Name: ________________________ Class: ___________________ Date: __________ ID: A

Unit 3 Practice Test

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

____ 1. Distance that sound travels through air d varies directly as time t, and $d = 1{,}675$ ft when $t = 5$ s. Find t when $d = 10{,}050$ ft.

a. 25 sec
b. 30 sec
c. 40 sec
d. 35 sec

____ 2. The volume V of a cylinder varies jointly with the height h and the radius squared r^2, and $V = 150.72$ cm^3 when $h = 3$ cm and $r^2 = 16$ cm^2. Find V when $h = 4$ cm and $r^2 = 36$ cm^2. Round your answer to the nearest hundredth.

a. 3.14 cm^3
b. 452.16 cm^3
c. 40.00 cm^3
d. 150.72 cm^3

____ 3. 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?

a. 4 lawns
b. 5 lawns
c. 11 lawns
d. 16 lawns

____ 4. 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?

a. 1.60 atmospheres
b. 1.57 atmospheres
c. 1.25 atmospheres
d. 1.63 atmospheres

____ 5. Simplify $\dfrac{6r^2 - 12r}{r - 2}$. Identify any r-values for which the expression is undefined.

a. $6r$; $r \neq 2$
b. $6r$; no excluded values
c. $6r$; $r \neq 2$ or 0
d. $6r\left(r - 2\right)$; $r \neq 2$

____ 6. Simplify $\dfrac{48 - x^2 + 2x}{x^2 - 3x - 40}$. Identify any x-values for which the expression is undefined.

a. $\dfrac{-x-6}{x+5}$; The expression is undefined at $x = 8$ and $x = -5$.
b. $\dfrac{x+6}{x+5}$; The expression is undefined at $x = -5$.
c. $\dfrac{-x-6}{x+5}$; The expression is undefined at $x = -5$.
d. $\dfrac{x+6}{x+5}$; The expression is undefined at $x = 8$ and $x = -5$.

____ 7. Multiply $\frac{8x^4y^2}{3z^3} \cdot \frac{9xy^2z^6}{4y^4}$. Assume that all expressions are defined.

a. $6x^5z^3$
b. $\frac{3}{2}x^3y^2z$
c. $6x^5y^8z^9$
d. $6x^4yz^2$

____ 8. Divide $\frac{3x^6}{2x^5y} \div \frac{9}{2y^6}$. Assume that all expressions are defined.

a. $\frac{xy^5}{3}$
b. $\frac{27x}{4y^7}$
c. $\frac{x}{3y^5}$
d. $\frac{3}{xy^5}$

____ 9. Solve $\frac{x^2-8x+15}{x-5} = 2$. Check your answer.

a. $x = 3$
b. $x = 5$
c. $x = 7$
d. There is no solution because the original equation is undefined at $x = 5$.

____ 10. Subtract $\frac{-x^2+2x-4}{3x^2+48} - \frac{5x^2-6}{3x^2+48}$. Identify any x-values for which the expression is undefined.

a. $\frac{4x^2+2x-10}{3x^2+48}$; The expression is always defined.
b. $\frac{4x^2+2x-10}{3x^2+48}$; The expression is undefined at $x = \pm 4$.
c. $\frac{-6x^2+2x+2}{3x^2+48}$; The expression is undefined at $x = \pm 4$.
d. $\frac{-6x^2+2x+2}{3x^2+48}$; The expression is always defined.

____ 11. Find the least common multiple for $12(x+5)^2(x-3)^8$ and $15(x+5)^4(x-3)^2$.

a. $3(x+5)^4(x-3)^8$
b. $60(x+5)^4(x-3)^8$
c. $60(x+5)^2(x-3)^2$
d. $15(x+5)^2(x-3)^2$

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____ 12. Add $\frac{x+8}{x-5}+\frac{-18x-66}{x^2+2x-35}$. Identify any x-values for which the expression is undefined.

a. $\frac{x+2}{x+7}$; The expression is undefined at $x=-7$.

b. $\frac{x^2+15x+56}{(x+7)(x-5)}$; The expression is undefined at $x=-7$ and $x=5$.

c. $\frac{x+8}{(x-5)(x+7)}$; The expression is undefined at $x=-7$ and $x=5$.

d. $\frac{-17x-58}{x^2+3x-40}$; The expression is undefined at $x=-8$ and $x=5$.

____ 13. Subtract $\frac{2x^2-48}{x^2-9}-\frac{x+8}{x+3}$. Identify any x-values for which the expression is undefined.

a. $\frac{x+8}{x-3}$; The expression is undefined at $x=3$ and $x=-3$.

b. $\frac{x-8}{x+3}$; The expression is undefined at $x=3$ and $x=-3$.

c. $\frac{x^2+5x-72}{(x-3)(x+3)}$; The expression is undefined at $x=3$ and $x=-3$.

d. $\frac{x-8}{x-3}$; The expression is undefined at $x=3$ and $x=-3$.

____ 14. Simplify $\frac{\frac{-4}{x+6}+\frac{x-3}{10}}{\frac{x+4}{x+6}}$. Assume that all expressions are defined.

a. $\frac{x^2+3x-58}{10(x+4)}$

b. $\frac{x-43}{10(x+4)}$

c. $\frac{x^2+3x-58}{10\left(x^2+10x+24\right)}$

d. $\frac{x^3+9x^2-40x-348}{10\left(x^2+10x+24\right)}$

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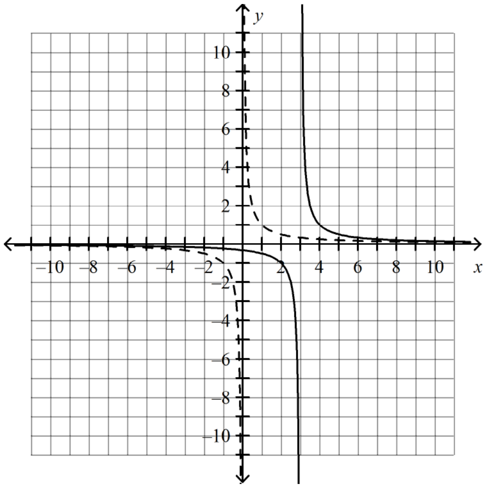
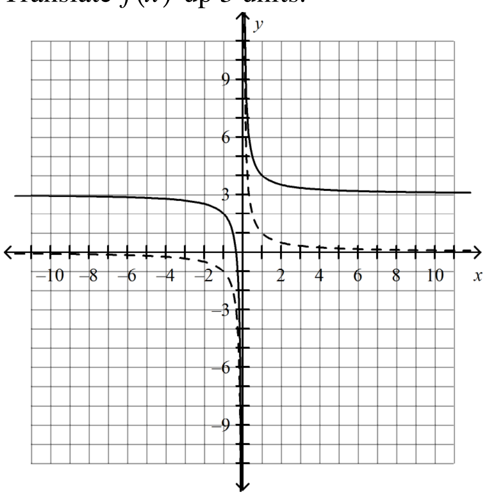
____ 15. Using the graph of $f(x) = \frac{1}{x}$ as a guide, describe the transformation and graph $g(x) = \frac{1}{x} + 3$.

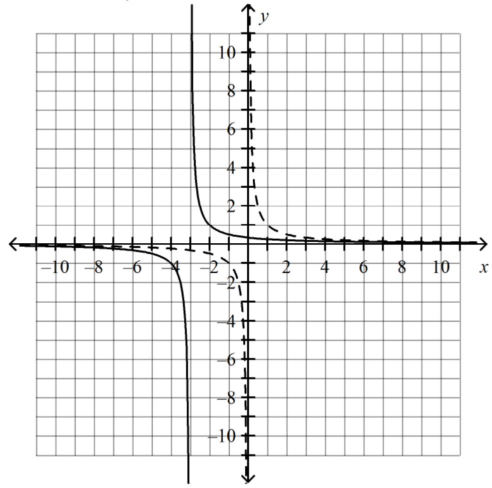
a. Translate $f(x)$ right 3 units.



