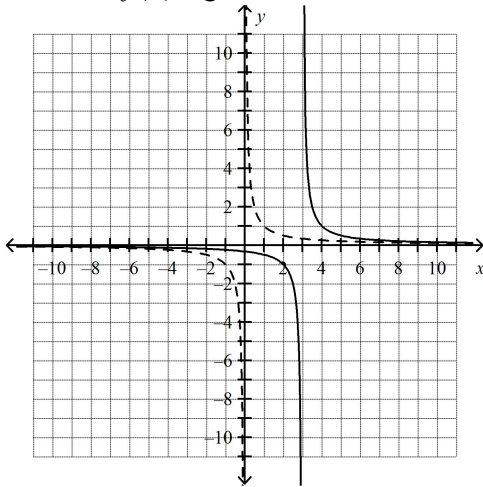
- a. Population: The deer in the herd being sampled
 Sample: All mule deer
- b. Population: All mule deer
 Sample: The deer in the herd being sampled

- _____ 47. Decide whether the sampling method could result in a biased sample. Explain your reasoning. The Candlelit-Dinner Candle Store surveys its Monday customers to find out their opinion on a new scented candle.
- The sample is probably not biased. It is a random sample.
 - The sample could be biased. The sample does not include customers who shop there on days other than Monday.
- _____ 48. The number of lawns l that a volunteer can mow in a day varies inversely with the number of shrubs s that need to be pruned that day. If the volunteer can prune 6 shrubs and mow 8 lawns in one day, then how many lawns can be mowed if there are only 3 shrubs to be pruned?
- 4 lawns
 - 11 lawns
 - 16 lawns
 - 5 lawns
- _____ 49. Manny is a plumber and charges \$50 when he visits a client and \$30 per hour for every hour he works. His bill can be expressed as a function of hours, x , with the function $f(x) = 50 + 30x$. Which statement explains the meaning of the inverse of the function?
- Cost per hour as a function of the total bill
 - Total bill as a function of the cost per hour
 - Number of hours as a function of the total bill
 - Total bill as a function of the number of hours
- _____ 50. Explain whether the situation is an experiment or an observational study. A researcher asks people how many hours they exercise per week and examines whether this affects the amount of sleep they get.
- This is an observational study. The researcher is applying a treatment (exercise) instead of simply gathering data.
 - This is an experiment. The researcher is applying a treatment (exercise) instead of simply gathering data.
 - This is an experiment. The researcher gathers data instead of applying a treatment.
 - This is an observational study. The researcher gathers data instead of applying a treatment.

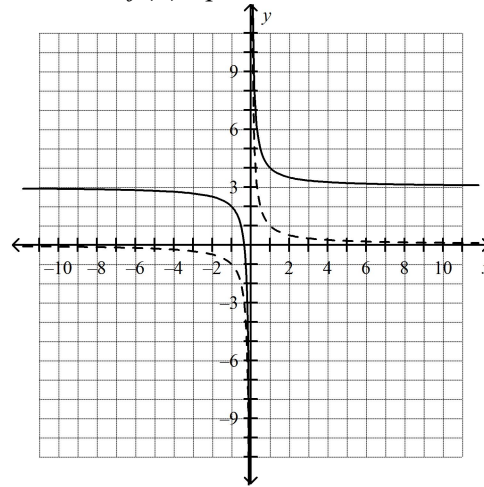
- _____ 51. In a game show, a contestant has 3 questions to answer in 3 different categories. (She does not lose any money for wrong answers.)
The Science question is worth \$1000, and she has a 30% chance of answering incorrectly without help.
The History question is worth \$1500, and she has a 40% chance of answering incorrectly without help.
The Math question is worth \$2000, and she has a 20% chance of answering incorrectly without help.
She can ask for help on two of the three questions.
Ask the Expert reduces her chance of answering any question incorrectly to 5%.
Simplify It cuts her probability of answering any question incorrectly in half.
- To maximize her expected winnings, on which question should the contestant use Ask the Expert? On which question should she use Simplify It? What are her expected winnings if she uses this strategy?
- Use Simplify It on the History question and Ask the Expert on the Math question.
Her expected winnings are \$3800.
 - Use Simplify It on the Science question and Ask the Expert on the History question.
Her expected winnings are \$3975.
 - Use Ask the Expert on the History question and Simplify It on the Math question.
Her expected winnings are \$3925.
 - Use Ask the Expert on the Science question and Simplify It on the History question.
Her expected winnings are \$3750.
- _____ 52. A speed reading course claims that it can boost reading speeds to 1050 words per minute.
In a random sample of 49 people who took the course, the average was 1020 words per minute, with a standard deviation of 90 words per minute. What is the z -value rounded to the nearest hundredth? Is there enough evidence to reject the claim?
- The z -value is -1.96 .
There is not enough evidence to reject the claim.
 - The z -value is -2.33 .
There is not enough evidence to reject the claim.
 - The z -value is -16.33 .
There is enough evidence to reject the claim.
 - The z -value is -2.33 .
There is enough evidence to reject the claim.

53. Using the graph of $f(x) = \frac{1}{x}$ as a guide, describe the transformation and graph $g(x) = \frac{1}{x} + 3$.

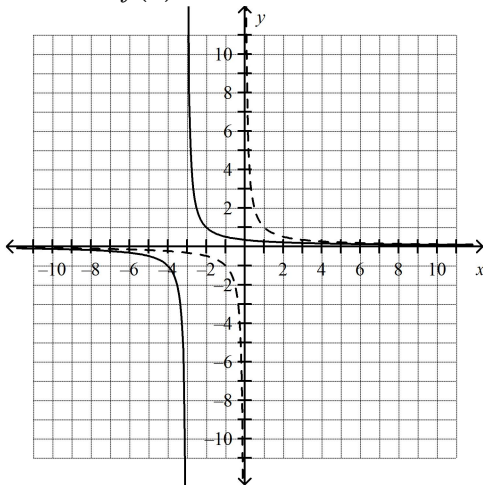
a. Translate $f(x)$ right 3 units.



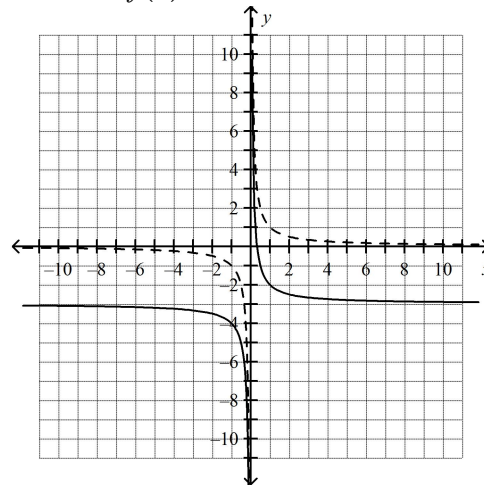
c. Translate $f(x)$ up 3 units.



b. Translate $f(x)$ left 3 units.



d. Translate $f(x)$ down 3 units.



54. Suppose x is a normally-distributed random variable with mean $\mu = 25$ and standard deviation $\sigma = 2$. Use the table to find the probability that $x > 22$. Express your answer as a decimal.

z	-2.5	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2	2.5
Area	0.01	0.02	0.07	0.16	0.31	0.5	0.69	0.84	0.93	0.98	0.99

- a. 0.7
 b. 0.07
 c. 0.93
 d. 0.84

55. Find the least common multiple for $6(x+1)^3(x-4)^2$ and $10(x+1)^8(x-4)^5$.

- a. $2(x+1)^8(x-4)^5$
 b. $30(x+1)^3(x-4)^2$
 c. $10(x+1)^3(x-4)^2$
 d. $30(x+1)^8(x-4)^5$

____ 56. A researcher is considering three methods of evaluating the effects of different fertilizers on corn production

Tell whether each method is a survey, an experiment, or an observational study. Then explain which method would be most reliable.

Method A: Monitor production on 200 randomly-chosen corn farms, and see how the fertilizers used on those farms affects production.

Method B: Randomly divide 200 corn farmers into two groups. Give each group a different type of fertilizer, and compare the amounts of corn produced.

Method C: Choose 200 corn farmers at random. Ask them which fertilizers they used and how they affected the amount of corn produced.

a. In method A, the researcher observes corn production, but does not impose a treatment. This is an observational study.

In method B, the researcher gives each group a treatment. This is an experiment.

In method C, the researcher asks questions about how fertilizers affect corn production.

This is a survey.

In method C, the farmers surveyed are randomly chosen, so they are not limited to just the two types of fertilizer used in method B. This method is the most reliable.

b. In method A, the researcher observes corn production, but does not impose a treatment. This is an observational study.

In method B, the researcher gives each group a treatment. This is an experiment.

In method C, the researcher asks questions about how fertilizers affect corn production.

This is a survey.

In method B, the members in each group are randomly chosen, so they are likely to be similar except for the type of fertilizer used. This method is the most reliable.

c. In method A, the researcher observes corn production, but does not impose a treatment. This is a survey.

In method B, the researcher gives each group a treatment. This is an experiment.

In method C, the researcher asks questions about how fertilizers affect corn production.

This is an observational study.

In method B, the members in each group are randomly chosen, so they are likely to be similar except for the type of fertilizer used. This method is the most reliable.

d. In method A, the researcher observes corn production, but does not impose a treatment. This is a survey.

In method B, the researcher gives each group a treatment. This is an experiment.

In method C, the researcher asks questions about how fertilizers affect corn production.

This is an observational study.

In method C, the farmers surveyed are randomly chosen, so they are not limited to just the two types of fertilizer used in method B. This method is the most reliable.

Name: _____

ID: A

____ 57. A initial investment of \$10,000 grows at 11% per year. What function represents the value of the investment after t years?

a. $f(t) = 10000(0.11)^t$

c. $f(t) = 10000(1.11)^t$

b. $f(t) = 10000(12)^t$

d. $f(t) = 10000(1.11)t$

Name: _____

ID: A

- ____ 58. A factory produces nails whose lengths have a mean of 2 inches and a standard deviation of 0.05 inches. Lengths of 18 nails are shown. Do the data appear to be normally distributed? Explain.

Nail Lengths (inches)					
2.01	2.06	2.01	2.07	1.99	2.11
1.99	1.96	1.93	1.93	2.04	1.98
2.03	1.97	1.98	2.01	1.94	2.02

- a. The data do not appear to be normally distributed. Most data values have a z -value near 2, so the distribution is skewed to the right.

z	Area below z	x	Projected values less than x	Actual values less than x
-2	0.2	1.90	0	0
-1	0.16	1.95	3	3
0	0.5	2.0	9	9
1	0.84	2.05	15	15
2	0.98	2.10	18	17

- b. The data do not appear to be normally distributed. All the data values have a z -value less than 2, so the distribution is skewed to the left.

z	Area below z	x	Projected values less than x	Actual values less than x
-2	0.2	1.90	0	0
-1	0.16	1.95	3	3
0	0.5	2.0	9	9
1	0.84	2.05	15	15
2	0.98	2.10	18	18

- c. The data appear to be normally distributed. The actual number of data values for each z -value is the same as the expected number.

z	Area below z	x	Projected values less than x	Actual values less than x
-2	0.2	1.90	0	0
-1	0.16	1.95	3	3
0	0.5	2.0	9	9
1	0.84	2.05	15	15
2	0.98	2.10	18	18

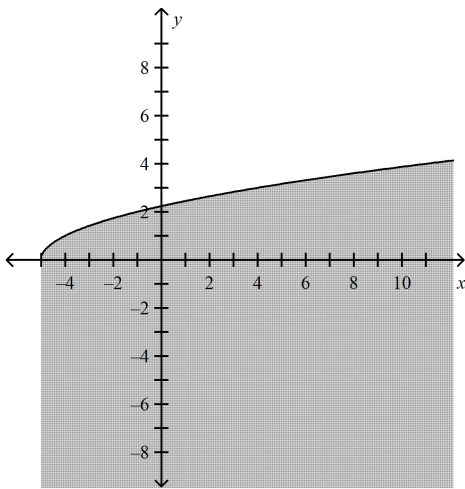
- d. The data appear to be normally distributed. The actual number of data values for each z -value is close to the expected number.

z	Area below z	x	Projected values less than x	Actual values less than x
-2	0.2	1.90	0	0
-1	0.16	1.95	3	3
0	0.5	2.0	9	9
1	0.84	2.05	15	15
2	0.98	2.10	18	17

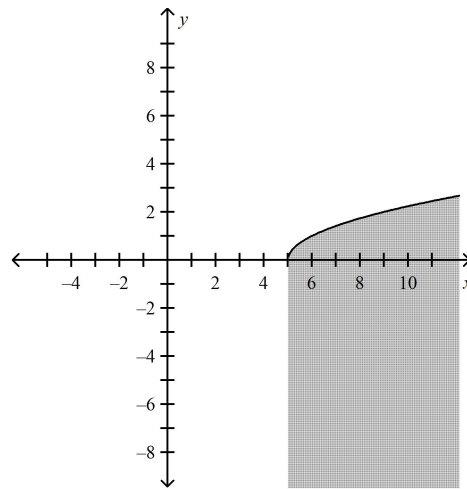
65. A factory produces 28,000 computer monitors per day. The manager of the factory claims that fewer than 870 defective computer monitors are produced each day. In a random sample of 200 computer monitors, there are 3 defective computer monitors. Determine whether the manager's claim is likely to be true. Explain.
- Yes, the manager's claim is likely to be true. Based on the data, you can predict that there are 420 defective computer monitors produced per day.
 - No, the manager's claim is not likely to be true. Based on the data, you can predict that there are 875 defective computer monitors produced per day.
 - No, the manager's claim is not likely to be true. Based on the data, you can predict that there are 880 defective computer monitors produced per day.
 - Yes, the manager's claim is likely to be true. Based on the data, you can predict that there are 425 defective computer monitors produced per day.

66. Graph the inequality $y \leq \sqrt{x-5}$

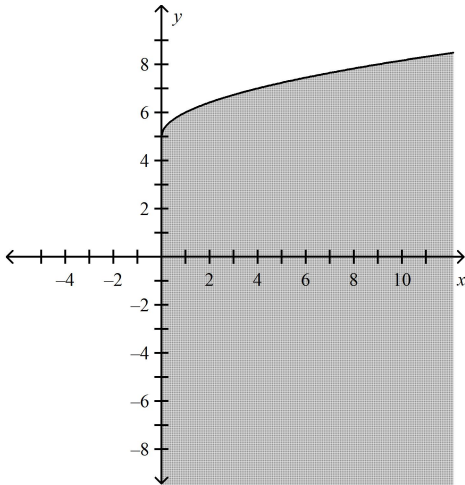
a.



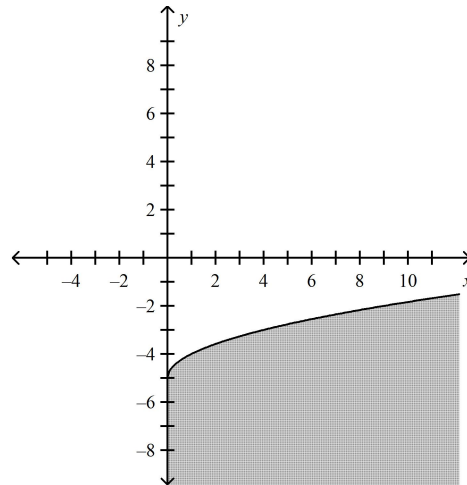
c.



b.



d.

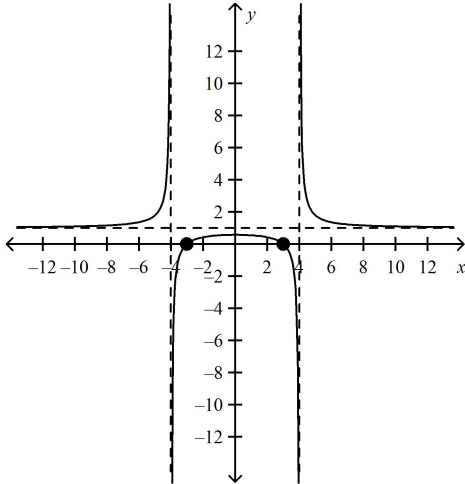


67. Identify the zeros and asymptotes of $f(x) = \frac{2x^2 - 18}{x^2 - 16}$. Then graph.

a. Zeros: -3 and 3

Vertical asymptotes: $x = -4, x = 4$

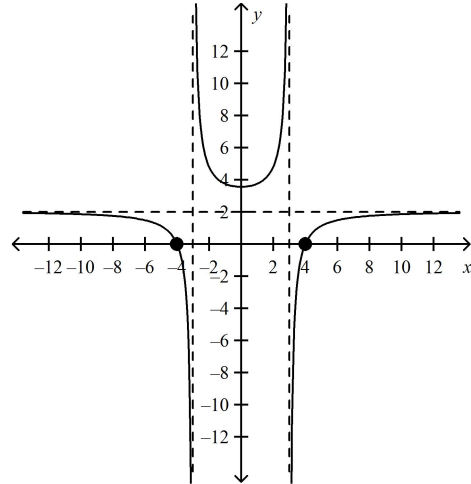
Horizontal asymptote: $y = 1$



c. Zeros: -4 and 4

Vertical asymptotes: $x = -3, x = 3$

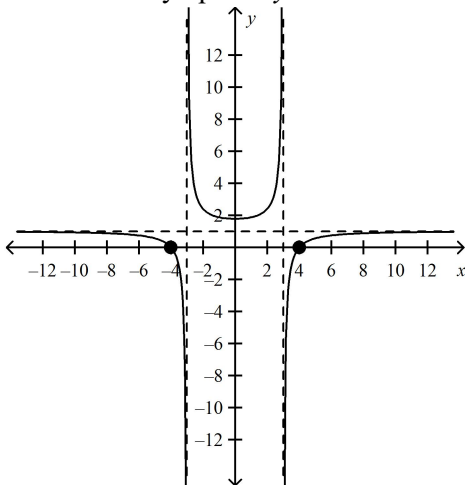
Horizontal asymptote: $y = 2$



b. Zeros: -4 and 4

Vertical asymptotes: $x = -3, x = 3$

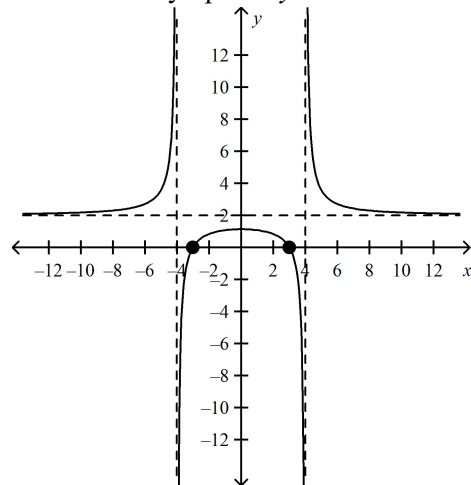
Horizontal asymptote: $y = 1$



d. Zeros: -3 and 3

Vertical asymptotes: $x = -4, x = 4$

Horizontal asymptote: $y = 2$



68. Solve $\sqrt{x+31} = x+1$.

a. $x = -6$

b. $x = 5$

c. No solution.

