PARCC Assessment Readiness

UNIT 3 Review/Test

Organizer

Objective: Provide review and practice for this unit and standardized tests.

Resources

Assessment Resources
Unit Assessment

Go to **my.hrw.com** for updated online PARCC-aligned *Assessment Readiness*.

Standard	Items
MCC9-12.A.APR.6	9, 10, 21, 25, 29
MCC9-12.A.APR.7(+)	3, 6, 24
MCC9-12.A.CED.2	1, 8, 26
MCC9-12.A.CED.3	27, 28, 31, 32
MCC9-12.A.REI.2	2, 5, 12–19, 22
MCC9-12.F.IF.4	11, 30, 34
MCC9-12.F.IF.7b	4, 27, 28
MCC9-12.F.IF.7d(+)	23
MCC9–12.F.LE.2	7
MCC9-12.G.GMD.3	20, 33
MCC.MP.4	26

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Selected Response

1. Given: y varies jointly as x and z, and $y = 16$ when $x = \frac{1}{2}$ and $z = 8$. What equation represents the joint variation function?

Ⓐ $y = \frac{4x}{z}$
Ⓑ $y = 4x$
Ⓒ $y = \frac{1}{4}xz$
Ⓓ $y = 4xz$

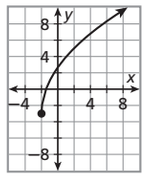
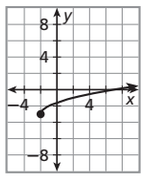
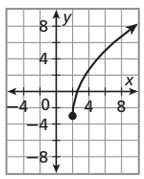
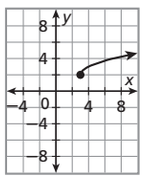
2. What is the solution of the equation $\sqrt{3x + 2} = 3\sqrt{2x - 2}$?

Ⓕ $x = \frac{4}{15}$
Ⓖ $x = \frac{8}{15}$
Ⓗ $x = \frac{4}{3}$
Ⓙ $x = \frac{8}{3}$

3. Which expression can be simplified to a rational number?

Ⓐ $\sqrt{1} + \sqrt{8}$
Ⓑ $\sqrt{10} \cdot \sqrt{25}$
Ⓒ $(\sqrt{15})^2$
Ⓓ $\sqrt{\frac{20}{4}}$

4. Which is the graph of the function $f(x) = 4\sqrt{x + 2} - 3$?

Ⓕ 
Ⓗ 
Ⓖ 
Ⓙ 

HOT TIP! If you have extra time at the end of a test, go back and check your answers. Remember that you can always check the solution to an equation by substituting your answer to see if it makes the equation true.

5. What value of x makes the equation true?
$\frac{7}{4} = \frac{3}{x} + 1$

Ⓐ 1
Ⓑ 3
Ⓒ 4
Ⓓ 7

6. Simplify the expression.
$\frac{5x}{x + \frac{1}{4}} - \frac{20x}{4x + 1}$

Ⓕ 0
Ⓖ 4
Ⓗ $x + 1$
Ⓙ $\frac{1}{4x + 1}$

7. Determine whether the data set represents a direct variation, an inverse variation, or neither.

x	y
2	420
3	280
4	210

Ⓐ Direct variation
Ⓑ Inverse variation
Ⓒ Neither

8. 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?

Ⓕ 1.60 atmospheres
Ⓖ 1.57 atmospheres
Ⓗ 1.25 atmospheres
Ⓙ 1.63 atmospheres

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9. Simplify $\frac{2z^3 - 6z^2}{z^2 - 3z}$. Identify any z-values for which the expression is undefined.

(A) $2z$; $z^2 - 3z$; $z \neq 3$ or 0

(B) $2z$; $z \neq 3$ or 0

(C) $2z$; no excluded values

(D) $2z$; $z \neq 3$

10. 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?

(F) $x + 8$

(G) $x + 4.00$

(H) $x + 2$

(J) $x - 2$

11. Identify the asymptotes, domain, and range of the function $g(x) = \frac{1}{x + 7} + 3$.

(A) Vertical asymptote: $x = -7$
Domain: $\{x | x \neq -7\}$
Horizontal asymptote: $y = -3$
Range: $\{y | y \neq -3\}$

(B) Vertical asymptote: $x = 7$
Domain: $\{x | x \neq 7\}$
Horizontal asymptote: $y = 3$
Range: $\{y | y \neq 3\}$

(C) Vertical asymptote: $x = 7$
Domain: $\{x | x \neq 7\}$
Horizontal asymptote: $y = -3$
Range: $\{y | y \neq -3\}$

(D) Vertical asymptote: $x = -7$
Domain: $\{x | x \neq -7\}$
Horizontal asymptote: $y = 3$
Range: $\{y | y \neq 3\}$

12. Solve the equation $\frac{6x}{x - 3} = \frac{4x + 6}{x - 3}$.

(F) $x = -\frac{3}{2}$

(G) $x = 3$

(H) $x = -3$

(J) There is no solution.

13. 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.

(A) 118 mph

(B) 125 mph

(C) 121 mph

(D) Cannot determine. To determine the average speed, you need the time it took for each leg of the trip, not the total time.