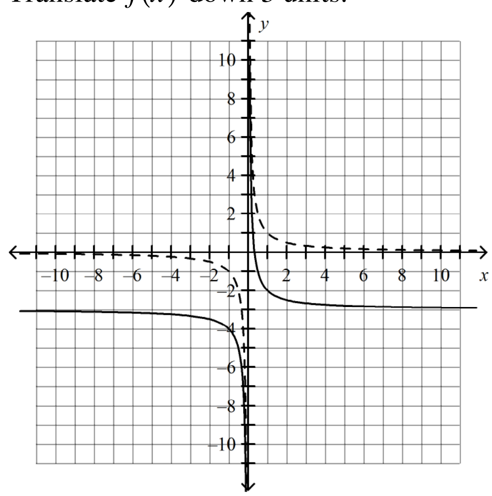
b. Translate $f(x)$ up 3 units.



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



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



____ 16. Identify the asymptotes, domain, and range of the function $g(x) = \dfrac{1}{x+5} - 1$.

a. Vertical asymptote: $x = -5$
Domain: $\{x | x \neq -5\}$
Horizontal asymptote: $y = 1$
Range: $\{y | y \neq 1\}$

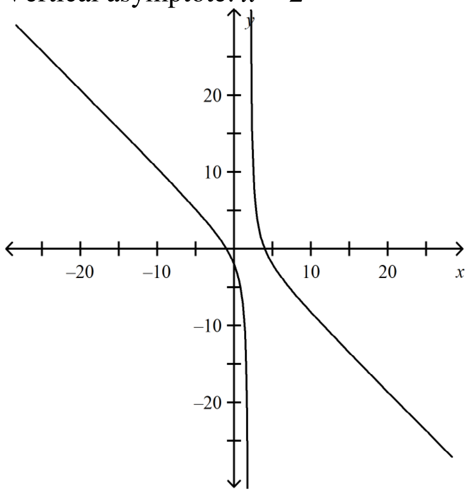
b. Vertical asymptote: $x = -5$
Domain: $\{x | x \neq -5\}$
Horizontal asymptote: $y = -1$
Range: $\{y | y \neq -1\}$

c. Vertical asymptote: $x = 5$
Domain: $\{x | x \neq 5\}$
Horizontal asymptote: $y = -1$
Range: $\{y | y \neq -1\}$

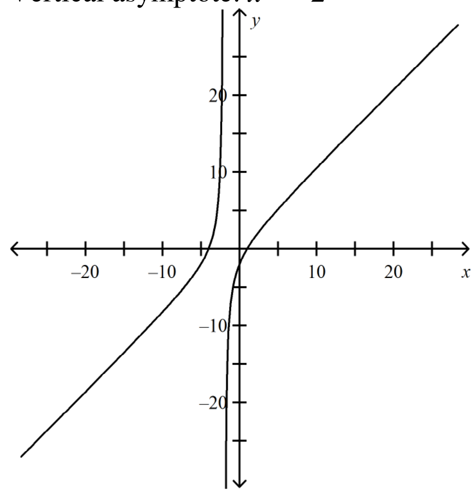
d. Vertical asymptote: $x = 5$
Domain: $\{x | x \neq 5\}$
Horizontal asymptote: $y = 1$
Range: $\{y | y \neq 1\}$

____ 17. Identify the zeros and vertical asymptotes of $g(x) = \dfrac{x^2 - 3x - 4}{x - 2}$. Then graph.

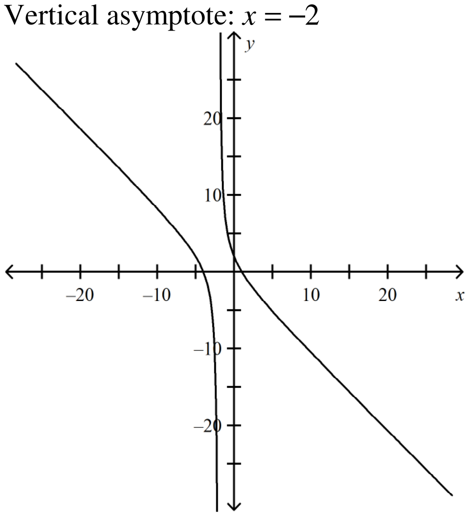
a. Zeros at 4 and −1.
Vertical asymptote: $x = 2$



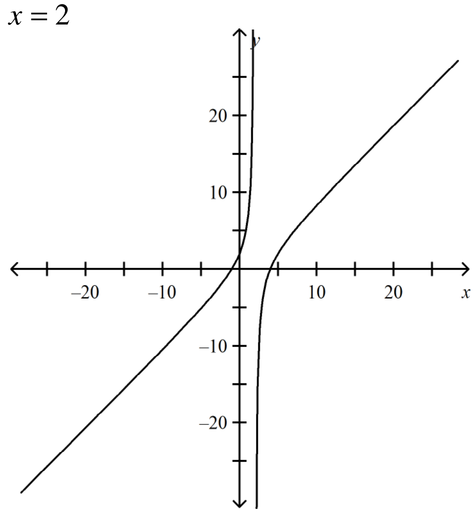
c. Zeros at –4 and 1.
Vertical asymptote: $x = -2$



b. Zeros at –4 and 1.
Vertical asymptote: $x = -2$



d. Zeros at 4 and −1.
Vertical asymptote:
$x = 2$



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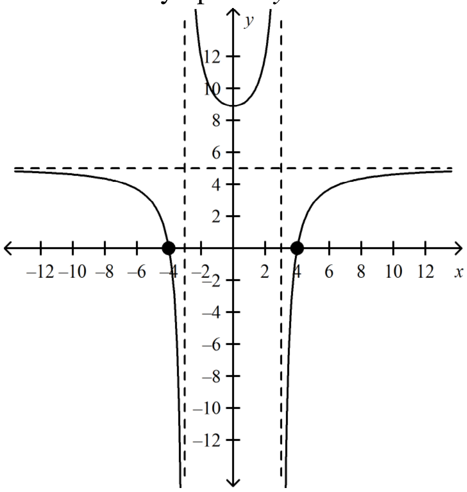
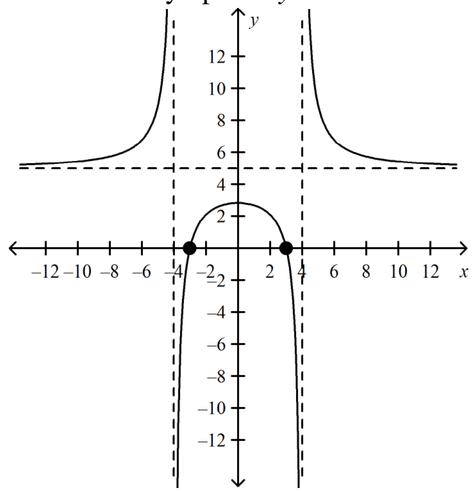
____ 18. Identify the zeros and asymptotes of $f(x) = \dfrac{5x^2 - 45}{x^2 - 16}$. Then graph.