$\sqrt{x+31}$ is not defined for $x < -31$.

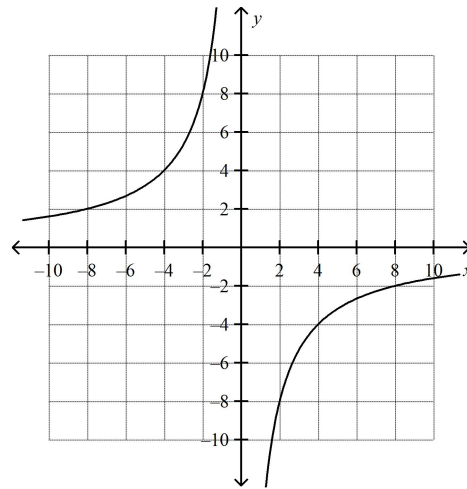
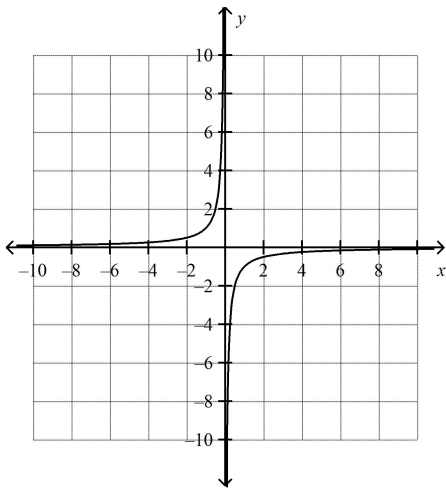
d. $x = 5$ or $x = -6$

- _____ 69. Simplify $\frac{10-x^2-3x}{x^2+2x-8}$. Identify any x -values for which the expression is undefined.
- $\frac{x+5}{x+4}$; The expression is undefined at $x = 2$ and $x = -4$.
 - $\frac{-x-5}{x+4}$; The expression is undefined at $x = -4$.
 - $\frac{x+5}{x+4}$; The expression is undefined at $x = -4$.
 - $\frac{-x-5}{x+4}$; The expression is undefined at $x = 2$ and $x = -4$.
- _____ 70. The pressure P of a gas varies inversely with the volume V of its container and directly with the temperature T . A certain gas has a pressure of 1.6 atmospheres with a volume of 14 liters and a temperature of 280 kelvins. If the gas is cooled to a temperature of 250 kelvins and the container is expanded to 16 liters, what will be the new pressure?
- 1.25 atmospheres
 - 1.57 atmospheres
 - 1.63 atmospheres
 - 1.60 atmospheres
- _____ 71. A wildlife biologist in Nova Scotia is testing the pH of stream water. She hopes that the pH of the water is greater than 5.5 so that Atlantic Salmon returning this year to their natal streams will be able to reproduce. The hydrogen ion concentration of the water is 0.0000019 moles per liter. To the nearest tenth, what is the pH of the water? (Recall that $\text{pH} = -\log[\text{H}^+]$.)
- 6.0
 - 6.0
 - 5.7
 - 1.9×10^{-6}
- _____ 72. Mira bought \$300 of Freerange Wireless stock in January of 1998. The value of the stock is expected to increase by 7.5% per year. Use a graph to predict the year the value of Mira's stock will reach \$700.
- 2009
 - 2004
 - 1999
 - 2014
- _____ 73. Decide whether the sampling method could result in a biased sample. Explain your reasoning. A TV station wants to get the opinions of viewers on the look of a new game-show set. The station's staff e-mails a survey to all viewers who have subscribed to their online program guide.
- The sample could be biased. Some people who watch the show do not subscribe to the program guide.
 - The sample is probably not biased. It is a random sample.
- _____ 74. Identify the asymptotes, domain, and range of the function $g(x) = \frac{1}{x+7} + 3$.
- Vertical asymptote: $x = 7$
Domain: $\{x|x \neq 7\}$
Horizontal asymptote: $y = 3$
Range: $\{y|y \neq 3\}$
 - Vertical asymptote: $x = -7$
Domain: $\{x|x \neq -7\}$
Horizontal asymptote: $y = 3$
Range: $\{y|y \neq 3\}$
 - Vertical asymptote: $x = 7$
Domain: $\{x|x \neq 7\}$
Horizontal asymptote: $y = -3$
Range: $\{y|y \neq -3\}$
 - Vertical asymptote: $x = -7$
Domain: $\{x|x \neq -7\}$
Horizontal asymptote: $y = -3$
Range: $\{y|y \neq -3\}$

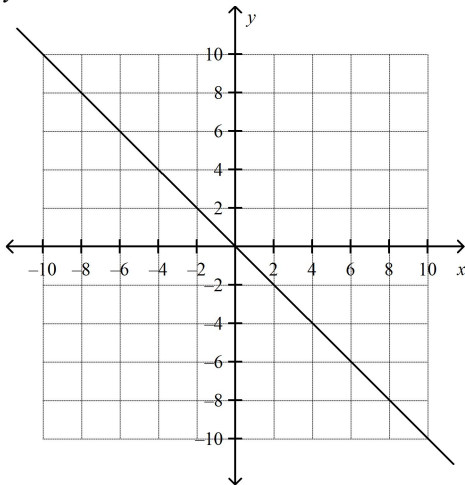
75. Solve $\sqrt{11x} = 3\sqrt{x+2}$.
- a. $x = 11$
 - b. $x = 14$
 - c. $x = 18$
 - d. $x = 9$

76. An oil company plans to add a chemical to its gasoline to make it burn more cleanly. The company conducts an experiment to see whether adding the chemical affects the gasoline mileage of cars using their gasoline. State the null hypothesis for the experiment.
- a. Adding the chemical affect gasoline mileage.
 - b. Adding the chemical increases gasoline mileage.
 - c. Adding the chemical decreases gasoline mileage.
 - d. Adding the chemical does not affect gasoline mileage.

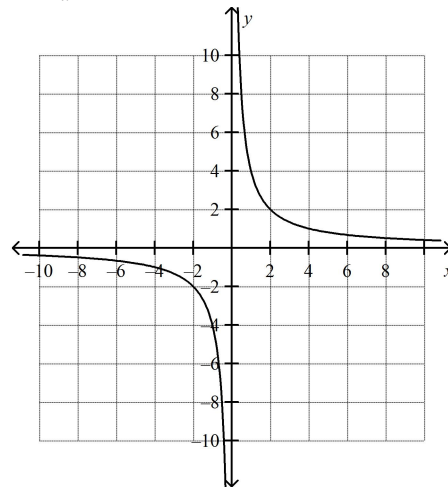
77. Given: y varies inversely as x , and $y = 4$ when $x = -4$. Write and graph the inverse variation function.
- a. $y = -\frac{1}{x}$
 - c. $y = -\frac{16}{x}$



b. $y = -x$



d. $y = \frac{4}{x}$



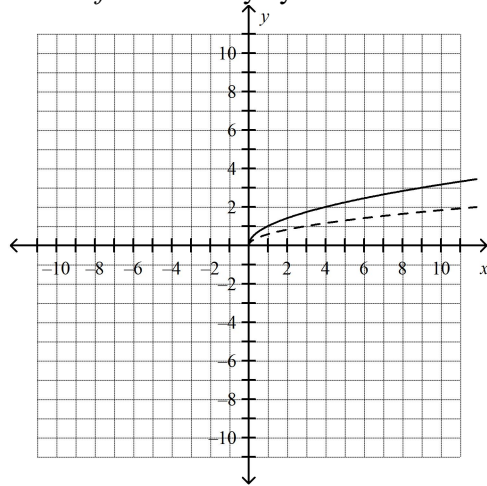
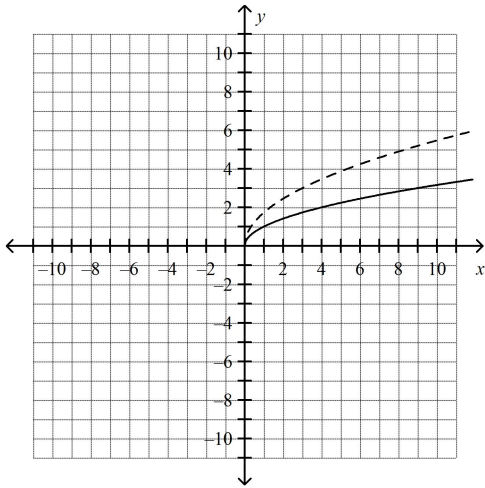
- _____ 78. Determine if the set of polynomials is closed under division. Explain why or why not.
- The set of polynomials is closed under division.
Since the set of polynomials is closed under multiplication, and division is the inverse operation for multiplication, the set of polynomials is also closed under division.
 - The set of polynomials is not closed under division.
Let $f(x)$ and $g(x)$ be polynomial expressions where $g(x)$ is not equal to zero.
By the definition of polynomial expressions, $\frac{f(x)}{g(x)}$ is *not* a polynomial expression, so the set of polynomials is not closed under division. (The quotient of two polynomial expressions is a rational expression.)
 - The set of polynomials is not closed under division.
Let $f(x)$ and $g(x)$ be polynomial expressions where $g(x)$ is not equal to zero.
Then $\frac{f(x)}{g(x)}$ is undefined if $g(x) = 0$. In this case, $\frac{f(x)}{g(x)}$ is *not* a rational expression, so the set of polynomials is not closed under division.
 - The set of polynomials is closed under division.
Just as multiplication is repeated addition, division is repeated subtraction. Since polynomials are closed under subtraction, they are also closed under division.
- _____ 79. Use inverse operations to write the inverse of $f(x) = x + \frac{2}{3}$.
- $f^{-1}(x) = x + \frac{2}{3}$
 - $f^{-1}(x) = x - \frac{2}{3}$
 - $f^{-1}(x) = x - \frac{1}{3}$
 - $f^{-1}(x) = x + \frac{1}{3}$
- _____ 80. Simplify $\ln e^{-5x}$.
- $-5x$
 - e^{-5x}
 - e^{-5}
 - -5
- _____ 81. Determine whether the set of even whole numbers is closed under subtraction. Explain why the set is closed or provide a counterexample.
- The set of even whole numbers is closed under subtraction.
Any even whole number can be written as 2 times a whole number. Let $2a$ and $2b$ be even whole numbers. Then $2a - 2b = 2(a - b)$, which is also an even whole number.
 - The set of even whole numbers is not closed under subtraction.
Counterexample: $4 - 6 = -2$, which is not a whole number.
- _____ 82. Evaluate $\log_4 \frac{1}{16}$ by using mental math.
- -2
 - 2
 - $\frac{1}{4}$
 - 4

83. The data $\{1, 5, 8, 5, 1\}$ represent a random sample of the number of days absent from school for five students at Monta Vista High. Find the mean and the standard deviation of the data.
- The mean is 4, and the standard deviation is about 2.68.
 - The mean is 4.4, and the standard deviation is about 2.76.
 - The mean is 4, and the standard deviation is about 7.2.
 - The mean is 20, and the standard deviation is about 7.6.

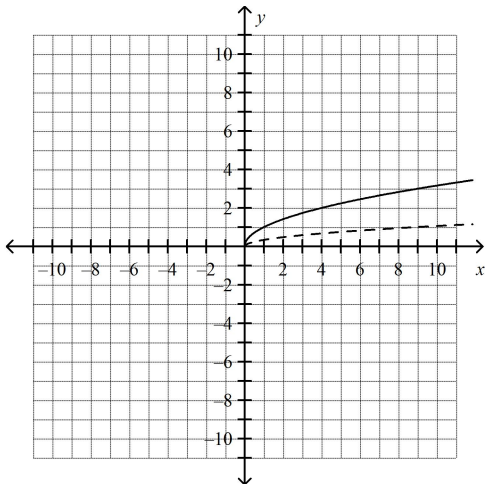
84. Solve the inequality $\frac{5}{x+3} < 6$ algebraically.

- | | |
|------------------------------------|-----------------------------|
| a. $x < -3$ or $x > -\frac{13}{6}$ | c. $-3 < x < -\frac{13}{6}$ |
| b. $x < -\frac{13}{6}$ or $x > -3$ | d. $-\frac{13}{6} < x < -3$ |

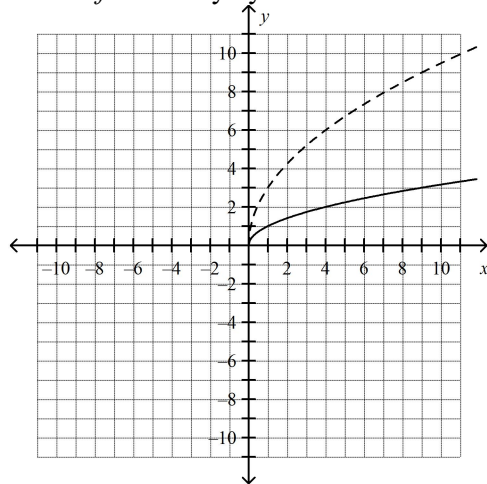
85. Using the graph of $f(x) = \sqrt{x}$ as a guide, describe the transformation and graph $g(x) = \sqrt{3x}$.
- Compress f horizontally by a factor of $\frac{1}{3}$.
 - Stretch f horizontally by a factor of 3.



- b. Compress f vertically by a factor of $\frac{1}{3}$.



- d. Stretch f vertically by a factor of 3.



86. Solve $(-3x + 18)^{\frac{1}{2}} = x$.
- a. $x = -6$ or $x = 3$ c. $x = -6$
 b. $x = 6$ or $x = -3$ d. $x = 3$
87. The parent function $f(x) = \sqrt{x}$ is stretched horizontally by a factor of 4, reflected across the y -axis, and translated left 2 units. Write the square-root function g .
- a. $g(x) = \sqrt{-\frac{1}{4}(x-2)}$ c. $g(x) = -\sqrt{\frac{1}{4}(x+2)}$
 b. $g(x) = \sqrt{-4(x+2)}$ d. $g(x) = \sqrt{-\frac{1}{4}(x+2)}$
88. Jeremy and Ahmed are painting a wall. Working alone, Jeremy can paint $\frac{1}{4}$ of the wall in 1 hour. Working together, Jeremy and Ahmed can paint the entire wall in 80 minutes. How long would it take Ahmed to paint the entire the wall by himself?
- a. 4 hours c. 30 minutes
 b. 80 minutes d. 2 hours
89. The diagrams show the locations where surveyors from Tino's Auto Parts talked to a sample of people about their cars. Classify the sample shown in each diagram.

Diagram 1

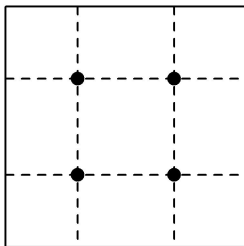


Diagram 2

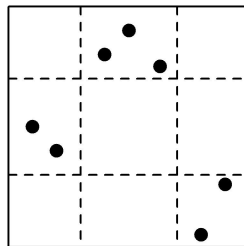
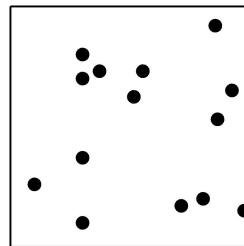


Diagram 3



- a. Diagram 1: simple random
 Diagram 2: stratified
 Diagram 3: systematic
- b. Diagram 1: systematic
 Diagram 2: simple random
 Diagram 3: stratified
- c. Diagram 1: systematic
 Diagram 2: stratified
 Diagram 3: simple random
- d. Diagram 1: stratified
 Diagram 2: systematic
 Diagram 3: simple random

90. Evaluate $\log_9 243$. If necessary, round your answer to the nearest tenth.
- a. 27 c. 2.5
 b. 3 d. 1.4

91. Which of the following is true about these two data sets?

$\{71, 71, 75, 77, 83, 91, 92\}$ and $\{73, 75, 76, 76, 83, 87, 90\}$

- a. The means are equal. c. The ranges are equal.
 b. The variances are equal. d. The medians are equal.