14. 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?

(F) 2 hours

(G) 80 minutes

(H) 4 hours

(J) 30 minutes

15. Solve $\frac{x}{x - 6} \geq -1$ by using a graph and a table.

(A) $x \leq 3$ or $x \geq 6$

(B) $3 \leq x < 6$

(C) $x \leq 3$ or $x > 6$

(D) $3 \leq x \leq 6$

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

(F) $-3 < x < -\frac{13}{6}$

(G) $x < -3$ or $x > -\frac{13}{6}$

(H) $-\frac{13}{6} < x < -3$

(J) $x < -\frac{13}{6}$ or $x > -3$

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Mini-Task Rubric

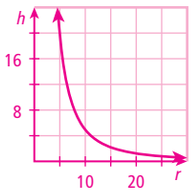
Items 26–32

2 Points = The student's answer is an accurate and complete execution of the task or tasks.

1 Point = The student's answer contains attributes of an appropriate response but is flawed.

0 Points = The student's answer contains no attributes of an appropriate response.

Performance Task Rubric

Task	Possible points
33a	1 point for correctly rewriting the equation as $h = \frac{V}{\pi r^2}$
b	1 point for rewriting the equation as $h = \frac{1550}{\pi r^2}$ and 1 point for making the graph 
c	1 point for choosing an r value and correctly calculating the value of h, and 1 point for identifying that point on their graph Possible answer: $r = 10$ cm, and $h \approx 4.9$ cm
d	1 point for correctly calculating the radius of the lid given the radius they chose in part **c** Possible answer: The container has a radius of 10 cm, so the lid must have a radius of 10.2 cm.
Total possible points: 6	

17. Simplify the expression $\sqrt[4]{256z^{16}}$. Assume that all variables are positive.

Ⓐ $\sqrt[4]{256z^4}$

Ⓑ $4z^4$

Ⓒ $4z^{11}$

Ⓓ $\sqrt[4]{256z^{11}}$

18. Write the expression $8^{\frac{5}{3}}$ in radical form, and simplify. Round to the nearest whole number if necessary.

Ⓕ $\left(\sqrt[5]{8}\right)^3$; 3

Ⓖ $\left(\sqrt[3]{8}\right)^5$; 32

Ⓗ $\sqrt[5]{8}$; 32

Ⓙ $\frac{8^5}{8^3}$; 64

19. Simplify the expression $(27)^{\frac{1}{3}} \cdot (27)^{\frac{2}{3}}$.

Ⓐ 729

Ⓑ 3

Ⓒ 9

Ⓓ 27

20. The surface area S of a cube with volume V is $S = 6V^{\frac{2}{3}}$. What effect does increasing the volume of a cube by a factor of 7 have on the on the surface area?

Ⓕ The surface area increases by a factor of 7.

Ⓖ The surface area increases by a factor of 7^2.

Ⓗ The surface area increases by a factor of $7^{-\frac{1}{3}}$.

Ⓙ The surface area increases by a factor of $7^{\frac{2}{3}}$.

21. 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 $x = -4$.

Ⓑ $\frac{x+5}{x+4}$; The expression is undefined at $x = -4$.

Ⓒ $\frac{x+5}{x+4}$; The expression is undefined at $x = 2$ and $x = -4$.

Ⓓ $\frac{-x-5}{x+4}$; The expression is undefined at $x = 2$ and $x = -4$.

22. Simplify the expression $\sqrt[3]{-x^6}$.

Ⓕ $x^{\frac{1}{2}}$

Ⓖ $-x^{\frac{1}{2}}$

Ⓗ x^2

Ⓙ $-x^2$

23. Identify the asymptotes, domain, and range of the function $f(x) = \frac{1}{x-2} - 1$.

Ⓐ Vertical asymptote: $x = 2$
Domain: $\{x \mid x \neq 2\}$
Horizontal asymptote: $y = 1$
Range: $\{y \mid y \neq -1\}$

Ⓑ Vertical asymptote: $x = -2$
Domain: $\{x \mid x \neq 2\}$
Horizontal asymptote: $y = 1$
Range: $\{y \mid y \neq -1\}$

Ⓒ Vertical asymptote: $x = 2$
Domain: $\{x \mid x \neq -2\}$
Horizontal asymptote: $y = 1$
Range: $\{y \mid y \neq -1\}$

Ⓓ Vertical asymptote: $x = 2$
Domain: $\{x \mid x \neq 2\}$
Horizontal asymptote: $y = -1$
Range: $\{y \mid y \neq -1\}$

24. Which expression can NOT be simplified to a rational number?

Ⓕ $\sqrt[3]{8}$

Ⓖ $\sqrt[4]{5}$

Ⓗ $\sqrt{169}$

Ⓙ $\sqrt[3]{-64}$

25. At what value(s) is the expression $\frac{4}{6 - 5x + x^2}$ undefined?

Ⓐ $x = 5$

Ⓑ $x = -2, 6$

Ⓒ $x = 2, 3$

Ⓓ It is defined for all values of x.

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