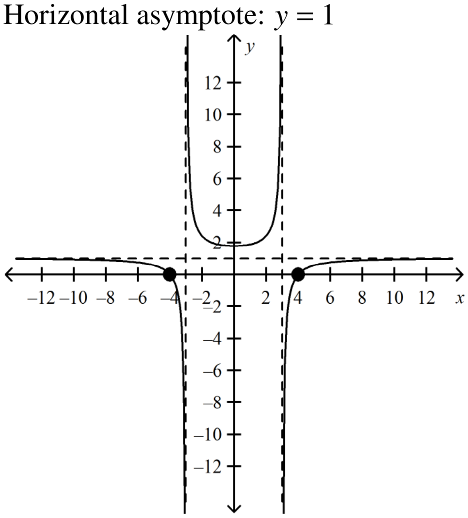
a. Zeros: –4 and 4
Vertical asymptotes: $x = -3$, $x = 3$
Horizontal asymptote: $y = 5$



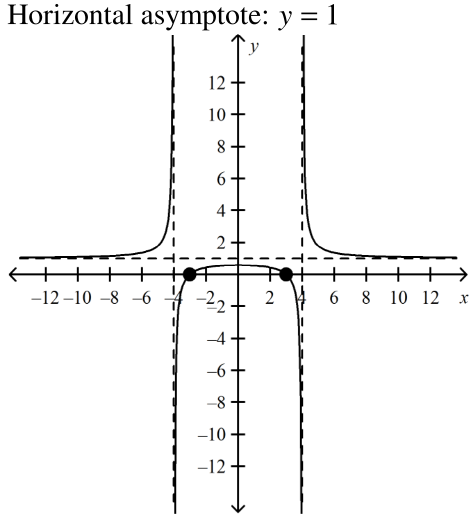
c. Zeros: –3 and 3
Vertical asymptotes: $x = -4$, $x = 4$
Horizontal asymptote: $y = 5$



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: $y = 1$



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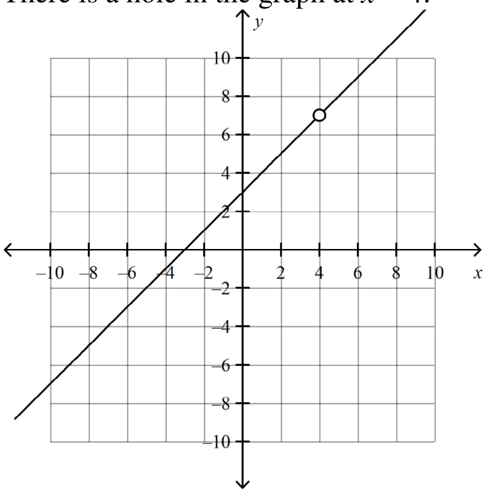
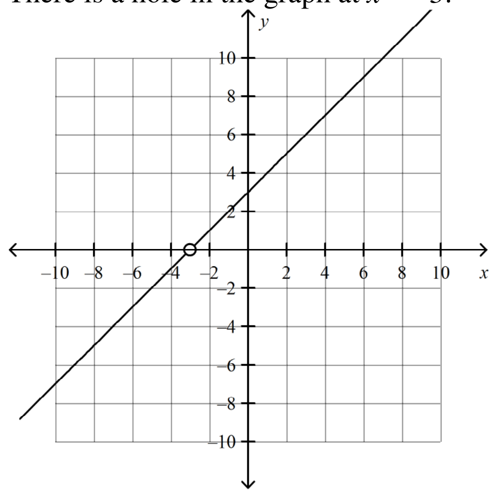
____ 19. Identify holes in the graph of $f(x) = \dfrac{x^2 + 7x + 12}{x + 4}$. Then graph.

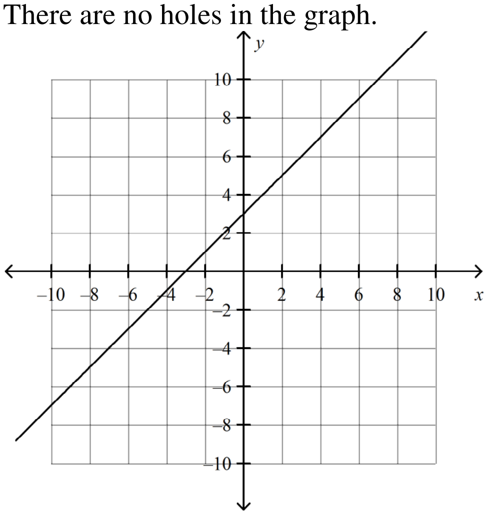
a. There is a hole in the graph at $x = 4$.



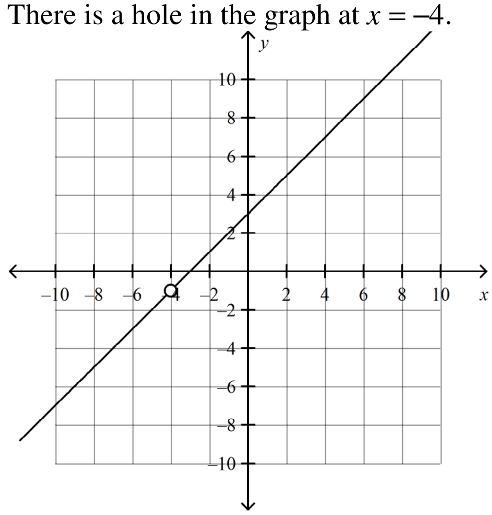
c. There is a hole in the graph at $x = -3$.



b. There are no holes in the graph.



d. There is a hole in the graph at $x = -4$.



____ 20. Solve the equation $x - 1 = \dfrac{6}{x}$.

a. $x = -2$
c. $x = 2$ or $x = -3$
b. $x = -2$ or $x = 3$
d. $x = 3$

____ 21. Solve the equation $\dfrac{5x}{x-7} = \dfrac{3x+14}{x-7}$.

a. There is no solution.
c. $x = 7$
b. $x = -7$
d. $x = -\frac{14}{3}$

____ 22. Solve $\dfrac{x}{x-6} \geq -1$ by using a graph and a table.

a. $x \leq 3$ or $x \geq 6$
c. $x \leq 3$ or $x > 6$
b. $3 \leq x < 6$
d. $3 \leq x \leq 6$

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____ 23. Solve the inequality $\frac{11}{x+8} < 7$ algebraically.

a. $x < -\frac{45}{7}$ or $x > -8$

b. $-8 < x < -\frac{45}{7}$

c. $x < -8$ or $x > -\frac{45}{7}$

d. $-\frac{45}{7} < x < -8$

____ 24. Solve the equation $\frac{2x}{x^2 - 7x - 18} = \frac{6x}{x^2 + x - 2}$.

a. $x = -2$, $x = 9$, or $x = 1$

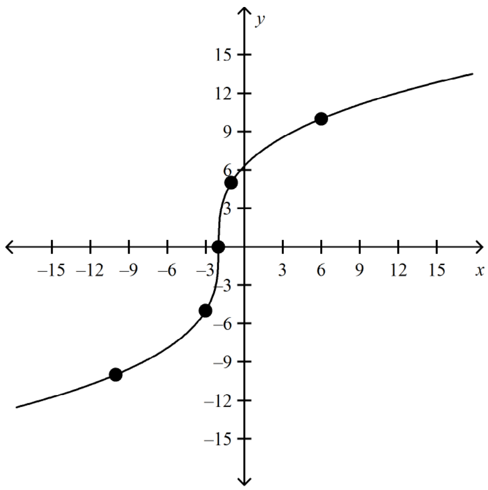
b. $x = 0$ or $x = 13$

c. $x = 0$ or $x = -13$

d. $x = 9$ or $x = 1$

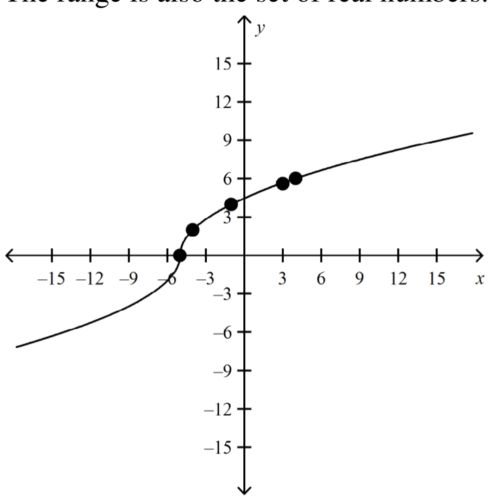
____ 25. Graph the function $f(x) = 2\sqrt[3]{x+5}$, and identify its domain and range.

a.