- _____ 92. The amount of money in a bank account can be expressed by the exponential equation $A = 300(1.005)^{12t}$ where A is the amount in dollars and t is the time in years. About how many years will it take for the amount in the account to be more than \$900?
- a. 37 years
b. 30 years
c. 221 years
d. 19 years

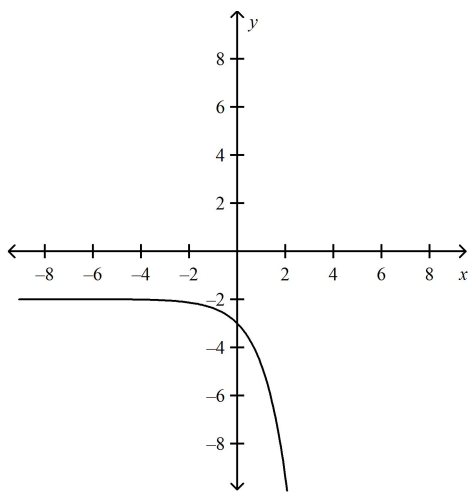
- _____ 93. At a school carnival, you can win tickets to trade for prizes. A particular game has 5 possible outcomes. What is the expected number of tickets won?

Tickets won	18	38	45	70	91
Probability	0.32	0.26	0.19	0.14	0.09

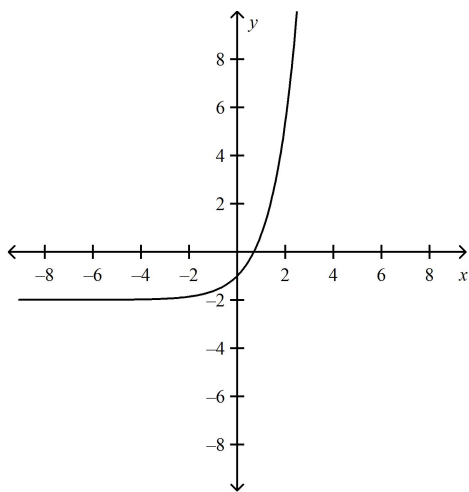
- a. 42.18
b. 58.24
c. 62.81
d. 52.4
- _____ 94. Solve $b^{x-2} < c$.
- a. $x < \frac{\log b}{\log c} + 2$
b. $x < \frac{c}{\log b} + 2$
c. $x < \frac{\log c}{b} + 2$
d. $x < \frac{\log c}{\log b} + 2$

95. Graph $f(x) = e^x + 2$.

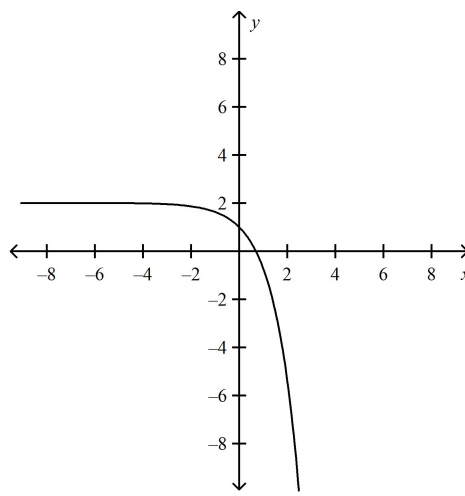
a.



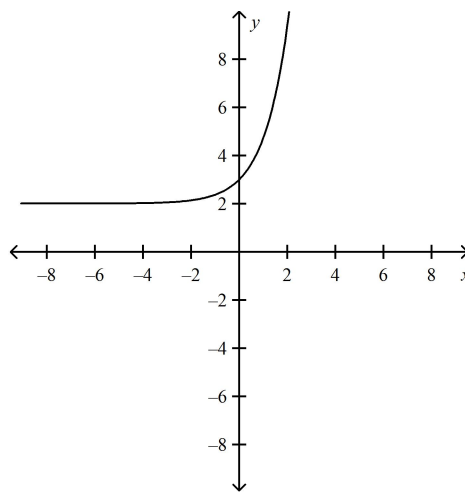
b.



c.



d.



96. Divide $\frac{5x^3}{3x^2y} \div \frac{25}{3y^9}$. Assume that all expressions are defined.

a. $\frac{xy^8}{5}$

c. $\frac{125x}{9y^{10}}$

b. $\frac{x}{5y^8}$

d. $\frac{5}{xy^8}$

97. Write the exponential equation $2^3 = 8$ in logarithmic form.

a. $\log_2 8 = 3$

c. $\log_3 8 = 2$

b. $\log_8 2 = 3$

d. $\log_2 3 = 8$

- _____ 98. In 2009, 1672 cats, 1114 dogs, and 639 other animals (such as rabbits and hamsters) were adopted at an animal shelter. The shelter president wants to survey the people who adopted pets. Classify each sampling method. Which is most accurate? Which is least accurate? Explain your reasoning.

Method A: Leave 300 surveys at the adoption desk for people to pick up and fill out.

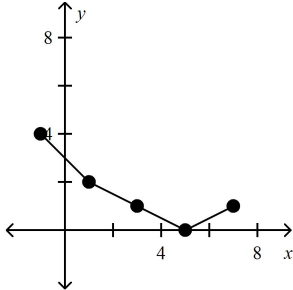
Method B: Randomly select 300 people from all of the people who adopted pets.

Method C: Randomly select 100 people who adopted cats, 100 who adopted dogs, and 100 who adopted other animals.

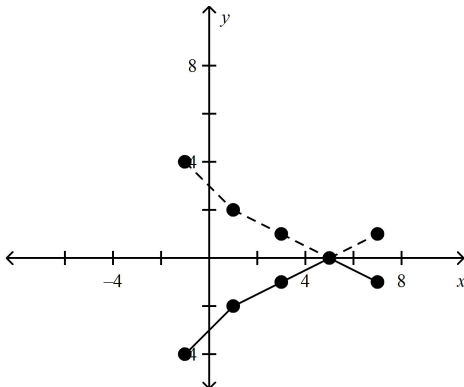
- a. Method A is a simple random sample; Method B is a stratified sample, and Method C is a self-selected sample.
Method C is the most accurate because it includes an equal number of people for each type of pet.
Method A is the least accurate because it is likely to overrepresent cat adopters.
- b. Method A is a self-selected sample; Method B is a simple random sample, and Method C is a stratified sample.
Method B is the most accurate because every member of the population is equally likely to be included.
Method A is the least accurate because it is likely to overrepresent or underrepresent certain types of people--for instance, people who adopt on weekends may have more time to fill out a survey than those who adopt on weekdays.
- c. Method A is a self-selected sample; Method B is a simple random sample, and Method C is a stratified sample.
Method C is the most accurate because it includes an equal number of people for each type of pet.
Method A is the least accurate because it is the most likely to include only cat and dog adopters.
- d. Method A is a stratified sample; Method B is a simple random sample, and Method C is a self-selected sample.
Method B is the most accurate because every member of the population is equally likely to be included.
Method C is the least accurate because it underrepresents people who adopted cats..

99. Graph the inverse of the relation. Identify the domain and range of the inverse.

x	-1	1	3	5	7
y	4	2	1	0	1

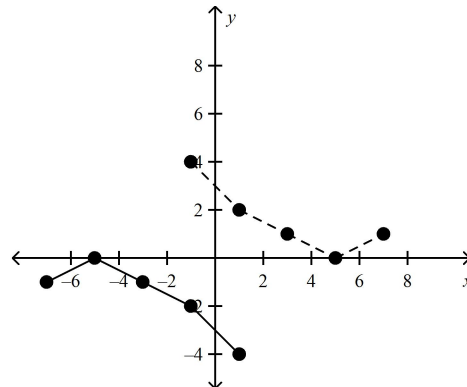


a.



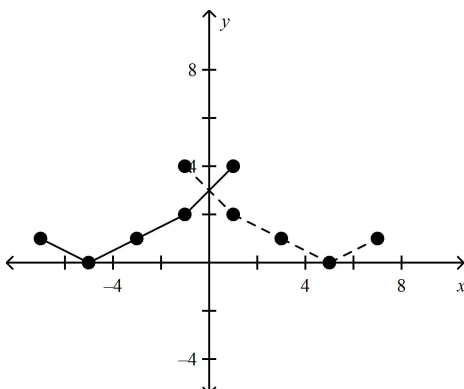
Domain: $\{x \mid -1 \leq x \leq 7\}$;
Range: $\{y \mid -4 \leq y \leq 1\}$

c.



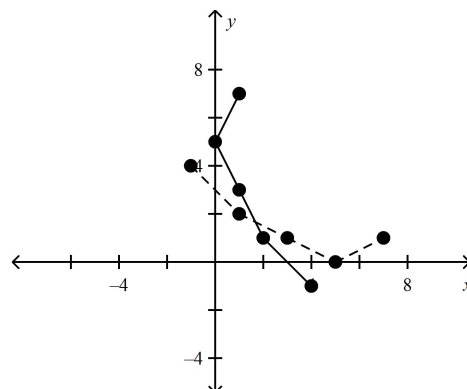
Domain: $\{x \mid -7 \leq x \leq 1\}$;
Range: $\{y \mid -4 \leq y \leq 0\}$

b.



Domain: $\{x \mid -7 \leq x \leq 1\}$;
Range: $\{y \mid 0 \leq y \leq 4\}$

d.



Domain: $\{x \mid 0 \leq x \leq 4\}$;
Range: $\{y \mid -1 \leq y \leq 7\}$

100. Solve $\sqrt{6x-2} \leq 3$.

a. $\frac{1}{3} \leq x \leq \frac{5}{6}$

b. $\frac{1}{3} \leq x \leq \frac{11}{6}$

c. $x \leq \frac{11}{6}$

d. $x \leq \frac{5}{6}$

GSE AA Final Exam Practice Answer Section

MULTIPLE CHOICE

1. ANS: D

$$A = Pe^{rt}$$

$$A = 6000e^{0.05(8)}$$

$$A \approx 8950.95$$

Substitute 6,000 for P , 0.05 for r , and 8 for t .Use the $[e^x]$ key on a calculator.

The total amount after 8 years is \$8950.95.

	Feedback
A	Use the formula for continuously compounded interest. Don't add 6000.
B	5% = 0.05
C	Check the answer on your calculator.
D	Correct!

PTS: 1

DIF: 2

REF: 1663716a-4683-11df-9c7d-001185f0d2ea

OBJ: 9-3.3 Application

NAT: NT.CCSS.MTH.10.9-12.F.LE.4

STA: MCC9-12.F.BF.5

LOC: MTH.C.10.05.03.05.005

TOP: 9-3 The Natural Base, e

DOK: DOK 3

2. ANS: B

Arrange the expressions so like terms are together: $\frac{8 \cdot 9(x^4 \cdot x)(y^2 \cdot y^2)z^6}{3 \cdot 4 \cdot z^3 y^4}$.

Multiply the numerators and denominators, remembering to add exponents when multiplying: $\frac{72x^5 y^4 z^6}{12z^3 y^4}$.

Divide, remembering to subtract exponents: $6x^5 y^0 z^3$.

Since $y^0 = 1$, this expression simplifies to $6x^5 z^3$.

	Feedback
A	Multiply, then simplify.
B	Correct!
C	A variable raised to the 0 power simplifies to 1.
D	When dividing powers with the same base, subtract the exponents.

PTS: 1

DIF: 1

REF: 16a16ec2-4683-11df-9c7d-001185f0d2ea

OBJ: 6-2.3 Multiplying Rational Expressions

NAT: NT.CCSS.MTH.10.9-12.A.APR.7

STA: MCC9-12.A.APR.7

LOC: MTH.C.10.05.09.012

TOP: 6-2 Multiplying and Dividing Rational Expressions

DOK: DOK 2

3. ANS: B

Make a table of values. Plot enough ordered pairs to see the shape of the curve. Choose both negative and positive values for x .

x	$4\sqrt[3]{x+5}$	$(x, f(x))$
-13	$4\sqrt[3]{-13+5} = 4\sqrt[3]{-8} = -8$	$(-13, -8)$
-6	$4\sqrt[3]{-6+5} = 4\sqrt[3]{-1} = -4$	$(-6, -4)$
-5	$4\sqrt[3]{-5+5} = 4\sqrt[3]{0} = 0$	$(-5, 0)$
-4	$4\sqrt[3]{-4+5} = 4\sqrt[3]{1} = 4$	$(-4, 4)$
3	$4\sqrt[3]{3+5} = 4\sqrt[3]{8} = 8$	$(3, 8)$

The domain is the set of all real numbers. The range is also the set of all real numbers.

	Feedback
A	You reversed the values of the numbers under the radical sign and outside of it when graphing the function.
B	Correct!
C	The function whose graph you need to draw is a product of a number and a cube root.
D	The function whose graph you need to draw is a product of a number and a cube root.

PTS: 1 DIF: 2 REF: 16cebb96-4683-11df-9c7d-001185f0d2ea

OBJ: 7-1.1 Graphing Radical Functions NAT: NT.CCSS.MTH.10.9-12.F.IF.7.b

STA: MCC9-12.F.IF.5

LOC: MTH.C.10.07.10.002 | MTH.C.10.07.10.003 | MTH.C.10.07.10.005

TOP: 7-1 Radical Functions

DOK: DOK 2

4. ANS: C

$$\frac{2x^2 - 48}{(x-4)(x+4)} - \frac{x+6}{x+4}$$

Factor the denominators.

$$= \frac{2x^2 - 48}{(x-4)(x+4)} - \frac{x+6}{x+4} \left(\frac{x-4}{x-4} \right)$$

The LCD is $(x-4)(x+4)$, so multiply $\frac{x+6}{x+4}$ by

$$\frac{x-4}{x-4}.$$

$$= \frac{2x^2 - 48 - (x+6)(x-4)}{(x-4)(x+4)}$$

Subtract the numerators.

$$= \frac{2x^2 - 48 - (x^2 + 2x - 24)}{(x-4)(x+4)}$$

Multiply the binomials in the numerator.

$$= \frac{2x^2 - 48 - x^2 - 2x + 24}{(x-4)(x+4)}$$

Distribute the negative sign.

$$= \frac{x^2 - 2x - 24}{(x-4)(x+4)}$$

Write the numerator in standard form.

$$= \frac{(x-6)(x+4)}{(x-4)(x+4)} = \frac{x-6}{x-4}$$

Factor the numerator, and divide out common factors.

The expression is undefined at $x = 4$ and $x = -4$ because these values of x make the factors $(x-4)$ and $(x+4)$ equal 0.

	Feedback
A	Check your distribution of the negative sign.
B	Did you factor the numerator and divide out common factors correctly?
C	Correct!
D	Did you factor the numerator and divide out common factors correctly?

PTS: 1

DIF: 2

REF: 16ab1f42-4683-11df-9c7d-001185f0d2ea

OBJ: 6-3.4 Subtracting Rational Expressions

NAT: NT.CCSS.MTH.10.9-12.A.APR.7

STA: MCC9-12.A.APR.7

LOC: MTH.C.10.05.09.010

TOP: 6-3 Adding and Subtracting Rational Expressions

DOK: DOK 2

5. ANS: D

	Feedback
A	Is there enough evidence to reject the claim?
B	Check the z -value.
C	Check the z -value.
D	Correct!

PTS: 1

DIF: 2

REF: 909622b3-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-1.2 Using a z -Test

NAT: NT.CCSS.MTH.10.9-12.S.IC.5

STA: MCC9-12.S.IC.5 | MCC9-12.S.IC.6

TOP: 2-1 Sampling of Experimental Results

KEY: significance | experiment | z -test

DOK: DOK 3

6. ANS: C

	Feedback
A	Check the counterexample.If $x = 0$, is the counterexample valid?
B	Check the counterexample.
C	Correct!
D	Check the counterexample.

PTS: 1 DIF: 3 REF: 905aace0-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 6-3-Ext.4 Determining Closure of Rational Expressions NAT: NT.CCSS.MTH.10.9-12.A.APR.7
 STA: MCC9-12.A.APR.7 TOP: 6-3-Ext Polynomials, Rational Expressions, and Closure
 KEY: rational expressions | closure DOK: DOK 3

7. ANS: A

	Feedback
A	Correct!
B	Check for bias in the survey method.
C	Is the new sampling method likely to produce a representative sample?
D	Check for bias in the survey method.

PTS: 1 DIF: 3 REF: 90857236-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-2.4 Using Data to Make Decisions
 NAT: NT.CCSS.MTH.10.9-12.S.IC.1 | NT.CCSS.MTH.10.9-12.S.MD.6
 STA: MCC9-12.S.IC.1 | MCC9-12.S.MD.7 TOP: 1-2 Data Gathering
 KEY: decisions | sampling | bias DOK: DOK 4

8. ANS: A

	Feedback
A	Correct!
B	This is the number of defect-free players in the 400 that were originally tested. Predict the number of defect-free players in a shipment of 800 players.
C	Check that you calculated the failure rate correctly.
D	This is the number of players that are likely to <i>have</i> defects. Predict the number that do <i>not</i> have defects.

PTS: 1 DIF: 2 REF: 9080ad80-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-2.3 Using Data to Make Predictions NAT: NT.CCSS.MTH.10.9-12.S.IC.1
 STA: MCC9-12.S.IC.1 | MCC9-12.S.IC.4 TOP: 1-2 Data Gathering
 KEY: sample | prediction from a sample DOK: DOK 3

9. ANS: A

The outlier is 14. The outlier in the data set causes the mean to decrease from about 69.4 to about 66.3 and the standard deviation to increase from about 13.7 to about 18.6.

	Feedback
A	Correct!
B	An outlier is an extreme value that is much less than or much greater than the other data values.
C	First, find the outlier. Then, compare the mean and standard deviation with and without the outlier.
D	Use a graphing calculator to help you.

PTS: 1 DIF: 2 REF: 17af006e-4683-11df-9c7d-001185f0d2ea

OBJ: 1-1.5 Examining Outliers NAT: NT.CCSS.MTH.10.9-12.S.ID.3

STA: MCC9-12.S.ID.3

LOC: MTH.C.13.04.02.01.009 | MTH.C.13.04.02.02.013 | MTH.C.13.04.02.02.014

TOP: 1-1 Measures of Central Tendency and Variation DOK: DOK 3

10. ANS: A

	Feedback
A	Correct!
B	A sample is part of the population.

PTS: 1 DIF: 1 REF: 90772414-6ab2-11e0-9c90-001185f0d2ea

NAT: NT.CCSS.MTH.10.9-12.S.IC.1 STA: MCC9-12.S.IC.4

TOP: 1-2 Data Gathering

KEY: survey | population | sample

DOK: DOK 2

11. ANS: A

	Feedback
A	Correct!
B	Check that you graphed the line correctly.
C	Check that you graphed the functions correctly.
D	Check that you graphed the functions correctly.

PTS: 1 DIF: 2 REF: 905f4c86-6ab2-11e0-9c90-001185f0d2ea

OBJ: 7-2-Ext.1 Solving Equations Algebraically and Graphically

STA: MCC9-12.A.REI.11

TOP: 7-2-Ext Solving Equations Graphically

KEY: solving by graphing | quadratic equation

DOK: DOK 1

12. ANS: C

	Feedback
A	The nutritionist is prescribing a treatment to some subjects and using the others as a control group.
B	The nutritionist is prescribing a treatment to some subjects and using the others as a control group.
C	Correct!
D	In an observational study, the researcher gathers data instead of specifying a treatment.

PTS: 1 DIF: 1 REF: 9087d491-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-3.1 Identifying Experiments and Observational Studies NAT: NT.CCSS.MTH.10.9-12.S.IC.3
 STA: MCC9-12.S.IC.3 TOP: 1-3 Surveys, Experiments, and Observational Studies
 KEY: experiment | observational study DOK: DOK 2

13. ANS: D

$$x(x) - 9(x) = -\frac{18}{x}(x) \quad \text{Multiply each term by the LCD.}$$

$$x^2 - 9x = -18 \quad \text{Simplify. Note } x \neq 0$$

$$x^2 - 9x + 18 = 0 \quad \text{Write in standard form.}$$

$$(x - 3)(x - 6) = 0 \quad \text{Factor.}$$

$$x - 3 = 0 \text{ or } x - 6 = 0 \quad \text{Apply the Zero-Product Property.}$$

$$x = 3 \text{ or } x = 6 \quad \text{Solve for } x.$$

Check:

$$x - 9 = -\frac{18}{x} \qquad x - 9 = -\frac{18}{x}$$

$\begin{array}{r} 3 - 9 \\ -6 \end{array}$	$\begin{array}{r} -\frac{18}{3} \\ -6 \end{array}$	$\begin{array}{r} 6 - 9 \\ -3 \end{array}$	$\begin{array}{r} -\frac{18}{6} \\ -3 \end{array}$
--	--	--	--

	Feedback
A	Multiply each term by the LCD. Then solve the resulting quadratic equation. There may be more than one solution.
B	Multiply each term by the LCD. Then solve the resulting quadratic equation.
C	Multiply each term by the LCD. Then solve the resulting quadratic equation. There may be more than one solution.
D	Correct!

PTS: 1 DIF: 2 REF: 16b9465a-4683-11df-9c7d-001185f0d2ea
 OBJ: 6-5.1 Solving Rational Equations NAT: NT.CCSS.MTH.10.9-12.A.REI.2
 STA: MCC9-12.A.REI.2 LOC: MTH.C.10.06.06.01.002
 TOP: 6-5 Solving Rational Equations and Inequalities DOK: DOK 3

14. ANS: B

$$3.6 = -\left(\frac{100}{9}\right)\log\frac{P}{31}$$

Substitute 3.6 for h .

$$-\frac{9}{100}(3.6) = \log\frac{P}{31}$$

Multiply both sides by $-\frac{9}{100}$.

$$-0.324 = \log\frac{P}{31}$$

Simplify.

$$-0.324 = \log P - \log 31$$

Apply the Quotient Property of Logarithms.

$$-0.324 = \log P - 1.491$$

Calculate.

$$1.167 = \log P$$

Add 1.491 to both sides.

$$P = 10^{1.167}$$

Apply the Inverse Property of Exponents and Logarithms.

$$P \approx 14.7$$

Calculate.

	Feedback
A	You are given B , the pressure at sea level, and need to find P .
B	Correct!
C	Use the fact that $\log(a/b) = \log a - \log b$.
D	Use the Inverse Property of Exponents and Logarithms.

PTS: 1

DIF: 2

REF: 16552342-4683-11df-9c7d-001185f0d2ea

OBJ: 9-1.6 Application

NAT: NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.BF.5 | MCC9-12.F.LE.4

LOC: MTH.C.10.05.11.02.004

TOP: 9-1 Properties of Logarithms

DOK: DOK 3

15. ANS: A

	Feedback
A	Correct!
B	A group of people is not a treatment. The treatment is the behavior, medication, etc. assigned to a group.
C	Having fewer calories is a result, not a treatment.
D	The people in the treatment group are told to brush for two minutes twice a day.

PTS: 1

DIF: 2

REF: 9087fba1-6ab2-11e0-9c90-001185f0d2ea

OBJ: 1-3.2 Evaluating a Published Report

NAT: NT.CCSS.MTH.10.9-12.S.IC.3

STA: MCC9-12.S.IC.3 | MCC9-12.S.IC.6

TOP: 1-3 Surveys, Experiments, and Observational Studies

KEY: experiment | control group | treatment group

DOK: DOK 3

16. ANS: A

$$\frac{2x}{x^2 - 7x - 18} = \frac{6x}{x^2 + x - 2}$$

$$\frac{2x}{(x+2)(x-9)} = \frac{6x}{(x+2)(x-1)}$$

$$2x(x-1) = 6x(x-9)$$

$$2x^2 - 2x = 6x^2 - 54x$$

$$4x^2 - 52x = 0$$

$$4x(x-13) = 0$$

$$4x = 0 \text{ or } x - 13 = 0$$

$$x = 0 \text{ or } x = 13$$

Factor the denominator.

Multiply each term by the LCD $(x+2)(x-9)(x-1)$ and simplify. Note that $x \neq -2$, $x \neq 9$, and $x \neq 1$.

Use the Distributive Property.

Write in standard form.

Factor.

Use the Zero-Product Property.

Solve for x .

	Feedback
A	Correct!
B	A rational expression is undefined for any value of a variable that makes a denominator in the expression equal to 0.
C	Check your answer. Substitute -13 for x in the original equation to see if you get a true statement.
D	First, factor the denominator, and then multiply each term by the LCD. Then, factor and solve for x .

PTS: 1

DIF: 3

REF: 16c0947e-4683-11df-9c7d-001185f0d2ea

NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.REI.2

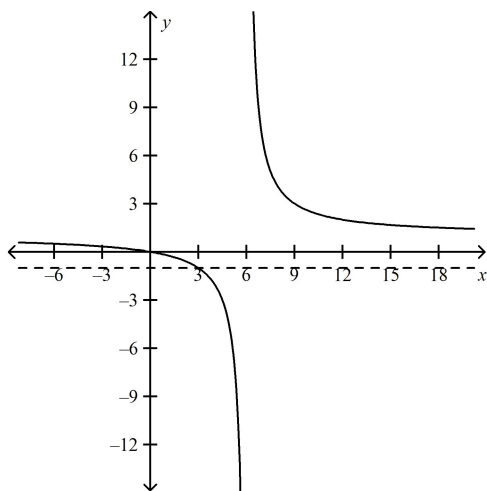
LOC: MTH.C.10.06.06.01.002

TOP: 6-5 Solving Rational Equations and Inequalities

DOK: DOK 3

17. ANS: A

Use a graphing calculator. Let $Y1 = \frac{x}{x-6}$ and $Y2 = -1$



X	$Y1$	$Y2$
2	-0.5	-1
3	-1	-1
4	-2	-1
5	-5	-1
6	ERROR	-1
7	7	-1
8	4	-1

The graph of $\frac{x}{x-6}$ is greater or equal to -1 for values of x that are less than or equal to 3 or greater than 6.

Also notice in the table that $y = \frac{x}{x-6}$ is undefined when $x = 6$.

	Feedback
A	Correct!
B	This is the answer if the inequality is reversed.
C	Check for any vertical asymptotes in the graph.
D	This is the answer if the inequality is reversed. Check for any vertical asymptotes.

PTS: 1 DIF: 2 REF: 16be0b12-4683-11df-9c7d-001185f0d2ea

OBJ: 6-5.5 Using Graphs and Tables to Solve Rational Equations and Inequalities

NAT: NT.CCSS.MTH.10.9-12.A.REI.2 STA: MCC9-12.A.REI.11

LOC: MTH.C.10.08.06.001 | MTH.C.10.08.06.002

TOP: 6-5 Solving Rational Equations and Inequalities

DOK: DOK 3

18. ANS: C

$$\frac{x^2 + x - 30}{x - 5} = 11 \quad \text{Note that } x \neq 5.$$

$$\frac{(x - 5)(x + 6)}{x - 5} = 11 \quad \text{Factor.}$$

$$x + 6 = 11 \quad \text{The factor } (x - 5) \text{ cancels.}$$

$$x = 5$$

Because the left side of the original equation is undefined when $x = 5$, there is no solution.

	Feedback
A	Factor the numerator and cancel common factors before solving for x . Is the original equation defined for this value of x ?
B	Is the original equation defined for this value of x ?
C	Correct!
D	Factor the numerator and cancel common factors before solving for x . Is the original equation defined for this value of x ?

PTS: 1

DIF: 2

REF: 16a3d11e-4683-11df-9c7d-001185f0d2ea

OBJ: 6-2.5 Solving Simple Rational Equations

NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.REI.2

LOC: MTH.C.10.05.09.014

TOP: 6-2 Multiplying and Dividing Rational Expressions

DOK: DOK 2

19. ANS: B

Write $g(x)$ in the form $g(x) = a\sqrt{\frac{1}{b}(x-h)} + k$.

$$g(x) = 4\sqrt{\frac{1}{1}(x-3)} + 0$$

Thus $a = 4$ and $h = 3$. Stretch f vertically by a factor of 4 and translate it right 3 units.

	Feedback
A	If $h > 0$, $g(x) = \sqrt{x-h}$ represents a horizontal translation right h units. If $h < 0$, $g(x) = \sqrt{x-h}$ represents a horizontal translation right $ h $ units.
B	Correct!
C	$g(x) = a\sqrt{x}$ represents a vertical stretch by a factor of a and $g(x) = \sqrt{x-h}$ represents a horizontal translation right or left $ h $ units.
D	$g(x) = a\sqrt{x}$ represents a vertical stretch by a factor of a and $g(x) = \sqrt{x-h}$ represents a horizontal translation right or left $ h $ units.

PTS: 1

DIF: 2

REF: 16d11df2-4683-11df-9c7d-001185f0d2ea

OBJ: 7-1.3 Applying Multiple Transformations

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.b | NT.CCSS.MTH.10.9-12.F.BF.3

STA: MCC9-12.F.IF.7b

LOC: MTH.C.10.07.16.01.01.007 | MTH.C.10.07.16.05.001 | MTH.C.10.07.16.05.002

TOP: 7-1 Radical Functions

DOK: DOK 2

20. ANS: C

The expected value is the weighted average of all the outcomes of the study.

$$\text{Expected value} = 2(.20) + 3(.32) + 4(.288) + 5(.1536) + 6(.0384) = 3.5104 \approx 3.5$$

	Feedback
A	This is the average of the number of people. To find the expected value, multiply the outcomes by their probabilities.
B	To find the expected value, multiply the outcomes by their probabilities.
C	Correct!
D	To find the expected value, multiply the outcomes by their probabilities.

PTS: 1 DIF: 2 REF: 17aa3bb6-4683-11df-9c7d-001185f0d2ea

OBJ: 1-1.2 Finding Expected Value

NAT: NT.CCSS.MTH.10.9-12.S.MD.5 | NT.CCSS.MTH.10.9-12.S.MD.4

STA: MCC9-12.S.MD.2

LOC: MTH.C.13.05.05.004

TOP: 1-1 Measures of Central Tendency and Variation

DOK: DOK 3

21. ANS: B

	Feedback
A	Does the survey show more people in favor of the tax or more people against the tax?
B	Correct!
C	The margin of error is $\pm 6\%$. not $\pm 3\%$.
D	The margin of error is $\pm 6\%$. not $\pm 12\%$.

PTS: 1 DIF: 2 REF: 909d49c4-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-2.3 Interpreting a Margin of Error

NAT: NT.CCSS.MTH.10.9-12.S.IC.4 | NT.CCSS.MTH.10.9-12.S.IC.6

STA: MCC9-12.S.IC.4 | MCC9-12.S.IC.6

TOP: 2-2 Sampling Distributions

KEY: survey | margin of error

DOK: DOK 3

22. ANS: B

$$f(x) = \frac{x^2 + 8x + 12}{x + 2}$$

$$= \frac{(x+2)(x+6)}{x+2}$$

$$= x + 6$$

Factor the numerator. $x + 2$ is a factor in both the numerator and the denominator, so there is a hole at $x = -2$.

Divide out common factors.

Except for the hole at $x = -2$, the graph of f is the same as $y = x + 6$. On the graph, indicate the hole with an open circle. The domain of f is $\{x \mid x \neq -2\}$.

	Feedback
A	For what value(s) of x are the numerator and denominator of $f(x)$ equal to zero?
B	Correct!
C	For what value(s) of x are the numerator and denominator of $f(x)$ equal to zero?
D	For what value(s) of x are the numerator and denominator of $f(x)$ equal to zero?

PTS: 1

DIF: 2

REF: 16b6e3fe-4683-11df-9c7d-001185f0d2ea

OBJ: 6-4.5 Graphing Rational Functions with Holes

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.d

STA: MCC9-12.F.IF.7d

TOP: 6-4 Rational Functions

DOK: DOK 2

23. ANS: D

	Feedback
A	Remember to divide by the number of sectors.
B	Check the sum of the numbers on the spinner.
C	Check the sum of the numbers on the spinner.
D	Correct!

PTS: 1

DIF: 2

REF: 90a9358b-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-4.1 Finding Expected Value

STA: MCC9-12.S.MD.3

TOP: 2-4 Analyzing Decisions

KEY: analyzing decisions | expected value

DOK: DOK 3

24. ANS: B

	Feedback
A	Check that the box plot for the old club is drawn correctly.
B	Correct!
C	The null hypothesis is that the treatment does not have an effect.
D	The null hypothesis is that the treatment does not have an effect.

PTS: 1

DIF: 3

REF: 90915dfd-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-1.1 Analyzing a Controlled Experiment

NAT: NT.CCSS.MTH.10.9-12.S.IC.5

STA: MCC9-12.S.IC.5 | MCC9-12.S.IC.6

TOP: 2-1 Sampling of Experimental Results

KEY: significance | experiment

DOK: DOK 4

25. ANS: C

$$V = khr^2$$

$$157.00 = k(2)(25)$$

$$3.14 = k$$

V varies jointly as h and r^2 .
 Substitute 157.00 for V , 2 for h and 25 for r^2 .
 Solve for k .

$$V = (3.14)hr^2$$

$$V = 3.14(3)(36)$$

$$V = 339.12$$

Replace k in the function.
 Substitute 3 for h and 36 for r^2 .

	Feedback
A	This is the area of the first cylinder, now find the area of the second cylinder.
B	This is the constant of variation. Use this value to find the volume of the new cylinder.
C	Correct!
D	The volume is equal to a constant times the height times the square of the radius.

PTS: 1 DIF: 2 REF: 1695aa06-4683-11df-9c7d-001185f0d2ea
 OBJ: 6-1.3 Solving Joint Variation Problems STA: MCC8.MP.1
 LOC: MTH.C.10.07.02.04.02.006 TOP: 6-1 Variation Functions
 DOK: DOK 2

26. ANS: D

$$\frac{6x}{x-3}(x-3) = \frac{4x+6}{x-3}(x-3)$$

$$6x = 4x + 6$$

$$2x = 6$$

$$x = 3$$

Multiply each term by the LCD, $(x - 3)$.
 Simplify. Note that $x \neq 3$.
 Solve for x .

The solution $x = 3$ is extraneous because it makes the denominators of the original equation equal to 0. Therefore the equation has no solution.

	Feedback
A	Check your answer in the original equation.
B	Check your answer in the original equation.
C	Check your answer in the original equation.
D	Correct!