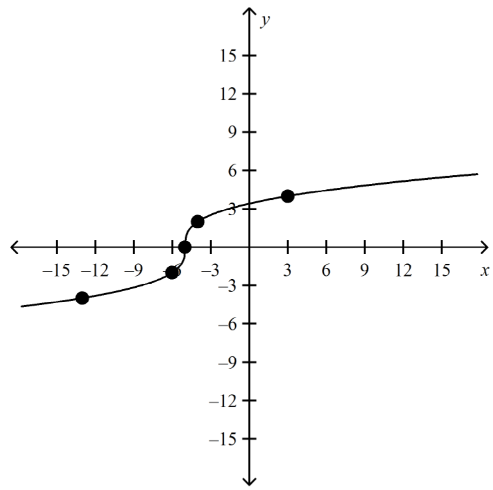
The domain is the set of all real numbers.
The range is also the set of real numbers.

b.



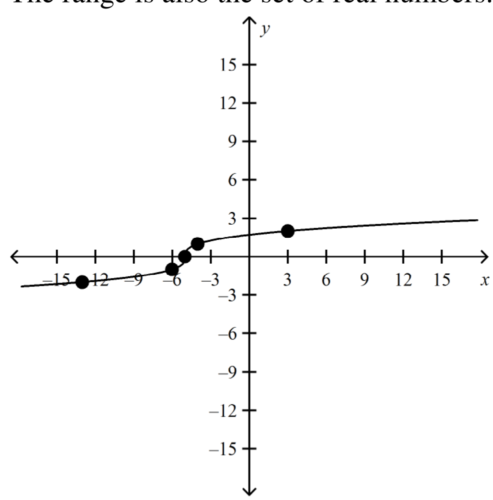
The domain is the set of all real numbers.
The range is also the set of real numbers.

c.



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

d.



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

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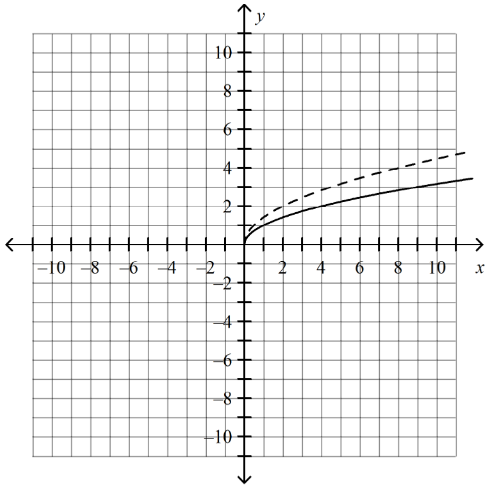
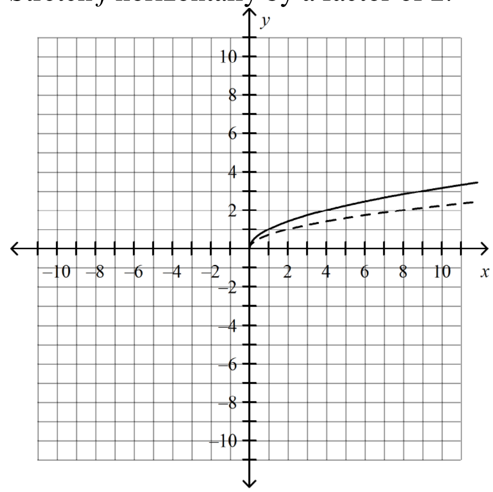
____ 26. Using the graph of $f(x) = \sqrt{x}$ as a guide, describe the transformation and graph $g(x) = \sqrt{2x}$.

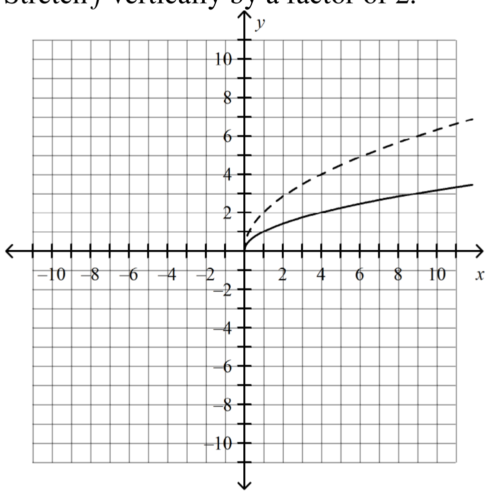
a. Compress f horizontally by a factor of $\frac{1}{2}$.



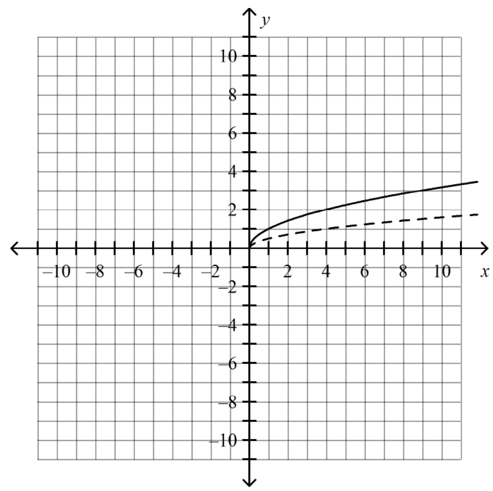
c. Stretch f horizontally by a factor of 2.



b. Stretch f vertically by a factor of 2.



d. Compress f vertically by a factor of $\frac{1}{2}$.



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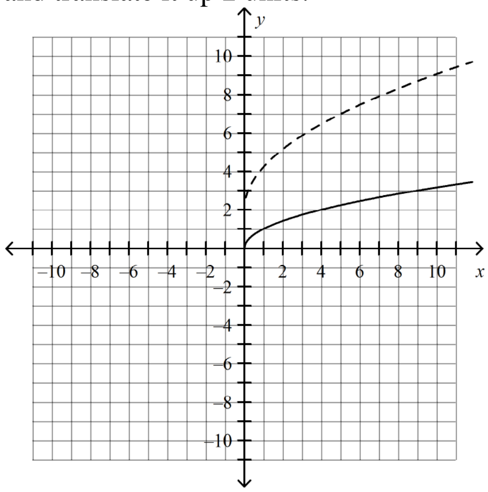
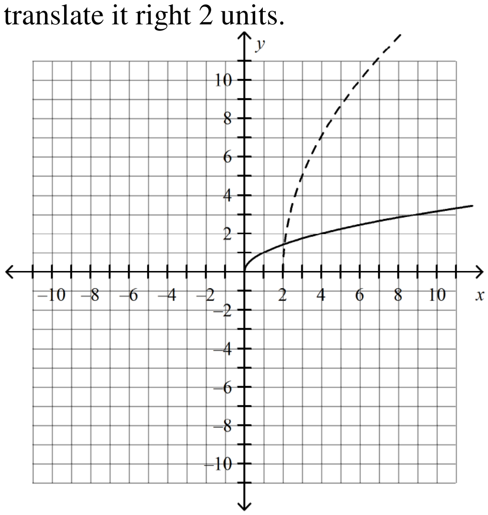
____ 27. Using the graph of $f(x) = \sqrt{x}$ as a guide, describe the transformation and graph $g(x) = 5\sqrt{x+2}$.