PTS: 1 DIF: 2 REF: 16b96d6a-4683-11df-9c7d-001185f0d2ea
 OBJ: 6-5.2 Extraneous Solutions NAT: NT.CCSS.MTH.10.9-12.A.REI.2
 STA: MCC9-12.A.REI.2 LOC: MTH.C.10.06.06.01.004
 TOP: 6-5 Solving Rational Equations and Inequalities DOK: DOK 3

27. ANS: D

	Feedback
A	The margin of error is $\pm 7\%$, not $\pm 3.5\%$.
B	The margin of error is $\pm 7\%$, not $\pm 14\%$.
C	Check the ranges for Candidates A and B.
D	Correct!

PTS: 1 DIF: 2 REF: 909fac1f-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-2.3 Interpreting a Margin of Error

NAT: NT.CCSS.MTH.10.9-12.S.IC.4 | NT.CCSS.MTH.10.9-12.S.IC.6

STA: MCC9-12.S.IC.4 | MCC9-12.S.IC.6

TOP: 2-2 Sampling Distributions

KEY: survey | margin of error

DOK: DOK 3

28. ANS: D

Factor 64. Then write it in the form of 4^3 , and apply the Inverse Properties of Logarithms and Exponents.

	Feedback
A	Apply the Inverse Properties of Logarithms and Exponents; this is the base, not the answer.
B	Factor, then apply the Inverse Properties of Logarithms and Exponents.
C	Factor, then apply the Inverse Properties of Logarithms and Exponents.
D	Correct!

PTS: 1 DIF: 1 REF: 1652c0e6-4683-11df-9c7d-001185f0d2ea

OBJ: 9-1.4 Recognizing Inverses

NAT: NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.BF.5

LOC: MTH.C.10.05.11.008

TOP: 9-1 Properties of Logarithms

DOK: DOK 2

29. ANS: A

Graph $f(x) = 2^x$ using a table of values.

x	-3	-2	0	1	2
$f(x) = 2^x$	$\frac{1}{8}$	$\frac{1}{4}$	1	2	4

To graph the inverse $f^{-1}(x) = \log_2 x$, reverse each ordered pair.

x	$\frac{1}{8}$	$\frac{1}{4}$	1	2	4
$f^{-1}(x) = \log_2 x$	-3	-2	0	1	2

The domain of $f^{-1}(x)$ is $\{x|x > 0\}$ and the range is all real numbers.

	Feedback
A	Correct!
B	The inverse of an exponential function is a logarithmic function.
C	The inverse of an exponential function is a logarithmic function.
D	The inverse of an exponential function is a logarithmic function.

PTS: 1 DIF: 2 REF: 16495e86-4683-11df-9c7d-001185f0d2ea

OBJ: 8-3.4 Graphing Logarithmic Functions

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.e | NT.CCSS.MTH.10.9-12.F.BF.4.c

STA: MCC9-12.F.IF.7e

LOC: MTH.C.10.07.12.02.003

TOP: 8-3 Logarithmic Functions

DOK: DOK 3

30. ANS: D

	Feedback
A	There is a better answer.
B	A convenience sample is a group that takes little effort to survey.
C	A self-selected survey includes people who choose to be part of the sample.
D	Correct!

PTS: 1 DIF: 1

REF: 9098850e-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-2.1 Classifying a Sample

TOP: 2-2 Sampling Distributions

KEY: sampling methods

DOK: DOK 2

31. ANS: A

Step 1 To compress f vertically by a factor of $\frac{5}{8}$, multiply f by $\frac{5}{8}$.

$$g(r) = \frac{5}{8}f(r) = \frac{5}{8}\sqrt{1.6r}$$

Step 2 Find the value of g around a curve with a radius of curvature of 1000 feet.

Substitute 1000 for r and simplify.

$$g(1000) = \frac{5}{8}\sqrt{1.6(1000)} = 25$$

On a rainy day, the maximum safe speed around a curve with a radius of curvature of 1000 feet is 25 mph.

	Feedback
A	Correct!
B	To compress f vertically, multiply f by $5/8$.
C	To find the value of g around a curve with a radius of curvature of 1000 ft, substitute 1000 for r and simplify.
D	To compress f vertically, multiply f by $5/8$.

PTS: 1 DIF: 2

REF: 16d3a75e-4683-11df-9c7d-001185f0d2ea

OBJ: 7-1.5 Application

NAT: NT.CCSS.MTH.10.9-12.F.BF.3

STA: MCC9-12.F.BF.3

LOC: MTH.C.10.07.10.009

TOP: 7-1 Radical Functions

DOK: DOK 2

32. ANS: B

$$\left(2^3\right)^{x+8} = \left(2^5\right)^x \quad \text{Rewrite each side as powers of the same base.}$$

$$2^{3(x+8)} = 2^{5x} \quad \text{To raise a power to a power, multiply the exponents.}$$

$$3(x+8) = 5x \quad \text{The bases are the same, so the exponents must be equal.}$$

$$x = 12$$

The solution is $x = 12$.

	Feedback
A	Rewrite each side as powers of the same base and then set the exponents equal.
B	Correct!
C	Rewrite each side as powers of the same base and then set the exponents equal.
D	Rewrite each side as powers of the same base and then set the exponents equal.

PTS: 1 DIF: 2

REF: 1657acae-4683-11df-9c7d-001185f0d2ea

OBJ: 9-2.1 Solving Exponential Equations

NAT: NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.LE.4

LOC: MTH.C.10.06.08.003

TOP: 9-2 Exponential and Logarithmic Equations and Inequalities

DOK: DOK 3

33. ANS: C

$$\sqrt{x-5} = 4$$

$$x-5 = 16$$

$$x = 21$$

Subtract -6 from both sides.

Square both sides.

Simplify.

Check

$$-6 + \sqrt{21-5} = -2$$

$$-6 + \sqrt{16} = -2$$

$$-6 + 4 = -2$$

$$-2 = -2 \quad \text{OK}$$

	Feedback
A	It looks like in your last step you added the value instead of subtracting the value.
B	Remember to subtract the value that is next to the x .
C	Correct!
D	It looks like you didn't subtract the leading term from both sides before squaring.

PTS: 1

DIF: 1

REF: 16d84506-4683-11df-9c7d-001185f0d2ea

OBJ: 7-2.1 Solving Equations Containing One Radical

NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.REI.2

LOC: MTH.C.10.06.07.003

TOP: 7-2 Solving Radical Equations and Inequalities

DOK: DOK 1

34. ANS: A

	Feedback
A	Correct!
B	Check that you added the numbers on the net correctly.
C	Check that you added the numbers on the net correctly.
D	Check that you added the numbers on the net correctly.

PTS: 1

DIF: 2

REF: 90a95c9b-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-4.1 Finding Expected Value

STA: MCC9-12.S.MD.3

TOP: 2-4 Analyzing Decisions

KEY: analyzing decisions | expected value

DOK: DOK 3

35. ANS: A

Order the data from least to greatest.

7, 7, 9, 9, 10, 11, 12, 12, 12, 12, 13, 15, 15, 17, 18, 18
 ↑ ↑ ↑ ↑ ↑

Find the minimum, maximum, median, and quartiles.

Minimum = 7

Maximum = 18

Median = 12

Lower Quartile = 9.5

Upper Quartile = 15

Interquartile range = $15 - 9.5 = 5.5$

	Feedback
A	Correct!
B	Order the data from least to greatest, then find the minimum, maximum, median, and quartiles.
C	Order the data from least to greatest, then find the minimum, maximum, median, and quartiles.
D	Order the data from least to greatest, then find the minimum, maximum, median, and quartiles.

PTS: 1 DIF: 2 REF: 17ac7702-4683-11df-9c7d-001185f0d2ea

OBJ: 1-1.3 Making a Box-and-Whisker Plot and Finding the Interquartile Range

NAT: NT.CCSS.MTH.10.9-12.S.ID.1 STA: MCC9-12.S.ID.1

LOC: MTH.C.13.02.03.016 | MTH.C.13.04.02.02.009

TOP: 1-1 Measures of Central Tendency and Variation

DOK: DOK 3

36. ANS: B

Let s represent the average speed of the plane. Using $\text{time} = \frac{\text{distance}}{\text{speed}}$, organize the data in a table.

	Distance (mi)	Average Speed (mi/h)	Time (h)
Leg 1	250	$s - 10$	$\frac{250}{s - 10}$
Leg 2	250	$s + 30$	$\frac{250}{s + 30}$

Total time = time from headquarters to plant + time from plant to headquarters

$$4 = \frac{250}{s - 10} + \frac{250}{s + 30}$$

$$4(s - 10)(s + 30) = \frac{250}{s - 10}(s - 10)(s + 30) + \frac{250}{s + 30}(s - 10)(s + 30) \quad \text{Multiply by the LCD.}$$

$$4(s - 10)(s + 30) = 250(s + 30) + 250(s - 10)$$

Simplify. $s \neq 10$ or -30 .

$$4(s^2 + 20s - 300) = 250s + 7500 + 250s - 2500$$

Distribute.

$$4s^2 + 80s - 1200 = 500s + 5000$$

Combine like terms.

$$4s^2 - 420s - 6200 = 0$$

$$s^2 - 105s - 1550 = 0$$

Divide both sides by 4.

$$s = \frac{-(-105) \pm \sqrt{(-105)^2 - 4(1)(-1550)}}{2(1)}$$

Use the Quadratic Formula.

$$s = \frac{105 \pm 131.2}{2}$$

Solve for s .

$$s = 118 \text{ or } s = -13$$

The speed of the plane cannot be negative. Therefore, the average speed of the plane is 118 mph.

	Feedback
A	Use time = distance/speed and organize your data in a table. Remember to add or subtract the wind speed.
B	Correct!
C	Remember to add or subtract the wind speed.
D	Use time = distance/speed and organize your data in a table. Remember to add or subtract the wind speed.

PTS: 1

DIF: 2

REF: 16bba8b6-4683-11df-9c7d-001185f0d2ea

OBJ: 6-5.3 Problem-Solving Application

NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.REI.2 | MCC9-12.A.CED.3

LOC: MTH.C.10.06.06.01.002

TOP: 6-5 Solving Rational Equations and Inequalities

DOK: DOK 3

37. ANS: C

$$A = lw$$

$$(x^2 + 10x + 16) = (x + 8)w$$

$$\frac{(x + 8)(x + 2)}{(x + 8)} = w$$

$$(x + 2) = w$$

Area of a rectangle equals length times width.

Substitute the area and length expressions given.

Factor and solve for w .

Simplify.

	Feedback
A	Factor the polynomial to find the possible length and width.
B	Multiply the expressions for length and width to be sure they create the polynomial expression for area.
C	Correct!
D	In a rectangle, length times width equals area.

PTS: 1

DIF: 3

REF: 16a6337a-4683-11df-9c7d-001185f0d2ea

NAT: NT.CCSS.MTH.10.9-12.A.APR.6

STA: MCC9-12.A.APR.7

LOC: MTH.C.10.05.09.014

TOP: 6-2 Multiplying and Dividing Rational Expressions

DOK: DOK 2

38. ANS: C

$$\log_3 27^{-3}$$

$$= -3 \log_3 27$$

$$= -3(3)$$

$$= -9$$

The Power Property of Logarithms says $\log_b a^p = p \log_b a$.Because $3^3 = 27$, $\log_3 27 = 3$.

	Feedback
A	Use the Power Property of Logarithms when simplifying.
B	Use the Power Property of Logarithms when simplifying.
C	Correct!
D	Use the Power Property of Logarithms when simplifying.

PTS: 1

DIF: 2

REF: 16505e8a-4683-11df-9c7d-001185f0d2ea

OBJ: 9-1.3 Simplifying Logarithms with Exponents

NAT: NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.BF.5

LOC: MTH.C.10.05.11.008 | MTH.C.10.05.11.02.006

TOP: 9-1 Properties of Logarithms

DOK: DOK 3

39. ANS: D

Step 1 Find the value of the base: 5.

The base is greater than 1. So, this is an exponential growth function.

Step 2 Choose several values of x and generate ordered pairs. Then, graph the ordered pairs and connect with a smooth curve.

	Feedback
A	Check that you have identified the base correctly.
B	The coefficient multiplies the power; it is not added to the power.
C	Be sure you are using the sign of the exponent correctly.
D	Correct!

PTS: 1 DIF: 1 REF: 16362496-4683-11df-9c7d-001185f0d2ea

OBJ: 8-1.1 Graphing Exponential Functions

NAT: NT.CCSS.MTH.10.9-12.A.CED.2 | NT.CCSS.MTH.10.9-12.F.IF.7.e |

NT.CCSS.MTH.10.9-12.F.IF.8.b STA: MCC9-12.F.IF.7e

LOC: MTH.C.10.07.11.01.001 | MTH.C.10.07.11.03.003

TOP: 8-1 Exponential Functions, Growth, and Decay

KEY: exponential function | graph

DOK: DOK 2

40. ANS: A

	Feedback
A	Correct!
B	Check your answer. Both factors in the multiplication must be in the set of odd whole numbers.

PTS: 1 DIF: 2 REF: 90582575-6ab2-11e0-9c90-001185f0d2ea

OBJ: 6-3-Ext.2 Determining Closure of the Set of Rational Numbers Under Operations

STA: MCC9-12.A.APR.7

TOP: 6-3-Ext Polynomials, Rational Expressions, and Closure

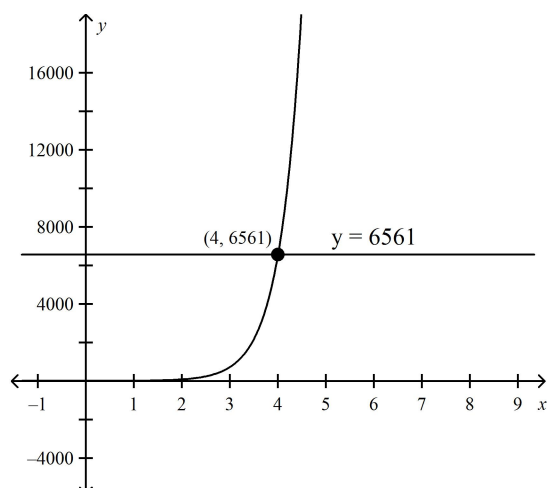
KEY: whole number operations | closure DOK: DOK 3

41. ANS: C

Use a graphing calculator. Enter 3^{2x} as Y1 and 6561 as Y2. Use the table to locate the value of x where $Y1 = Y2$.

X	Y1	Y2
1	9	6561
2	81	6561
3	729	6561
4	6561	6561
5	59049	6561

The graph shows $x = 4$ as the point of intersection of Y1 and Y2.



	Feedback
A	Solve for x , not the exponent.
B	The base is 3 and the exponent is $2x$.
C	Correct!
D	Graph the intersection of $y = 6561$ and $y = 3^{(2x)}$.

PTS: 1 DIF: 1 REF: 165c7166-4683-11df-9c7d-001185f0d2ea
 OBJ: 9-2.4 Using Tables and Graphs to Solve Exponential and Logarithmic Equations and Inequalities
 NAT: NT.CCSS.MTH.10.9-12.A.REI.11 | NT.CCSS.MTH.10.9-12.F.LE.4
 STA: MCC9-12.F.IF.7e LOC: MTH.C.10.06.08.005
 TOP: 9-2 Exponential and Logarithmic Equations and Inequalities
 DOK: DOK 2

42. ANS: A

	Feedback
A	Correct!
B	Check that you graphed the lines correctly.
C	This is the y -coordinate of the intersection point. Find the x -coordinate of the intersection point.
D	Check that you graphed the lines correctly.

PTS: 1 DIF: 2 REF: 905cea2b-6ab2-11e0-9c90-001185f0d2ea

OBJ: 7-2-Ext.1 Solving Equations Algebraically and Graphically

NAT: NT.CCSS.MTH.10.9-12.A.REI.6 STA: MCC9-12.A.REI.7

TOP: 7-2-Ext Solving Equations Graphically

KEY: solving by graphing | linear equation

DOK: DOK 1

43. ANS: A

	Feedback
A	Correct!
B	Check that you graphed the lines correctly.
C	Check that you graphed the lines correctly.
D	Check that you graphed the lines correctly.

PTS: 1 DIF: 2 REF: 905f7396-6ab2-11e0-9c90-001185f0d2ea

OBJ: 7-2-Ext.2 Solving Equations Graphically with the Use of Technology

NAT: NT.CCSS.MTH.10.9-12.A.REI.6 STA: MCC9-12.A.REI.11

TOP: 7-2-Ext Solving Equations Graphically

KEY: solving by graphing | linear equation

DOK: DOK 1

44. ANS: B

	Feedback
A	A sample is part of the population.
B	Correct!

PTS: 1 DIF: 1 REF: 9074c1b9-6ab2-11e0-9c90-001185f0d2ea

NAT: NT.CCSS.MTH.10.9-12.S.IC.1 STA: MCC9-12.S.IC.4

TOP: 1-2 Data Gathering

DOK: DOK 2

45. ANS: C

	Feedback
A	Check your answer about subtraction.
B	Check your answers about subtraction and multiplication.
C	Correct!
D	Check your answer about addition.

PTS: 1 DIF: 2 REF: 9055c31a-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 6-3-Ext.1 Determining Closure of the Set of Integers Under Operations
 STA: MCC9-12.A.APR.7 TOP: 6-3-Ext Polynomials, Rational Expressions, and Closure
 KEY: integer operations | closure DOK: DOK 3

46. ANS: B

Logarithmic form: $\log_4 16 = 2$ Exponential form: $4^2 = 16$

The base of the logarithm becomes the base of the power, and the logarithm is the exponent.

	Feedback
A	The base of the logarithm becomes the base of the power, and the logarithm is the exponent.
B	Correct!
C	The logarithm is the exponent.
D	The base of the logarithm becomes the base of the power.

PTS: 1 DIF: 1 REF: 1646d51a-4683-11df-9c7d-001185f0d2ea
 OBJ: 8-3.2 Converting from Logarithmic to Exponential Form NAT: NT.CCSS.MTH.10.9-12.F.BF.5
 STA: MCC9-12.F.BF.5 LOC: MTH.C.10.07.12.005 | MTH.C.10.07.12.009
 TOP: 8-3 Logarithmic Functions DOK: DOK 2

47. ANS: B

	Feedback
A	This sample is not random. Customers who do not shop on Monday have no chance of being in the sample.
B	Correct!

PTS: 1 DIF: 2 REF: 90774b24-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-2.1 Determining if a Sample is Biased
 NAT: NT.CCSS.MTH.10.9-12.S.IC.1 | NT.CCSS.MTH.10.9-12.S.MD.6
 STA: MCC9-12.S.IC.1 TOP: 1-2 Data Gathering
 KEY: sample | biased sample DOK: DOK 3

48. ANS: C

One method is to use $s_1 l_1 = s_2 l_2$. $(6)(8) = (3)l_2$ Substitute given values. $48 = 3l_2$ Simplify. $16 = l_2$ Divide.

	Feedback
A	With inverse variation, when one quantity decreases, the other quantity increases. The number of shrubs was divided by 2, so the number of lawns should be multiplied by 2.
B	The number of shrubs was divided by 2, so the number of lawns should be multiplied by 2.
C	Correct!
D	With inverse variation, when one quantity decreases, the other quantity increases. The number of shrubs was divided by 2, so the number of lawns should be multiplied by 2.

PTS: 1

DIF: 2

REF: 169a47ae-4683-11df-9c7d-001185f0d2ea

OBJ: 6-1.5 Application

STA: MCC9-12.A.CED.3

LOC: MTH.C.10.07.09.01.008

TOP: 6-1 Variation Functions

DOK: DOK 2

49. ANS: C

The function $f(x)$ represents the total bill as a function of the number of hours Manny works. The inverse uses the output of the function as its input and uses the input of the function as its output. The output of the function is the total bill. This becomes the input of the inverse function. The input of the function is the number of hours Manny works. This becomes the output of the inverse function. The inverse of the function therefore represents the number of hours Manny works as a function of the total bill.

	Feedback
A	The inverse uses the output of the function as its input and uses the input of the function as its output.
B	The inverse uses the output of the function as its input and uses the input of the function as its output.
C	Correct!
D	This represents the function, not its inverse.

PTS: 1

DIF: 3

REF: 164472be-4683-11df-9c7d-001185f0d2ea

STA: MCC9-12.F.BF.4a

TOP: 8-2 Inverses of Relations and Functions

DOK: DOK 4

50. ANS: D

	Feedback
A	Is the researcher setting up a control group and a treatment group?
B	Is the researcher setting up a control group and a treatment group?
C	In an experiment, the researcher applies a treatment.
D	Correct!

PTS: 1 DIF: 1 REF: 90859946-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-3.1 Identifying Experiments and Observational Studies NAT: NT.CCSS.MTH.10.9-12.S.IC.3
 STA: MCC9-12.S.IC.3 TOP: 1-3 Surveys, Experiments, and Observational Studies
 KEY: experiment | observational study DOK: DOK 2

51. ANS: C

	Feedback
A	There is a better strategy.
B	Check your answer. What would the expected value be if the contestant had a 15% chance of answering incorrectly on the Science question and a 5% chance of answering incorrectly on the History question?
C	Correct!
D	There is a better strategy.

PTS: 1 DIF: 3 REF: 90adfa41-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 2-4.3 The Monty Hall Problem NAT: NT.CCSS.MTH.10.9-12.S.MD.7
 STA: MCC9-12.S.MD.5a TOP: 2-4 Analyzing Decisions
 KEY: analyzing decisions | expected value DOK: DOK 4

52. ANS: D

	Feedback
A	Check the z -value.
B	Is there enough evidence to reject the claim?
C	Check the z -value.
D	Correct!

PTS: 1 DIF: 2 REF: 9091850d-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 2-1.2 Using a z -Test NAT: NT.CCSS.MTH.10.9-12.S.IC.5
 STA: MCC9-12.S.IC.5 TOP: 2-1 Sampling of Experimental Results
 KEY: significance | experiment | z -test DOK: DOK 3

53. ANS: C

Write $g(x)$ in the form $g(x) = \frac{1}{x-h} + k$ where h is the horizontal translation and k is the vertical translation.

$$g(x) = \frac{1}{x} + 3 = \frac{1}{x-0} + 3 = \frac{1}{x-h} + k$$

$h = 0$ and $k = 3$. Translate $f(x)$ up 3 units.

	Feedback
A	$(1/x) + c$ represents a vertical translation of $f(x)$.
B	$(1/x) + c$ represents a vertical translation of $f(x)$.
C	Correct!
D	The sign of c determines whether $(1/x) + c$ represents a vertical translation of $f(x)$ $ c $ units up or down.

PTS: 1 DIF: 2 REF: 16afe3fa-4683-11df-9c7d-001185f0d2ea
 OBJ: 6-4.1 Transforming Rational Functions NAT: NT.CCSS.MTH.10.9-12.F.BF.3
 STA: MCC9-12.F.BF.3 LOC: MTH.C.10.07.16.01.01.010 | MTH.C.10.07.16.02.002
 TOP: 6-4 Rational Functions DOK: DOK 2

54. ANS: C

	Feedback
A	Convert 22 to a z-score. Then use the table to find the probability.
B	Convert 22 to a z-score. Then use the table to find the probability.
C	Correct!
D	Convert 22 to a z-score. Then use the table to find the probability.

PTS: 1 DIF: 2 REF: 90a6d330-6ab2-11e0-9c90-001185f0d2ea
 NAT: NT.CCSS.MTH.10.9-12.S.ID.4 STA: MCC9-12.S.ID.4
 TOP: 2-3 Fitting to a Normal Distribution KEY: normal distribution | z-value
 DOK: DOK 3

55. ANS: D

List the factors for each polynomial.

$$6(x+1)^3(x-4)^2 = 3 \cdot 2 \cdot (x+1)^3 \cdot (x-4)^2 \text{ and } 10(x+1)^8(x-4)^5 = 5 \cdot 2 \cdot (x+1)^8 \cdot (x-4)^5$$

If the polynomials have common factors, use the highest power of each common factor.

$$\text{The LCM is } 3 \cdot 5 \cdot 2 \cdot (x+1)^8(x-4)^5 = 30(x+1)^8(x-4)^5.$$

	Feedback
A	Use all the factors of each polynomial and the highest power of any repeated factors.
B	Use all the factors of each polynomial and the highest power of any repeated factors.
C	Use all the factors of each polynomial and the highest power of any repeated factors.
D	Correct!

PTS: 1

DIF: 3

REF: 16a895d6-4683-11df-9c7d-001185f0d2ea

OBJ: 6-3.2 Finding the Least Common Multiple of Polynomials

STA: MCC9-12.A.APR.7

TOP: 6-3 Adding and Subtracting Rational Expressions

DOK: DOK 2

56. ANS: B

	Feedback
A	Method C uses the farmers' own observations, which may not be as reliable as data gathered by researchers. Also, there may be other differences in the farmers' crop treatments besides fertilizer. There is a more reliable method.
B	Correct!
C	Check your classifications of methods A and C.
D	Check your classifications of methods A and C.

PTS: 1

DIF: 3

REF: 908c9947-6ab2-11e0-9c90-001185f0d2ea

OBJ: 1-3.4 Evaluating Data Collection Methods

NAT: NT.CCSS.MTH.10.9-12.S.IC.3

STA: MCC9-12.S.IC.3

TOP: 1-3 Surveys, Experiments, and Observational Studies

KEY: experiment | survey | observational study | reliability

DOK: DOK 4

57. ANS: C

The investment follows an exponential growth of 11% per year with an initial value of \$10,000. Using the formula $f(t) = P(1+r)^t$, substitute the given values.

$$f(t) = 10000(1 + 11\%)^t$$

$$f(t) = 10000(1 + 0.11)^t$$

$$f(t) = 10000(1.11)^t$$

	Feedback
A	Use the formula for exponential growth.
B	Change the rate to a decimal before adding.
C	Correct!
D	Use the formula for exponential growth.

PTS: 1 DIF: 3 REF: 163ae94e-4683-11df-9c7d-001185f0d2ea

NAT: NT.CCSS.MTH.10.9-12.A.CED.2 | NT.CCSS.MTH.10.9-12.F.IF.8.b |

NT.CCSS.MTH.10.9-12.F.LE.2 | NT.CCSS.MTH.10.9-12.F.LE.5

STA: MCC9-12.A.CED.2

LOC: MTH.C.10.07.11.007

TOP: 8-1 Exponential Functions, Growth, and Decay

DOK: DOK 4

58. ANS: D

	Feedback
A	Check that you found the number of values less than 2.10 correctly.
B	If the projected values are close to the actual values, the data is likely to be normally distributed.
C	Check that you found the number of values less than 2.10 correctly.
D	Correct!

PTS: 1 DIF: 3 REF: 90a497e5-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-3.3 Determining Whether Data May Be Normally Distributed

NAT: NT.CCSS.MTH.10.9-12.S.ID.4 STA: MCC9-12.S.ID.4

TOP: 2-3 Fitting to a Normal Distribution

KEY: normal distribution | z-value

DOK: DOK 4

59. ANS: A

Factor common factors out of the numerator and/or denominator. Divide out the common factors to simplify the expression. Finally, use the original denominator to determine any z-values for which the expression is undefined.

	Feedback
A	Correct!
B	Determine excluded values from the original denominator.
C	Divide out common factors.
D	Determine excluded values from the original denominator.

PTS: 1 DIF: 2 REF: 169cd11a-4683-11df-9c7d-001185f0d2ea

OBJ: 6-2.1 Simplifying Rational Expressions

STA: MCC9-12.A.APR.6

LOC: MTH.C.10.05.09.004 | MTH.C.10.05.09.014

TOP: 6-2 Multiplying and Dividing Rational Expressions

DOK: DOK 2

60. ANS: C

In $s = \sqrt{30fd}$, after substituting the given values and simplifying we see that $s = \sqrt{189}$. Therefore, $s \approx 14$ mi/h. The driver wasn't speeding.

	Feedback
A	That is the value of 30 times f times d. You need to calculate the speed.
B	Estimate square of 20 and compare with 189. You need a lower value.
C	Correct!
D	Estimate the square of 20 and 25 to compare with 189. You need a lower value.

PTS: 1

DIF: 1

REF: 16df932a-4683-11df-9c7d-001185f0d2ea

OBJ: 7-2.6 Application

STA: MCC9-12.A.SSE.1

LOC: MTH.C.10.06.07.004

TOP: 7-2 Solving Radical Equations and Inequalities

DOK: DOK 1

61. ANS: B

$$\log_3 6 + \log_3 4.5 = \log_3 27$$

To add the numbers, multiply the logarithms

3

Think. What exponent on base 3 gives 27? $3^3 = 27$

	Feedback
A	To add logarithms of two numbers with the same base, multiply the numbers. Then simplify if possible.
B	Correct!
C	To add logarithms of two numbers with the same base, multiply the numbers. Then simplify if possible.
D	This is the product. Take the logarithm of this number to the given base.

PTS: 1

DIF: 1

REF: 164dfc2e-4683-11df-9c7d-001185f0d2ea

OBJ: 9-1.1 Adding Logarithms

NAT: NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.IF.8b

LOC: MTH.C.10.05.11.008

TOP: 9-1 Properties of Logarithms

DOK: DOK 2

62. ANS: D

	Feedback
A	Convert 67 and 74.5 to z-scores. Then use the table to find the probability.
B	This is the probability that a randomly-selected male is <i>not</i> between 67 and 74.5 inches tall.
C	Convert 67 and 74.5 to z-scores. Then use the table to find the probability.
D	Correct!

PTS: 1

DIF: 2

REF: 90a470d5-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-3.2 Using Standard Normal Values

NAT: NT.CCSS.MTH.10.9-12.S.ID.4

STA: MCC9-12.S.ID.4

TOP: 2-3 Fitting to a Normal Distribution

KEY: normal distribution | z-value

DOK: DOK 3

63. ANS: C

	Feedback
A	There is a sampling method that is more likely to select a random sample.
B	There is a sampling method that is more likely to select a random sample.
C	Correct!
D	There is a sampling method that is more likely to select a random sample.

PTS: 1 DIF: 2 REF: 907e4b25-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-2.2 Determining if a Sample is Representative of a Population
 NAT: NT.CCSS.MTH.10.9-12.S.IC.1 | NT.CCSS.MTH.10.9-12.S.IC.3 | NT.CCSS.MTH.10.9-12.S.MD.6
 STA: MCC9-12.S.IC.1 | MCC9-12.S.IC.3 TOP: 1-2 Data Gathering
 KEY: sample | random | word | real-life | method | survey | poll DOK: DOK 3

64. ANS: B

To subtract the logarithms divide the numbers.

$$\log_2 64 - \log_2 4 = \log_2 \left(\frac{64}{4}\right) = \log_2 16 = 4$$

	Feedback
A	This is what we'd get if we were adding the logarithms. To subtract logarithms, divide the values and then take the logarithm.
B	Correct!
C	To subtract logarithms, divide the values and then take the logarithm.
D	Divide the values, then take the logarithm of that value.

PTS: 1 DIF: 2 REF: 164e233e-4683-11df-9c7d-001185f0d2ea
 OBJ: 9-1.2 Subtracting Logarithms NAT: NT.CCSS.MTH.10.9-12.F.BF.5
 STA: MCC9-12.F.IF.8b LOC: MTH.C.10.05.11.008
 TOP: 9-1 Properties of Logarithms DOK: DOK 3

65. ANS: A

	Feedback
A	Correct!
B	Use a proportion to predict the number of defective monitors produced each day.
C	Use a proportion to predict the number of defective monitors produced each day.
D	Use a proportion to predict the number of defective monitors produced each day.

PTS: 1 DIF: 2 REF: 90830fdb-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-2.3 Using Data to Make Predictions NAT: NT.CCSS.MTH.10.9-12.S.IC.1
 STA: MCC9-12.S.IC.4 | MCC9-12.S.IC.1 | MCC9-12.S.MD.7 TOP: 1-2 Data Gathering
 KEY: sample | evaluating claims DOK: DOK 3

66. ANS: C

Use the related equation $y = \sqrt{x-5}$ to make a table of values

x	5	6	9	14
y	0	1	2	3

Use the table to graph the boundary curve. The inequality sign is \leq , so use a solid curve and shade the region below it. Because the value of $x - 5$ cannot be less than 0, do not shade to the left of $x = 5$.

	Feedback
A	Check the direction of your horizontal translation of the function the square root of x .
B	The translation is inside the radical, so it should be a horizontal shift of the function the square root of x .
C	Correct!
D	The translation is inside the radical, so it should be a horizontal shift of the function the square root of x .

PTS: 1

DIF: 2

REF: 16d5e2aa-4683-11df-9c7d-001185f0d2ea

OBJ: 7-1.6 Graphing Radical Inequalities

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.b

STA: MCC9-12.F.IF.7b

LOC: MTH.C.10.08.07.003

TOP: 7-1 Radical Functions

DOK: DOK 2

67. ANS: D

$$f(x) = \frac{2(x+3)(x-3)}{(x+4)(x-4)}$$

Zeros: -3 and 3 Vertical asymptotes: $x = -4, x = 4$ Horizontal asymptote: $y = 2$

Factor the numerator and denominator.

The numerator is 0 when $x = -3$ or $x = 3$.The denominator is 0 when $x = -4$ or $x = 4$.Both p and q have the same degree: 2. The horizontal asymptote is

$$y = \frac{\text{leading coefficient of } p}{\text{leading coefficient of } q} = \frac{2}{1} = 2$$

	Feedback
A	To find the horizontal asymptote, divide the leading coefficient of p by the leading coefficient of q .
B	Find the zeros by checking when the nominator is 0. Then find the vertical asymptotes by checking when the denominator is 0. To find the horizontal asymptote, divide the leading coefficient of p by the leading coefficient of q .
C	You reversed the values of the zeros and the vertical asymptotes.
D	Correct!