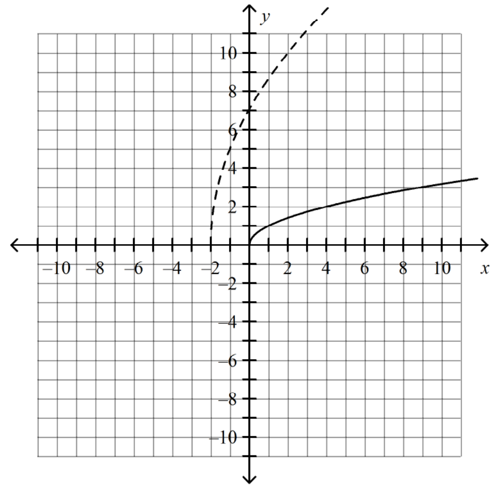
a. Compress *f* horizontally by a factor of $\frac{1}{5}$ and translate it up 2 units.



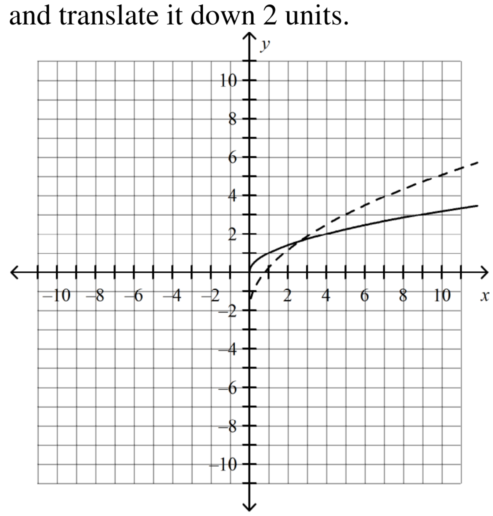
b. Stretch *f* vertically by a factor of 5 and translate it right 2 units.



c. Stretch *f* vertically by a factor of 5 and translate it left 2 units.



d. Compress *f* horizontally by a factor of $\frac{1}{5}$ and translate it down 2 units.



____ 28. 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. $g(x) = \sqrt{-\frac{1}{4}(x-2)}$

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

c. $g(x) = \sqrt{-4(x+2)}$

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

____ 29. 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.

a. 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.

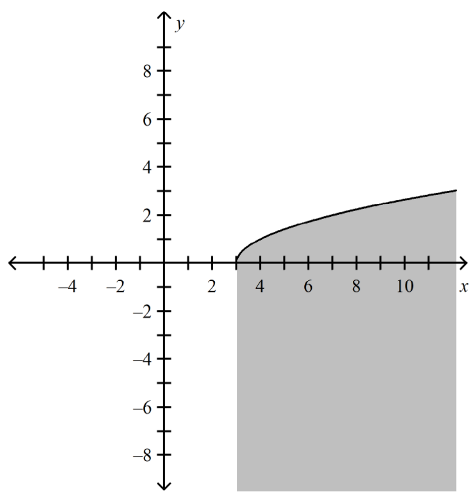
b. The maximum safe speed on a rainy day is represented by $g(r) = \frac{5}{8}\sqrt{1.6r}$.
The maximum safe speed around a curve with a radius of curvature of 1000 ft is 25 mph.

c. 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.

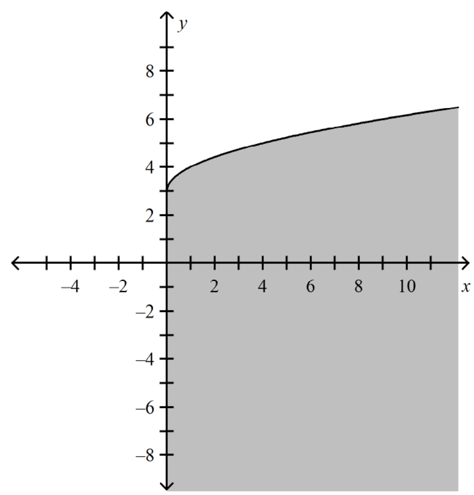
d. The maximum safe speed on a rainy day is represented by $g(r) = \sqrt{\frac{5}{8}(1.6)r}$.
The maximum safe speed around a curve with a radius of curvature of 1000 ft is 40 mph.

____ 30. Graph the inequality $y \le \sqrt{x-3}$

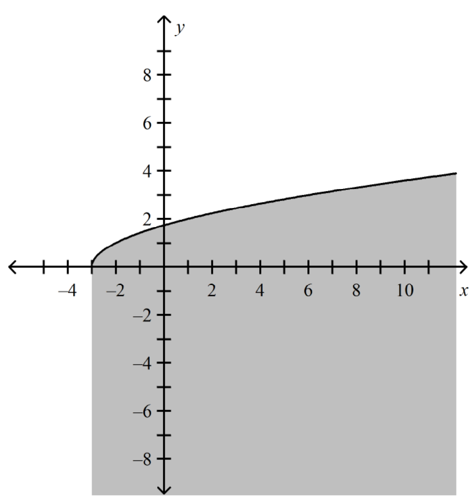
a.



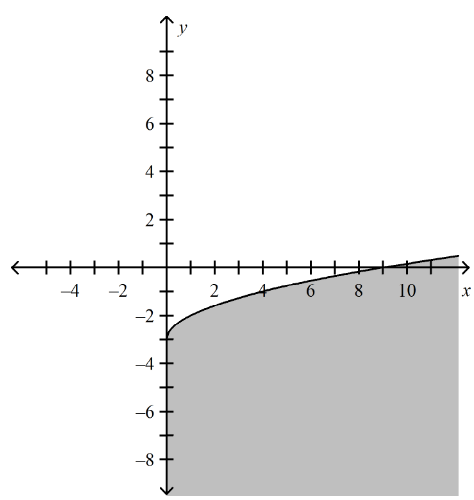
c.



b.



d.



____ 31. The function g is a translation 2 units right and 4 units down of $f(x) = \sqrt{x+8}$. Write the function $g(x)$.

a. $g(x) = \sqrt{x+6} + 4$
b. $g(x) = \sqrt{x+10}$
c. $g(x) = \sqrt{x+6} - 4$
d. $g(x) = \sqrt{x+14}$

____ 32. Solve the equation $1 + \sqrt{x-6} = 5$.

a. $x = 31$
b. $x = 16$
c. $x = 10$
d. $x = 22$

____ 33. Solve $\sqrt{7x} = 2\sqrt{x+3}$.

a. $x = 12$
b. $x = 6$
c. $x = 4$
d. $x = 9$

____ 34. Solve $\sqrt{x+8} = x+2$.

a. $x = 1$
b. $x = -4$
c. No solution. $\sqrt{x+8}$ is not defined for $x < -8$.
d. $x = 1$ or $x = -4$

____ 35. Solve $(2x+15)^{\frac{1}{2}} = x$.

a. $x = -5$ or $x = 3$
b. $x = 5$
c. $x = -3$
d. $x = 5$ or $x = -3$

____ 36. Solve $\sqrt{6x-5} \le 3$.

a. $x \le \frac{7}{3}$
b. $\frac{5}{6} \le x \le \frac{4}{3}$
c. $\frac{5}{6} \le x \le \frac{7}{3}$
d. $x \le \frac{4}{3}$

____ 37. The speed s in miles per hour that a car is traveling when it goes into a skid can be estimated by the formula $s = \sqrt{30fd}$, where f is the coefficient of friction and d is the length of the skid marks in feet. On the highway near Lake Tahoe, a police officer finds a car on the shoulder, abandoned by a driver after a skid and crash. He is sure that the driver was driving faster than the speed limit of 20 mi/h because the skid marks measure 9 feet and the coefficient of friction under those conditions would be 0.7. At about what speed was the driver driving at the time of the skid? Round your answer to the nearest mi/h.

a. 23 mi/h
b. 189 mi/h
c. 14 mi/h
d. 19 mi/h

____ 38. Solve the equation $x^2 - 7 = -x^2 + 1$ using tables.

a. $x = -2$ or 2
b. $x = -4$ or 0
c. $x = -3$ or 1
d. $x = -1$ or 3

Unit 3 Practice Test
Answer Section

MULTIPLE CHOICE

1. ANS: B

$r = 335$ ft per sec	Find the constant of variation r.
$d = 335t$	Write the direct variation function.
$10{,}050 = 335t$	Substitute.
$t = 30$	Solve.