PTS: 1

DIF: 2

REF: 16b4a8b2-4683-11df-9c7d-001185f0d2ea

OBJ: 6-4.4 Graphing Rational Functions with Vertical and Horizontal Asymptotes

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.d

STA: MCC9-12.F.IF.7d

LOC: MTH.C.10.07.01.015 | MTH.C.10.07.09.006

TOP: 6-4 Rational Functions

DOK: DOK 2

68. ANS: B

Step 1 Solve for x .

$$\left(\sqrt{x+31}\right)^2 = (x+1)^2 \quad \text{Square both sides.}$$

$$x+31 = x^2 + 2x + 1 \quad \text{Simplify.}$$

$$0 = x^2 + x - 30 \quad \text{Write in standard form.}$$

$$0 = (x-5)(x+6) \quad \text{Factor.}$$

$$x-5 = 0 \text{ or } x+6 = 0 \quad \text{Solve for } x.$$

$$x = 5 \text{ or } x = -6$$

Step 2 Use substitution to check for extraneous solutions.

$$\sqrt{x+31} = x+1$$

$$\sqrt{x+31} = x+1$$

$\sqrt{5+31}$	$5+1$
$\sqrt{36}$	6
6	6

$\sqrt{-6+31}$	$-6+1$
$\sqrt{25}$	-5
5	-5

Because $x = -6$ does not satisfy the original equation, it is extraneous.The only solution is $x = 5$.

	Feedback
A	Square both sides and solve for x . Check whether each possible solution satisfies the original equation.
B	Correct!
C	Square both sides and solve for x . Check whether each possible solution satisfies the original equation.
D	Check whether each possible solution satisfies the original equation.

PTS: 1

DIF: 2

REF: 16dace72-4683-11df-9c7d-001185f0d2ea

OBJ: 7-2.3 Solving Equations with Extraneous Solutions

NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.REI.2

LOC: MTH.C.10.06.07.003 | MTH.C.10.06.07.005

TOP: 7-2 Solving Radical Equations and Inequalities

DOK: DOK 2

69. ANS: D

$$\frac{-1(x^2 + 3x - 10)}{x^2 + 2x - 8}$$

Factor -1 from the numerator and reorder the terms.

$$= \frac{-1(x+5)(x-2)}{(x+4)(x-2)}$$

Factor the numerator and denominator.

$$= \frac{-x-5}{x+4}$$

Divide the common factors and simplify.

The expression is undefined at those x -values, 2 and -4 , that make the original denominator 0.

	Feedback
A	Don't forget to redistribute the -1 .
B	Look at the original expression to find the values that make it undefined.
C	Don't forget to redistribute the -1 . Look at the original expression to find the values that make it undefined.
D	Correct!

PTS: 1 DIF: 2 REF: 169f0c66-4683-11df-9c7d-001185f0d2ea

OBJ: 6-2.2 Simplifying by Factoring -1 STA: MCC9-12.A.APR.6

LOC: MTH.C.10.05.09.004 | MTH.C.10.05.09.014

TOP: 6-2 Multiplying and Dividing Rational Expressions DOK: DOK 2

70. ANS: A

$$P = k \frac{T}{V}$$

Write the original equation.

$$1.6 = k \frac{280}{14}$$

Substitute and solve for k .

$$1.6 = 20k$$

$$0.08 = k$$

$$P = 0.08 \frac{250}{16}$$

Substitute for k , T , and V .

$$P = 1.25$$

	Feedback
A	Correct!
B	This would be the answer if the pressure varied inversely with the volume and temperature.
C	This would be the answer if the pressure varied directly with volume and temperature.
D	This is the pressure under the original conditions. Now find the new pressure with the new volume and temperature.

PTS: 1 DIF: 2 REF: 169caa0a-4683-11df-9c7d-001185f0d2ea

OBJ: 6-1.7 Application STA: MCC9-12.A.CED.3

LOC: MTH.C.10.07.09.01.008 TOP: 6-1 Variation Functions

DOK: DOK 2

71. ANS: C

$$\text{pH} = -\log\left[\text{H}^+\right]$$

$$\text{pH} = -\log(0.0000019) \quad \text{Substitute the known values in the function.}$$

Use a calculator to find the value of the logarithm in base 10. Press the [LOG] key.

The stream water has a pH of about 5.7. Atlantic Salmon returning to their natal streams will be able to reproduce this year!

	Feedback
A	Substitute 0.0000019 in the equation for the pH. Use your calculator to solve.
B	Substitute 0.0000019 in the equation for the pH. Use your calculator to solve.
C	Correct!
D	Substitute 0.0000019 in the equation for the pH. Use your calculator to solve.

PTS: 1 DIF: 2

REF: 164b99d2-4683-11df-9c7d-001185f0d2ea

OBJ: 8-3.5 Application

STA: MCC9-12.F.LE.4

LOC: MTH.C.10.07.12.008

TOP: 8-3 Logarithmic Functions

DOK: DOK 3

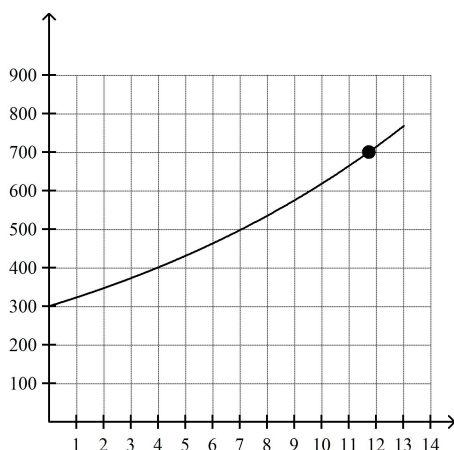
72. ANS: A

Step 1 Write a function to model the expected growth in value of the stock.

$$f(t) = a(1+r)^t$$

Exponential growth function

$$f(t) = 300(1+0.075)^t$$

Substitute 300 for a and 0.075 for r .**Step 2** Graph the function.**Step 3** Use the graph to predict when the value of the stock will reach \$700. Use the [TRACE] feature to find the t -value when $f(t) \approx 700$.The value of the function is approximately \$700 when $t \approx 11.72$. Thus, the stock will be worth \$700 about 11.72 years after it was bought, or sometime in 2009.

	Feedback
A	Correct!
B	Substitute 300 for a , and 0.075 for r in the exponential growth function. Graph and then use the [TRACE] function on your calculator.
C	Substitute 300 for a , and 0.075 for r in the exponential growth function. Graph and then use the [TRACE] function on your calculator.
D	Substitute 300 for a , and 0.075 for r in the exponential growth function. Graph and then use the [TRACE] function on your calculator.

PTS: 1

DIF: 1

REF: 163886f2-4683-11df-9c7d-001185f0d2ea

OBJ: 8-1.2 Application

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.e | NT.CCSS.MTH.10.9-12.F.IF.8.b | NT.CCSS.MTH.10.9-12.F.LE.2 |

NT.CCSS.MTH.10.9-12.F.LE.5

STA: MCC9-12.A.CED.2

LOC: MTH.C.10.07.11.010

TOP: 8-1 Exponential Functions, Growth, and Decay

DOK: DOK 2

73. ANS: A

	Feedback
A	Correct!
B	This is not a random sample. Customers who do not subscribe to the program guide have no chance of being in the sample.

PTS: 1 DIF: 2 REF: 9079866f-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 1-2.1 Determining if a Sample is Biased
 NAT: NT.CCSS.MTH.10.9-12.S.IC.1 | NT.CCSS.MTH.10.9-12.S.IC.3 | NT.CCSS.MTH.10.9-12.S.MD.6
 STA: MCC9-12.S.IC.1 | MCC9-12.S.IC.3 TOP: 1-2 Data Gathering
 KEY: sample | biased sample DOK: DOK 3

74. ANS: B

Write the function in the form $g(x) = \frac{1}{x-h} + k$ where $x = h$ is the vertical asymptote and helps find the domain, and $y = k$ is the horizontal asymptote and helps find the range.

$$g(x) = \frac{1}{x-(7)} + 3, \text{ so } h = -7 \text{ and } k = 3.$$

Vertical asymptote: $x = -7$
 Domain: $\{x|x \neq -7\}$

Horizontal asymptote: $y = 3$
 Range: $\{y|y \neq 3\}$

	Feedback
A	The vertical asymptote is at the value of x that makes the denominator equal 0.
B	Correct!
C	The vertical asymptote is at the value of x that makes the denominator equal 0. The horizontal asymptote is equal to the vertical translation of the parent function.
D	The horizontal asymptote is equal to the vertical translation of the parent function.

PTS: 1 DIF: 2 REF: 16b21f46-4683-11df-9c7d-001185f0d2ea
 OBJ: 6-4.2 Determining Properties of Hyperbolas NAT: NT.CCSS.MTH.10.9-12.F.IF.7.d
 STA: MCC9-12.F.IF.5 LOC: MTH.C.10.09.04.04.006
 TOP: 6-4 Rational Functions DOK: DOK 2

75. ANS: D

$$(\sqrt{11x})^2 = (3\sqrt{x+2})^2$$

$$11x = 9(x+2)$$

$$11x = 9x + 18$$

$$2x = 18$$

$$x = 9$$

Square both sides.

Simplify.

Distribute 9.

Solve for x .

	Feedback
A	Square both terms when squaring a product.
B	Square both terms when squaring a product, and distribute correctly.
C	Distribute correctly.
D	Correct!

PTS: 1

DIF: 2

REF: 16daa762-4683-11df-9c7d-001185f0d2ea

OBJ: 7-2.2 Solving Equations Containing Two Radicals

NAT: NT.CCSS.MTH.10.9-12.A.REI.2

LOC: MTH.C.10.06.07.003

TOP: 7-2 Solving Radical Equations and Inequalities

DOK: DOK 1

76. ANS: D

	Feedback
A	The null hypothesis is that the treatment does not have an effect.
B	The null hypothesis is that the treatment does not have an effect.
C	The null hypothesis is that the treatment does not have an effect.
D	Correct!

PTS: 1

DIF: 2

REF: 908efba2-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-1.1 Analyzing a Controlled Experiment

NAT: NT.CCSS.MTH.10.9-12.S.IC.5

STA: MCC9-12.S.IC.5

TOP: 2-1 Sampling of Experimental Results

KEY: significance | experiment

DOK: DOK 3

77. ANS: C

$$y = \frac{k}{x} \quad y \text{ varies inversely as } x.$$

$$4 = \frac{k}{-4} \quad \text{Substitute the given values.}$$

$$-16 = k \quad \text{Solve for } k.$$

$$y = -\frac{16}{x} \quad \text{Write the variation function.}$$

Make a table of values to graph $y = -\frac{16}{x}$. Use both positive and negative values.

x	y
-8	2
-6	$2.\bar{6}$
-4	4
0	Undefined
4	-4
6	$-2.\bar{6}$
8	-2

	Feedback
A	This equation does not have the correct constant of variation. To find k , use $xy = k$ and substitute the given x - and y -values.
B	Inverse variation equations are in the form $y = k/x$.
C	Correct!
D	This equation does not have the correct constant of variation. To find k , use $xy = k$ and substitute the given x - and y -values.

PTS: 1

DIF: 2

REF: 1697e552-4683-11df-9c7d-001185f0d2ea

OBJ: 6-1.4 Writing and Graphing Inverse Variation

NAT: NT.CCSS.MTH.10.9-12.A.CED.2 | NT.CCSS.MTH.10.9-12.F.IF.7.d

STA: MCC9-12.A.CED.2

LOC: MTH.C.10.07.09.01.006 | MTH.C.10.07.09.01.01.001

TOP: 6-1 Variation Functions

KEY: inverse variation | relationship | graph

DOK: DOK 2

78. ANS: B

	Feedback
A	A set that is closed under one operation is not necessarily closed under that operation's inverse.
B	Correct!
C	Check the reasoning supporting the answer.
D	Check the reasoning supporting the answer.

PTS: 1 DIF: 2 REF: 905a87d0-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 6-3-Ext.3 Determining Closure of Polynomials NAT: NT.CCSS.MTH.10.9-12.A.APR.1
 STA: MCC9-12.A.APR.1 TOP: 6-3-Ext Polynomials, Rational Expressions, and Closure
 KEY: polynomial operations | closure DOK: DOK 3

79. ANS: B

$$f(x) = x + \frac{2}{3} \quad \text{The number } \frac{2}{3} \text{ is added to } x.$$

$$f^{-1}(x) = x - \frac{2}{3} \quad \text{Subtract } \frac{2}{3} \text{ from } x \text{ to write the inverse.}$$

	Feedback
A	The opposite of addition is subtraction, and vice versa.
B	Correct!
C	Add or subtract the same number.
D	The opposite of addition is subtraction, and vice versa.

PTS: 1 DIF: 1 REF: 163d72ba-4683-11df-9c7d-001185f0d2ea
 OBJ: 8-2.2 Writing Inverse Functions by Using Inverse Operations
 NAT: NT.CCSS.MTH.10.9-12.F.BF.4.a STA: MCC9-12.F.BF.4a
 LOC: MTH.C.10.07.14.02.005 TOP: 8-2 Inverses of Relations and Functions
 DOK: DOK 2

80. ANS: A

$$\ln e^{-5x} = -5x \ln e = -5x(1) = -5x$$

	Feedback
A	Correct!
B	Use the inverse property of ln.
C	Use the inverse property of ln.
D	Remember the variable.

PTS: 1 DIF: 1 REF: 1661361e-4683-11df-9c7d-001185f0d2ea
 OBJ: 9-3.2 Simplifying Expressions with e or ln STA: MCC9-12.F.BF.5
 LOC: MTH.C.10.05.03.05.004 | MTH.C.10.05.11.007 TOP: 9-3 The Natural Base, e
 DOK: DOK 2

81. ANS: B

	Feedback
A	Check your answer. Does $a - b$ have to be a whole number?
B	Correct!

PTS: 1 DIF: 2 REF: 9055ea2a-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 6-3-Ext.2 Determining Closure of the Set of Rational Numbers Under Operations
 STA: MCC9-12.A.APR.7 TOP: 6-3-Ext Polynomials, Rational Expressions, and Closure
 KEY: whole number operations | closure DOK: DOK 3

82. ANS: A

$$4^? = \frac{1}{16} \quad \text{The log is the exponent.}$$

$$4^{-2} = \frac{1}{16} \quad \text{Think: What power of the base is the number?}$$

$$\log_4 \frac{1}{16} = -2$$

	Feedback
A	Correct!
B	Since the logarithm is the exponent, think: What power of the base is the number?
C	Since the logarithm is the exponent, think: What power of the base is the number?
D	Since the logarithm is the exponent, think: What power of the base is the number?

PTS: 1 DIF: 2 REF: 16493776-4683-11df-9c7d-001185f0d2ea
 OBJ: 8-3.3 Evaluating Logarithms by Using Mental Math NAT: NT.CCSS.MTH.10.9-12.F.BF.5
 STA: MCC9-12.F.BF.5 LOC: MTH.P.04.002 | MTH.C.10.07.12.01.001
 TOP: 8-3 Logarithmic Functions DOK: DOK 3

83. ANS: A

Step 1 Find the mean.

$$\bar{x} = \frac{1+5+8+5+1}{5} = 4$$

Step 2 Find the difference between the mean and each data value, and square it.

Data Value	1	5	8	5	1
$x - \bar{x}$	-3	1	4	1	-3
$(x - \bar{x})^2$	9	1	16	1	9

Step 3 Find the variance. Find the average of the last row of the table.

$$\sigma^2 = \frac{9+1+16+1+9}{5} = 7.2$$

Step 4 Find the standard deviation. The standard deviation is the square root of the variance.

$$\sigma = \sqrt{7.2} \approx 2.68$$

The mean is 4, and the standard deviation is about 2.68.

	Feedback
A	Correct!
B	Check your calculations.
C	The standard deviation is the square root of the variance.
D	Find the mean, then find the difference between the mean and each data value. Square the differences and take the square root of their average to find the standard deviation.

PTS: 1 DIF: 2 REF: 17aed95e-4683-11df-9c7d-001185f0d2ea

OBJ: 1-1.4 Finding the Mean and Standard Deviation STA: MCC9-12.S.ID.2

LOC: MTH.C.13.04.02.01.01.001 | MTH.C.13.04.02.02.011

TOP: 1-1 Measures of Central Tendency and Variation DOK: DOK 3

84. ANS: A

<p>Case 1: LCD is positive.</p> <p>Step 1 Solve for x.</p> $\frac{5}{x+3}(x+3) < 6(x+3)$ $5 < 6x + 18$ $-13 < 6x$ $x > -\frac{13}{6}$ <p>Step 2 Consider the value of the LCD.</p> $0 < x + 3$ $x > -3$ <p>For case 1, the solution must satisfy the compound inequality $x > -\frac{13}{6}$ and $x > -3$ which simplifies to $x > -\frac{13}{6}$.</p>	<p>Case 2: LCD is negative.</p> <p>Step 1 Solve for x.</p> $\frac{5}{x+3}(x+3) > 6(x+3)$ $5 > 6x + 18$ $-13 > 6x$ $x > -\frac{13}{6}$ <p>Step 2 Consider the value of the LCD.</p> $0 > x + 3$ $x < -3$ <p>For case 2, the solution must satisfy the compound inequality $x < -\frac{13}{6}$ and $x < -3$ which simplifies to $x < -3$.</p>
---	--

The solution to the original inequality is the union of the solutions to the two cases: $x < -3$ or $x > -\frac{13}{6}$.

	Feedback
A	Correct!
B	Check your answer with the original inequality.
C	Solve for the case when the LCD is positive and the case when the LCD is negative.
D	Solve for the case when the LCD is positive and the case when the LCD is negative.