It would take 30 seconds for sound to travel 10,050 feet.

	Feedback
A	Set up a proportion and solve.
B	Correct!
C	Use the direct variation equation $d = rt$.
D	First, write the direct variation function. Then, substitute the given values and solve.

PTS: 1 DIF: 2 REF: 169582f6-4683-11df-9c7d-001185f0d2ea
OBJ: 6-1.2 Solving Direct Variation Problems STA: MCC8.MP.1
LOC: MTH.C.10.07.02.04.009 TOP: 6-1 Variation Functions
DOK: DOK 2

2. ANS: B

$V = khr^2$	V varies jointly as h and r^2.
$150.72 = k(3)(16)$	Substitute 150.72 for V, 3 for h and 16 for r^2.
$3.14 = k$	Solve for k.
$V = (3.14)hr^2$	Replace k in the function.
$V = 3.14(4)(36)$	Substitute 4 for h and 36 for r^2.
$V = 452.16$	

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

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

3. ANS: D

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	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.
C	The number of shrubs was divided by 2, so the number of lawns should be multiplied by 2.
D	Correct!

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

4. ANS: C

$P = k\frac{T}{V}$	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	This is the pressure under the original conditions. Now find the new pressure with the new volume and temperature.
B	This would be the answer if the pressure varied inversely with the volume and temperature.
C	Correct!
D	This would be the answer if the pressure varied directly with 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

5. 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 *r*-values for which the expression is undefined.

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

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

6. ANS: A

$\dfrac{-1(x^2-2x-48)}{x^2-3x-40}$ Factor −1 from the numerator and reorder the terms.

$= \dfrac{-1(x+6)(x-8)}{(x+5)(x-8)}$ Factor the numerator and denominator.

$= \dfrac{-x-6}{x+5}$ Divide the common factors and simplify.

The expression is undefined at those *x*-values, 8 and −5, that make the original denominator 0.

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

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

7. ANS: A

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

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

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

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

8. ANS: A

$\dfrac{3x^6}{2x^5 y} \div \dfrac{9}{2y^6}$ Rewrite as multiplication by the reciprocal.

$= \dfrac{3x^6}{2x^5 y} \cdot \dfrac{2y^6}{9}$ Simplify by canceling common factors.

$= \dfrac{xy^5}{3}$

	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

9. ANS: D

$\frac{x^2 - 8x + 15}{x - 5} = 2$ Note that $x \neq 5$.

$\frac{(x - 5)(x - 3)}{x - 5} = 2$ Factor.

$x - 3 = 2$ The factor $(x - 5)$ 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	Factor the numerator and cancel common factors before solving for x. Is the original equation defined for this value of x?
D	Correct!

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

10. ANS: D

$\frac{-x^2 + 2x - 4}{3x^2 + 48} - \frac{5x^2 - 6}{3x^2 + 48}$

$= \frac{-x^2 + 2x - 4 - 5x^2 + 6}{3x^2 + 48}$ Subtract the numerators. Distribute the negative sign.

$= \frac{-6x^2 + 2x + 2}{3x^2 + 48}$ Combine like terms.

There is no real value of x for which $3x^2 + 48 = 0$; the expression is always defined.

	Feedback
A	Did you add or subtract the numerators?
B	Did you add or subtract the numerators?
C	The expression is undefined at $x = c$ if and only if the denominator is zero at $x = c$.
D	Correct!

PTS: 1 DIF: 1 REF: 16a65a8a-4683-11df-9c7d-001185f0d2ea
OBJ: 6-3.1 Adding and Subtracting Rational Expressions with Like Denominators
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

11. ANS: B
List the factors for each polynomial.
$12(x+5)^2(x-3)^8 = 4\cdot 3\cdot (x+5)^2\cdot (x-3)^8$ and $15(x+5)^4(x-3)^2 = 5\cdot 3\cdot (x+5)^4\cdot (x-3)^2$

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

The LCM is $4\cdot 5\cdot 3\cdot (x+5)^4(x-3)^8 = 60(x+5)^4(x-3)^8$.

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

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

12. ANS: A
$\frac{x+8}{x-5}+\frac{-18x-66}{(x+7)(x-5)}$ Factor the denominators. The LCD is $(x+7)(x-5)$.

$=\left(\frac{x+7}{x+7}\right)\frac{x+8}{x-5}+\frac{-18x-66}{(x+7)(x-5)}$ Multiply by $\left(\frac{x+7}{x+7}\right)$.

$=\frac{x^2+15x+56}{(x+7)(x-5)}+\frac{-18x-66}{(x+7)(x-5)}$

$=\frac{x^2-3x-10}{(x+7)(x-5)}$ Add the numerators.

$=\frac{(x+2)(x-5)}{(x+7)(x-5)}$ Factor the numerator.

$=\frac{x+2}{x+7}$ Divide the common factor.

To determine where the expression is undefined, solve for $x+7=0$.

	Feedback
A	Correct!
B	This is the first fraction rewritten with the common denominator. Add this to the second fraction.
C	Find a common denominator before adding the fractions.
D	Find a common denominator before adding the fractions.

PTS: 1 DIF: 2 REF: 16aaf832-4683-11df-9c7d-001185f0d2ea
OBJ: 6-3.3 Adding Rational Expressions NAT: NT.CCSS.MTH.10.9-12.A.APR.7
STA: MCC9-12.A.APR.7 LOC: MTH.C.10.05.09.009
TOP: 6-3 Adding and Subtracting Rational Expressions DOK: DOK 2

13. ANS: D

$\dfrac{2x^2-48}{(x-3)(x+3)}-\dfrac{x+8}{x+3}$	Factor the denominators.
$=\dfrac{2x^2-48}{(x-3)(x+3)}-\dfrac{x+8}{x+3}\left(\dfrac{x-3}{x-3}\right)$	The LCD is $(x-3)(x+3)$, so multiply $\dfrac{x+8}{x+3}$ by $\dfrac{x-3}{x-3}$.
$=\dfrac{2x^2-48-(x+8)(x-3)}{(x-3)(x+3)}$	Subtract the numerators.
$=\dfrac{2x^2-48-\left(x^2+5x-24\right)}{(x-3)(x+3)}$	Multiply the binomials in the numerator.
$=\dfrac{2x^2-48-x^2-5x+24}{(x-3)(x+3)}$	Distribute the negative sign.
$=\dfrac{x^2-5x-24}{(x-3)(x+3)}$	Write the numerator in standard form.
$=\dfrac{(x-8)(x+3)}{(x-3)(x+3)}=\dfrac{x-8}{x-3}$	Factor the numerator, and divide out common factors.

The expression is undefined at $x = 3$ and $x = -3$ because these values of x make the factors $(x-3)$ and $(x+3)$ equal 0.

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

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

14. ANS: A

Method 1 Write the complex fraction as division.

$\left(\frac{-4}{x+6}+\frac{x-3}{10}\right)\div\frac{x+4}{x+6}$	Divide.
$=\left(\frac{-4}{x+6}+\frac{x-3}{10}\right)\cdot\frac{x+6}{x+4}$	Multiply by the reciprocal.
$=\left(\frac{-4}{x+6}\left(\frac{10}{10}\right)+\frac{x-3}{10}\left(\frac{x+6}{x+6}\right)\right)\cdot\frac{x+6}{x+4}$	Add by finding the LCD.
$=\frac{x^2+3x-58}{10(x+6)}\cdot\frac{x+6}{x+4}$	The common factor $(x+6)$ cancels.
$=\frac{x^2+3x-58}{10(x+4)}$ or $\frac{x^2+3x-58}{10x+40}$	Simplify.

Method 2 Multiply the numerator and denominator of the complex fraction by the LCD of the fractions in the numerator and denominator.

$\dfrac{\frac{-4}{x+6}(10)(x+6)+\frac{x-3}{10}(10)(x+6)}{\frac{x+4}{x+6}(10)(x+6)}$	The LCD is $10(x+6)$.
$=\frac{-4(10)+(x-3)(x+6)}{10(x+4)}$	Cancel common factors.
$=\frac{x^2+3x-58}{10(x+4)}$ or $\frac{x^2+3x-58}{10x+40}$	Simplify.

	Feedback
A	Correct!
B	Multiply both addends in the numerator by the reciprocal of the denominator, not just the first.
C	Multiply the numerator by the reciprocal of the denominator.
D	Multiply the numerator by the reciprocal of the denominator.

PTS: 1 DIF: 2 REF: 16ad5a8e-4683-11df-9c7d-001185f0d2ea
OBJ: 6-3.5 Simplifying Complex Fractions NAT: NT.CCSS.MTH.10.9-12.A.APR.7
STA: MCC9-12.A.APR.7 LOC: MTH.C.10.05.09.01.002
TOP: 6-3 Adding and Subtracting Rational Expressions DOK: DOK 2

15. ANS: B

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

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

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

	Feedback
A	$(1/x) + c$ represents a vertical translation of $f(x)$.
B	Correct!
C	$(1/x) + c$ represents a vertical translation of $f(x)$.
D	The sign of c determines whether $(1/x) + c$ represents a vertical translation of $f(x)$ $\lvert c \rvert$ 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

16. ANS: B

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

$g(x) = \dfrac{1}{x-(5)} - 1$, so $h = –5$ and $k = –1$.

Vertical asymptote: $x = -5$
Domain: $\{x | x \neq -5\}$

Horizontal asymptote: $y = -1$
Range: $\{y | y \neq -1\}$

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

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

17. ANS: D

Factor the numerator.

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

The zeros are the values that make the numerator zero, $x = 4$ and $x = -1$.
The vertical asymptote is where the denominator is zero, $x = 2$.
Plot the zeros and draw the asymptote, then make a table of values to fill in missing points.

	Feedback
A	Factor the numerator. Zeros are the *x*-values that make the numerator zero. The asymptote is where the denominator is zero.
B	Factor the numerator. Zeros are the *x*-values that make the numerator zero. The asymptote is where the denominator is zero.
C	Factor the numerator. Zeros are the *x*-values that make the numerator zero. The asymptote is where the denominator is zero.
D	Correct!

PTS: 1 DIF: 2 REF: 16b481a2-4683-11df-9c7d-001185f0d2ea
OBJ: 6-4.3 Graphing Rational Functions with Vertical 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

18. ANS: C

$f(x)=\dfrac{5(x+3)(x-3)}{(x+4)(x-4)}$	Factor the numerator and denominator.
Zeros: –3 and 3	The numerator is 0 when $x=-3$ or $x=3$.
Vertical asymptotes: $x=-4$, $x=4$	The denominator is 0 when $x=-4$ or $x=4$.
Horizontal asymptote: $y=5$	Both p and q have the same degree: 2. The horizontal asymptote is $y=\dfrac{\text{leading coefficient of } p}{\text{leading coefficient of } q}=\dfrac{5}{1}=5$

.

	Feedback
A	You reversed the values of the zeros and the vertical asymptotes.
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	Correct!
D	To find the horizontal asymptote, divide the leading coefficient of p by the leading coefficient of q.

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

19. ANS: D

$f(x)=\dfrac{x^2+7x+12}{x+4}$

$=\dfrac{(x+4)(x+3)}{x+4}$	Factor the numerator. $x+4$ is a factor in both the numerator and the denominator, so there is a hole at $x=-4$.
$=x+3$	Divide out common factors.

Except for the hole at $x=-4$, the graph of f is the same as $y=x+3$. On the graph, indicate the hole with an open circle. The domain of f is $\{x \mid x\neq -4\}$.

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

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

20. ANS: B

$x(x)-(x)=\frac{6}{x}(x)$	Multiply each term by the LCD.
$x^2-x=6$	Simplify. Note $x \neq 0$
$x^2-x-6=0$	Write in standard form.
$(x+2)(x-3)=0$	Factor.
$x+2=0$ or $x-3=0$	Apply the Zero-Product Property.
$x=-2$ or $x=3$	Solve for *x*.

Check:

$x-1=\frac{6}{x}$

$-2-1$	$\frac{6}{-2}$
-3	-3

$x-1=\frac{6}{x}$

$3-1$	$\frac{6}{3}$
2	2

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

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

21. ANS: A

$\frac{5x}{x-7}(x-7) = \frac{3x+14}{x-7}(x-7)$	Multiply each term by the LCD, $(x - 7)$.
$5x = 3x + 14$	Simplify. Note that x g 7.
$2x = 14$	Solve for x.
$x = 7$	

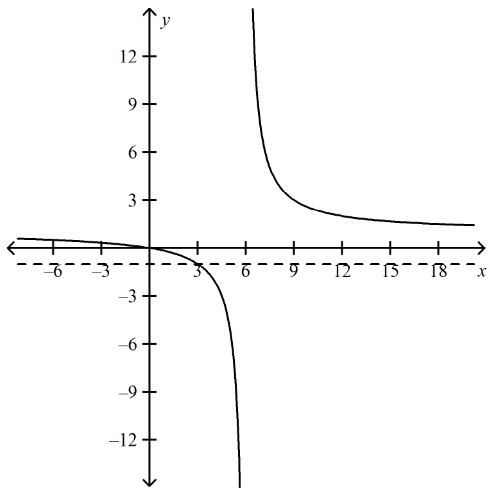
The solution $x = 7$ is extraneous because it makes the denominators of the original equation equal to 0. Therefore the equation has no solution.

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

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

22. ANS: C

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



X	*Y*1	*Y*2
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 $\dfrac{x}{x-6}$ 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 $y = \dfrac{x}{x-6}$ is undefined when $x = 6$.

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

23. ANS: C

Case 1: LCD is positive.	Case 2: LCD is negative.
Step 1 Solve for *x*. $\frac{11}{x+8}(x+8) < 7(x+8)$ $11 < 7x + 56$ $-45 < 7x$ $x > -\frac{45}{7}$ **Step 2** Consider the value of the LCD. $0 < x + 8$ $x > -8$ For case 1, the solution must satisfy the compound inequality $x > -\frac{45}{7}$ and $x > -8$ which simplifies to $x > -\frac{45}{7}$.	**Step 1** Solve for *x*. $\frac{11}{x+8}(x+8) > 7(x+8)$ $11 > 7x + 56$ $-45 > 7x$ $x > -\frac{45}{7}$ **Step 2** Consider the value of the LCD. $0 > x + 8$ $x < -8$ For case 2, the solution must satisfy the compound inequality $x < -\frac{45}{7}$ and $x < -8$ which simplifies to $x < -8$.

The solution to the original inequality is the union of the solutions to the two cases: $x < -8$ or $x > -\frac{45}{7}$.

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

24. ANS: B

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

$\frac{2x}{(x+2)(x-9)}=\frac{6x}{(x+2)(x-1)}$	Factor the denominator.
$2x(x-1)=6x(x-9)$	Multiply each term by the LCD $(x+2)(x-9)(x-1)$ and simplify. Note that $x \neq -2$, $x \neq 9$, and $x \neq 1$.
$2x^2-2x=6x^2-54x$	Use the Distributive Property.
$4x^2-52x=0$	Write in standard form.
$4x(x-13)=0$	Factor.
$4x=0$ or $x-13=0$	Use the Zero-Product Property.
$x=0$ or $x=13$	Solve for x.