PTS: 1 DIF: 2 REF: 16c06d6e-4683-11df-9c7d-001185f0d2ea
 OBJ: 6-5.6 Solving Rational Inequalities Algebraically NAT: NT.CCSS.MTH.10.9-12.A.REI.2
 STA: MCC9-12.A.REI.11 LOC: MTH.C.10.08.06.001
 TOP: 6-5 Solving Rational Equations and Inequalities DOK: DOK 3

85. ANS: A

Write $g(x)$ in the form $g(x) = a\sqrt{\frac{1}{b}(x-h)} + k$.

$$g(x) = 1\sqrt{\frac{1}{\frac{1}{3}}(x-0)} + 0$$

Thus $b = \frac{1}{3}$. Compress f horizontally by a factor of $\frac{1}{3}$.

	Feedback
A	Correct!
B	$g(x) = \sqrt{\frac{x}{b}}$ represents a horizontal compression by a factor of b .
C	$g(x) = \sqrt{\frac{x}{b}}$ represents a horizontal compression by a factor of b .
D	$g(x) = \sqrt{\frac{x}{b}}$ represents a horizontal compression by a factor of b .

PTS: 1 DIF: 2 REF: 16cee2a6-4683-11df-9c7d-001185f0d2ea

OBJ: 7-1.2 Transforming Square-Root Functions

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.b | NT.CCSS.MTH.10.9-12.F.BF.3

STA: MCC9-12.F.IF.7b

LOC: MTH.C.10.07.16.01.01.007

TOP: 7-1 Radical Functions

DOK: DOK 2

86. ANS: D

Step 1 Solve for x .

$$(-3x + 18)^{\frac{1}{2}} = x$$

$$\left[(-3x + 18)^{\frac{1}{2}}\right]^2 = x^2$$

Raise both sides to the reciprocal power.

$$-3x + 18 = x^2$$

Simplify.

$$x^2 + 3x - 18 = 0$$

Write in standard form.

$$(x + 6)(x - 3) = 0$$

Factor.

$$x + 6 = 0 \text{ or } x - 3 = 0$$

Use the Zero-Product Property.

$$x = -6 \text{ or } x = 3$$

Solve for x .**Step 2** Use substitution to check for extraneous solutions.

$$\begin{array}{l|l} (-3x + 18)^{\frac{1}{2}} = x & \\ \hline [(-3)(-6) + 18]^{\frac{1}{2}} & -6 \\ (36)^{\frac{1}{2}} & -6 \\ 6 & -6 \end{array}$$

$$\begin{array}{l|l} (-3x + 18)^{\frac{1}{2}} = x & \\ \hline [(-3)(3) + 18]^{\frac{1}{2}} & 3 \\ (9)^{\frac{1}{2}} & 3 \\ 3 & 3 \end{array}$$

Because $x = -6$ does not satisfy the original equation, it is extraneous. The only solution is $x = 3$.

	Feedback
A	Use substitution to check for extraneous solutions.
B	Raise both sides to the reciprocal power and solve for x . Use substitution to check your solution.
C	Raise both sides to the reciprocal power and solve for x . Use substitution to check your solution.
D	Correct!

PTS: 1

DIF: 2

REF: 16dd09be-4683-11df-9c7d-001185f0d2ea

OBJ: 7-2.4 Solving Equations with Rational Exponents

NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.REI.2

LOC: MTH.C.10.02.02.012 | MTH.C.10.06.07.003

TOP: 7-2 Solving Radical Equations and Inequalities

DOK: DOK 2

87. ANS: D

Step 1 Identify how each transformation affects the function.Horizontal stretch by a factor of 4: $|b| = 4$ Reflection across the y -axis: b is negativeTranslation left 2 units: $h = -3$ **Step 2** Write the transformed function.

$$g(x) = \sqrt{\frac{1}{b}(x-h)}$$

$$g(x) = \sqrt{\frac{1}{-4}[x - (-2)]}$$

Substitute -4 for b and -2 for h .

$$g(x) = \sqrt{-\frac{1}{4}(x+2)}$$

Simplify.

	Feedback
A	This is a translation of $f(x)$ to the right.
B	This is a horizontal compression of $f(x)$ by $1/4$.
C	This is a reflection of $f(x)$ across the x -axis.
D	Correct!

PTS: 1

DIF: 2

REF: 16d3804e-4683-11df-9c7d-001185f0d2ea

OBJ: 7-1.4 Writing Transformed Square-Root Functions

NAT: NT.CCSS.MTH.10.9-12.F.BF.3

STA: MCC9-12.F.BF.3

TOP: 7-1 Radical Functions

DOK: DOK 2

88. ANS: D

Jason's rate: $\frac{1}{4}$ of the wall per hourLet Ahmed's rate be $\frac{1}{h}$ of the wall per hour.Given: Jason's rate ($\frac{1}{4}$) plus Ahmed's rate ($\frac{1}{h}$) = the entire wall in 80 minutes.

$$\frac{1}{4} + \frac{1}{h} = \frac{3}{4}$$

$$4h \cdot \left(\frac{1}{4} + \frac{1}{h}\right) = 4h \cdot \frac{3}{4} \quad \text{Multiply by the LCD.}$$

$$h + 4 = 3h \quad \text{Simplify.}$$

$$2 = h \quad \text{Solve for } h.$$

Ahmed can paint the entire wall by himself in 2 hours.

	Feedback
A	That's how long it takes Jeremy to paint the entire wall working alone.
B	That's how long it takes them to paint the entire wall working together.
C	Solve for h , not $1/h$.
D	Correct!

PTS: 1 DIF: 2 REF: 16bbcf6-4683-11df-9c7d-001185f0d2ea

OBJ: 6-5.4 Application NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.CED.1 LOC: MTH.C.10.06.06.01.002

TOP: 6-5 Solving Rational Equations and Inequalities KEY: algebra | equation | rate

DOK: DOK 3

89. ANS: C

	Feedback
A	Check your answers for Diagrams 1 and 3.
B	Check your answers for Diagrams 2 and 3.
C	Correct!
D	Check your answers for Diagrams 1 and 2.

PTS: 1 DIF: 3 REF: 909ae769-6ab2-11e0-9c90-001185f0d2ea

STA: MCC9-12.S.IC.3 TOP: 2-2 Sampling Distributions

KEY: sampling methods DOK: DOK 4

90. ANS: C

Method 1 Change to base 10.

$$\log_9 243 = \frac{\log 243}{\log 9} = \frac{2.3856}{0.9542} \quad \text{Use a calculator.}$$

$$\log_9 243 = 2.5$$

Method 2 Change to base 3, because both 9 and 243 are powers of 3.

$$\log_9 243 = \frac{\log_3 243}{\log_3 9} = \frac{5}{2} = 2.5$$

	Feedback
A	To find the base b logarithm of a number n , divide the base 10 logarithm of n by the base 10 logarithm of b .
B	To find the base b logarithm of a number n , divide the base 10 logarithm of n by the base 10 logarithm of b .
C	Correct!
D	To find the base b logarithm of a number n , divide the base 10 logarithm of n by the base 10 logarithm of b .

PTS: 1

DIF: 2

REF: 1652e7f6-4683-11df-9c7d-001185f0d2ea

OBJ: 9-1.5 Changing the Base of a Logarithm

NAT: NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.BF.5

TOP: 9-1 Properties of Logarithms

DOK: DOK 3

91. ANS: A

The ranges of both sets are not equal: $92 - 71 = 21$ and $90 - 73 = 17$.The medians of both sets are not equal: $77 \neq 76$.The variances of both sets are not equal: $67.14 \neq 37.71$.

The means of both sets are equal:

$$\frac{71 + 71 + 75 + 77 + 83 + 91 + 92}{7} = 80$$

$$\frac{73 + 75 + 76 + 76 + 83 + 87 + 90}{7} = 80$$

	Feedback
A	Correct!
B	The variances are not equal.
C	The range of the first set is 21, and the range of the second set is 23.
D	The median of the first set is 77, and the median of the second set is 76.

PTS: 1

DIF: 3

REF: 17b13bba-4683-11df-9c7d-001185f0d2ea

NAT: NT.CCSS.MTH.10.9-12.S.ID.2 | NT.CCSS.MTH.10.9-12.S.ID.3

STA: MCC9-12.S.ID.2 | MCC9-12.S.ID.3

LOC: MTH.C.13.04.02.01.01.001

TOP: 1-1 Measures of Central Tendency and Variation

DOK: DOK 4

92. ANS: D

$$900 = 300(1.005)^{12t}$$

$$3 = 1.005^{12t}$$

$$\log 3 = \log 1.005^{12t}$$

$$\log 3 = (12t) \log 1.005$$

$$\frac{\log 3}{12 \log(1.005)} = t$$

$$t = 18.36$$

$$t \approx 19 \text{ years}$$

Write 900 for the amount.

Divide both sides by 300.

Take the log of both sides.

Use the Power Property.

Divide by $12 \log(1.005)$.

Evaluate with a calculator.

Round to the next year.

	Feedback
A	First divide by 300, then take the log of both sides. Use the Power Property to solve for t .
B	First divide by 300, then take the log of both sides. Use the Power Property to solve for t .
C	First divide by 300, then take the log of both sides. Use the Power Property to solve for t .
D	Correct!

PTS: 1 DIF: 2 REF: 1659e7fa-4683-11df-9c7d-001185f0d2ea

OBJ: 9-2.2 Application

NAT: NT.CCSS.MTH.10.9-12.F.LE.4 | NT.CCSS.MTH.10.9-12.A.SSE.3.c

STA: MCC9-12.F.LE.4 | MCC9-12.F.LE.1c

LOC: MTH.C.10.05.11.02.006 | MTH.C.10.06.08.004

TOP: 9-2 Exponential and Logarithmic Equations and Inequalities

DOK: DOK 3

93. ANS: A

	Feedback
A	Correct!
B	To find the expected value, multiply the number of tickets won times the probability for each possible outcome, then add the results.
C	To find the expected value, multiply the number of tickets won times the probability for each possible outcome, then add the results.
D	To find the expected value, multiply the number of tickets won times the probability for each possible outcome, then add the results.

PTS: 1 DIF: 2 REF: 90ab97e6-6ab2-11e0-9c90-001185f0d2ea

OBJ: 2-4.2 Using Expected Value in Real-World Situations STA: MCC9-12.S.MD.5b

TOP: 2-4 Analyzing Decisions

KEY: analyzing decisions | expected value

DOK: DOK 3

94. ANS: D

$$b^{x-2} < c$$

$$\log b^{x-2} < \log c$$

$$(x-2) \log b < \log c$$

$$x-2 < \frac{\log c}{\log b}$$

$$x < \frac{\log c}{\log b} + 2$$

Take the log of both sides.

Apply the Power Property of Logarithms.

Divide both sides by $\log b$.

	Feedback
A	You switched $\log(b)$ and $\log(c)$.
B	To find the solution, take the log of both sides.
C	To find the solution, take the log of both sides.
D	Correct!

PTS: 1

DIF: 3

REF: 165eacb2-4683-11df-9c7d-001185f0d2ea

NAT: NT.CCSS.MTH.10.9-12.F.LE.4 | NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.IF.7e

LOC: MTH.C.10.08.08.001

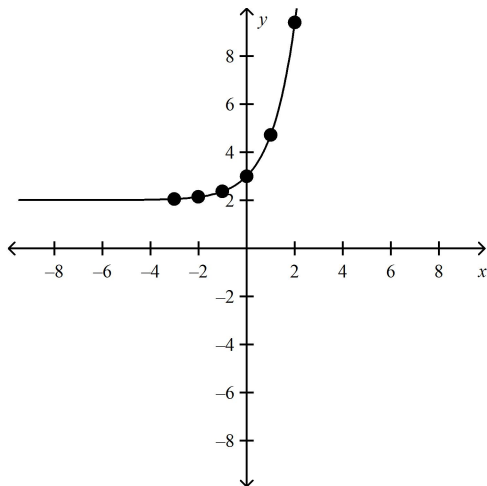
TOP: 9-2 Exponential and Logarithmic Equations and Inequalities

DOK: DOK 3

95. ANS: D

Make a table. Because e is irrational, round the values.

x	-3	-2	-1	0	1	2	3
$f(x) = e^x + 2$	2.05	2.14	2.37	3	4.72	9.39	22.09



	Feedback
A	Make a table to check your values.
B	Make a table to check your values.
C	Make a table to check your values.
D	Correct!

PTS: 1

DIF: 1

REF: 16610f0e-4683-11df-9c7d-001185f0d2ea

OBJ: 9-3.1 Graphing Exponential Functions

NAT: NT.CCSS.MTH.10.9-12.F.IF.7.e

STA: MCC9-12.F.IF.7e

LOC: MTH.C.10.07.11.03.004

TOP: 9-3 The Natural Base, e

DOK: DOK 2

96. ANS: A

$$\frac{5x^3}{3x^2y} \div \frac{25}{3y^9}$$

Rewrite as multiplication by the reciprocal.

$$= \frac{5x^3}{3x^2y} \cdot \frac{3y^9}{25}$$

Simplify by canceling common factors.

$$= \frac{xy^8}{5}$$

	Feedback
A	Correct!
B	To divide by a fraction, you multiply by its reciprocal.
C	To divide by a fraction, you multiply by its reciprocal.
D	Multiply the first fraction by the reciprocal of the second fraction.

PTS: 1

DIF: 1

REF: 16a195d2-4683-11df-9c7d-001185f0d2ea

OBJ: 6-2.4 Dividing Rational Expressions

NAT: NT.CCSS.MTH.10.9-12.A.APR.7

STA: MCC9-12.A.APR.7

LOC: MTH.C.10.05.09.014

TOP: 6-2 Multiplying and Dividing Rational Expressions

DOK: DOK 2

97. ANS: A

The base of the exponent becomes the base of the logarithm.

The exponent is the logarithm.

$$2^3 = 8 \text{ becomes } \log_2 8 = 3.$$

	Feedback
A	Correct!
B	The base of the exponent becomes the base of the logarithm.
C	A logarithm is the exponent to which a base is raised to obtain a given value.
D	The exponent is the logarithm.

PTS: 1

DIF: 1

REF: 164499ce-4683-11df-9c7d-001185f0d2ea

OBJ: 8-3.1 Converting from Exponential to Logarithmic Form

NAT: NT.CCSS.MTH.10.9-12.F.BF.5

STA: MCC9-12.F.BF.5

LOC: MTH.C.10.07.12.005 | MTH.C.10.07.12.009

TOP: 8-3 Logarithmic Functions

DOK: DOK 2

98. ANS: B

	Feedback
A	Check your classifications of the sample types.
B	Correct!
C	In Method C, does every member of the population have an equal chance of being selected?
D	Check your classifications of the sample types.

PTS: 1 DIF: 2 REF: 909b0e79-6ab2-11e0-9c90-001185f0d2ea
 OBJ: 2-2.2 Evaluating Sampling Methods NAT: NT.CCSS.MTH.10.9-12.S.IC.6
 STA: MCC9-12.S.IC.4 | MCC9-12.S.IC.6 TOP: 2-2 Sampling Distributions
 KEY: sampling methods DOK: DOK 3

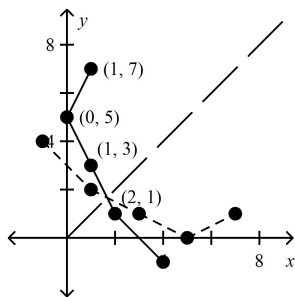
99. ANS: D

For the inverse relation, switch the x and y -values in each ordered pair.

x	4	2	1	0	1
y	-1	1	3	5	7

Graph each point and connect the points.

The inverse is the reflection of the original relation across the line $y = x$.



Domain: $\{x \mid 0 \leq x \leq 4\}$; Range: $\{y \mid -1 \leq y \leq 7\}$

	Feedback
A	To find the inverse, switch the x and y values of the original relation.
B	To find the inverse, switch the x and y values of the original relation.
C	To find the inverse, switch the x and y values of the original relation.
D	Correct!

PTS: 1 DIF: 1 REF: 163d4baa-4683-11df-9c7d-001185f0d2ea
 OBJ: 8-2.1 Graphing Inverse Relations
 NAT: NT.CCSS.MTH.10.9-12.F.IF.5 | NT.CCSS.MTH.10.9-12.F.BF.4.c
 STA: MCC9-12.F.BF.4c LOC: MTH.C.10.07.14.01.002
 TOP: 8-2 Inverses of Relations and Functions DOK: DOK 2

100. ANS: B

Step 1 Solve for x .

$$(\sqrt{6x-2})^2 \leq (3)^2$$

$$6x - 2 \leq 9$$

$$6x \leq 11$$

$$x \leq \frac{11}{6}$$

Square both sides.

Simplify.

Solve for x .**Step 2** Consider the radicand.

$$6x - 2 \geq 0$$

$$6x \geq 2$$

$$x \geq \frac{1}{3}$$

The radicand cannot be negative.

Solve for x .The solution to $\sqrt{6x-2} \leq 3$ is $x \leq \frac{11}{6}$ and $x \geq \frac{1}{3}$ or $\frac{1}{3} \leq x \leq \frac{11}{6}$

	Feedback
A	Square both sides of the equation.
B	Correct!
C	Remember to check the radical.
D	Square both sides of the equation. Remember to check the radical.

PTS: 1 DIF: 2 REF: 16df6c1a-4683-11df-9c7d-001185f0d2ea

OBJ: 7-2.5 Solving Radical Inequalities NAT: NT.CCSS.MTH.10.9-12.A.REI.2

STA: MCC9-12.A.REI.2 LOC: MTH.C.10.08.07.001

TOP: 7-2 Solving Radical Equations and Inequalities DOK: DOK 3