	Feedback
A	A rational expression is undefined for any value of a variable that makes a denominator in the expression equal to 0.
B	Correct!
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

25. ANS: C
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	$2\sqrt[3]{x+5}$	**(x, $f(x)$)**
–13	$2\sqrt[3]{-13+5} = 2\sqrt[3]{-8} = -4$	(–13, –4)
–6	$2\sqrt[3]{-6+5} = 2\sqrt[3]{-1} = -2$	(–6, –2)
–5	$2\sqrt[3]{-5+5} = 2\sqrt[3]{0} = 0$	(–5, 0)
–4	$2\sqrt[3]{-4+5} = 2\sqrt[3]{1} = 2$	(–4, 2)
3	$2\sqrt[3]{3+5} = 2\sqrt[3]{8} = 4$	(3, 4)

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	The function whose graph you need to draw is a product of a number and a cube root.
C	Correct!
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

26. ANS: A

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

$g(x) = 1\sqrt{\frac{1}{\frac{1}{2}}(x-0)} + 0$

Thus $b = \frac{1}{2}$. Compress f horizontally by a factor of $\frac{1}{2}$.

	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

27. ANS: C

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

$g(x) = 5\sqrt{\frac{1}{1}\left(x-(-2)\right)} + 0$

Thus $a = 5$ and $h = -2$. Stretch *f* vertically by a factor of 5 and translate it left 2 units.

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

28. 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 negative
Translation left 2 units: $h = -3$

Step 2 Write the transformed function.

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

$g(x) = \sqrt{\frac{1}{-4}\left[x-(-2)\right]}$ 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 reflection of $f(x)$ across the x-axis.
C	This is a horizontal compression of $f(x)$ by 1/4.
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

29. ANS: B

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

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

30. ANS: A

Use the related equation $y = \sqrt{x-3}$ to make a table of values

x	3	4	7	12
y	0	1	2	3

Use the table to graph the boundary curve. The inequality sign is ≤, so use a solid curve and shade the region below it. Because the value of $x - 3$ cannot be less than 0, do not shade to the left of $x = 3$.

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

31. ANS: C

$\sqrt{x+8} \Rightarrow \sqrt{(x-2)+8} = \sqrt{x+6}$ Replace *f(x)* with *f(x – h)* and simplify.

$\sqrt{x+6} \Rightarrow \sqrt{x+6} - 4$ Replace *f(x – h)* with *f(x – h) + k*.

	Feedback
A	For the vertical translation, replace $f(x)$ with $f(x) + k$.
B	Don't combine the vertical and horizontal units of translation.
C	Correct!
D	For the horizontal translation, replace $f(x)$ with $f(x – h)$.

PTS: 1 DIF: 3 REF: 16d609ba-4683-11df-9c7d-001185f0d2ea
NAT: NT.CCSS.MTH.10.9-12.F.BF.3 STA: MCC9-12.F.BF.3
TOP: 7-1 Radical Functions DOK: DOK 2

32. ANS: D

$\sqrt{x-6}=4$	Subtract 1 from both sides.
$x-6=16$	Square both sides.
$x=22$	Simplify.

Check

$1+\sqrt{22-6}=5$

$1+\sqrt{16}=5$

$1+4=5$

$5=5$ OK

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

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

33. ANS: C

$(\sqrt{7x})^2=(2\sqrt{x+3})^2$	Square both sides.
$7x=4(x+3)$	Simplify.
$7x=4x+12$	Distribute 4.
$3x=12$	Solve for *x*.
$x=4$	

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

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

34. ANS: A

Step 1 Solve for *x*.

$\left(\sqrt{x+8}\right)^2 = (x+2)^2$	Square both sides.
$x+8 = x^2+4x+4$	Simplify.
$0 = x^2+3x-4$	Write in standard form.
$0 = (x-1)(x+4)$	Factor.
$x-1=0$ or $x+4=0$	Solve for *x*.
$x=1$ or $x=-4$	

Step 2 Use substitution to check for extraneous solutions.

$\sqrt{x+8} = x+2$

$\sqrt{1+8}$	$1+2$
$\sqrt{9}$	3
3	3

$\sqrt{x+8} = x+2$

$\sqrt{-4+8}$	$-4+2$
$\sqrt{4}$	-2
2	-2

Because $x = -4$ does not satisfy the original equation, it is extraneous.
The only solution is $x = 1$.

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

35. ANS: B

Step 1 Solve for *x*.

$(2x+15)^{\frac{1}{2}} = x$

$\left[(2x+15)^{\frac{1}{2}}\right]^2 = x^2$	Raise both sides to the reciprocal power.
$2x+15 = x^2$	Simplify.
$x^2 - 2x - 15 = 0$	Write in standard form.
$(x-5)(x+3) = 0$	Factor.
$x-5=0$ or $x+3=0$	Use the Zero-Product Property.
$x=5$ or $x=-3$	Solve for *x*.

Step 2 Use substitution to check for extraneous solutions.

$(2x+15)^{\frac{1}{2}}$	$= x$
$\left[(2)(5)+15\right]^{\frac{1}{2}}$	5
$(25)^{\frac{1}{2}}$	5
5	5

$(2x+15)^{\frac{1}{2}}$	$= x$
$\left[(2)(-3)+15\right]^{\frac{1}{2}}$	−3
$(9)^{\frac{1}{2}}$	−3
3	−3

Because $x = -3$ does not satisfy the original equation, it is extraneous. The only solution is $x = 5$.

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

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

36. ANS: C

Step 1 Solve for *x*.

$(\sqrt{6x-5})^2 \le (3)^2$	Square both sides.
$6x-5 \le 9$	Simplify.
$6x \le 14$	Solve for *x*.
$x \le \frac{7}{3}$	

Step 2 Consider the radicand.

$6x-5 \ge 0$	The radicand cannot be negative.
$6x \ge 5$	Solve for *x*.
$x \ge \frac{5}{6}$	

The solution to $\sqrt{6x-5} \le 3$ is $x \le \frac{7}{3}$ and $x \ge \frac{5}{6}$ or $\frac{5}{6} \le x \le \frac{7}{3}$

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

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

38. ANS: A

	Feedback
A	Correct!
B	Check your answers by substituting them into the equation.
C	Check your answers by substituting them into the equation.
D	Check your answers by substituting them into the equation.

PTS: 1 DIF: 2 REF: 9061aee1-6ab2-11e0-9c90-001185f0d2ea
OBJ: 7-2-Ext.3 Using a Graphing Calculator Table to Solve NAT: NT.CCSS.MTH.10.9-12.A.REI.11
STA: MCC9-12.A.REI.11 TOP: 7-2-Ext Solving Equations Graphically
KEY: solving using tables | quadratic equation DOK: DOK 3

Unit 3 Practice Test [Answer Strip] ID: A

__B__ 1.

__B__ 2.

__D__ 3.

__C__ 4.

__A__ 5.

__A__ 6.

__A__ 7.

__A__ 8.

__D__ 9.

__D__ 10.

__B__ 11.

__A__ 12.

__D__ 13.

__A__ 14.

__B__ 15.

__B__ 16.

__D__ 17.

C 18.

D 19.

B 20.

A 21.

C 22.

C 23.

B 24.

C 25.

A 26.

C 27.

D 28.

Unit 3 Practice Test [Answer Strip] **ID: A**

__B__ 29.

__C__ 31.

__D__ 32.

__C__ 33.

__A__ 34.

__A__ 30.

__B__ 35.

__C__ 36.

__C__ 37.

__A__ 38.