1. Consider the rational function $f(x) = \frac{2x}{4x-2}$. Express the the domain D of $f(x)$ using "boot" notation.

A. The domain is $D = \mathbb{R} \backslash \{\frac{5}{2}, -\frac{3}{4}\}$

B. The domain is $D = \mathbb{R} \backslash \{-\frac{1}{6}\}$

C. The domain is $D = \mathbb{R} \backslash \{\frac{1}{2}\}$

D. The domain is $D = \mathbb{R} \backslash \{-\frac{3}{2}, \frac{1}{6}\}$

E. The domain is $D = \mathbb{R} \backslash \{-\frac{3}{4}, 0\}$

F. The domain is $D = \mathbb{R} \backslash \{-\frac{1}{4}, -\frac{3}{2}\}$

G. The domain is $D = \mathbb{R} \backslash \{-\frac{1}{2}\}$

H. The domain is $D = \mathbb{R} \backslash \{0, -\frac{1}{4}\}$

2. Evaluate the radical expression.

$$9\sqrt{7\theta} - 4\sqrt{7\theta}$$

A. $10\sqrt{14\theta}$

B. $-1\sqrt{14\theta}$

C. $13\sqrt{7\theta}$

D. $5\sqrt{14\theta}$

E. $10\sqrt{7\theta}$

F. $13\sqrt{14\theta}$

G. $5\sqrt{7\theta}$

H. $-1\sqrt{7\theta}$

3. Solve the quadratic equation by completing the square. (Don't simplify the radical expression.)

$$\xi^2 + 17\xi - 2 = 0$$

A. $\xi = \frac{17}{2} \pm \sqrt{25}$

B. $\xi = \frac{17}{2} \pm \sqrt{10}$

C. $\xi = -\frac{17}{2} \pm \sqrt{118}$

D. $\xi = \frac{17}{2} \pm \sqrt{73}$

E. $\xi = -\frac{17}{2} \pm \sqrt{21}$

F. $\xi = \frac{17}{2} \pm \sqrt{\frac{65}{4}}$

G. $\xi = -\frac{17}{2} \pm \sqrt{88}$

H. $\xi = -\frac{17}{2} \pm \sqrt{\frac{297}{4}}$

4. Solve the exponential equation and round your answer to the nearest hundredth.

$$1.08e^{0.19a} = 2.4$$

A. $a \approx 5.02$

B. $a \approx 3.67$

C. $a \approx 4.07$

D. $a \approx 4.2$

E. $a \approx 4.55$

F. $a \approx 5.01$

G. $a \approx 4.94$

H. $a \approx 3.48$

5. Find the domain and range of the of the absolute value function $f(x) = -0.5|x-4| - 2$.

A. The domain is $D = (-\infty, 4]$ and the range is $R = \mathbb{R}$.

B. The domain is $D = [-2, \infty)$ and the range is $R = \mathbb{R}$.

C. The domain is $D = \mathbb{R}$ and the range is $R = [-2, \infty)$.

D. The domain is $D = \mathbb{R}$ and the range is $R = (-\infty, -2]$.

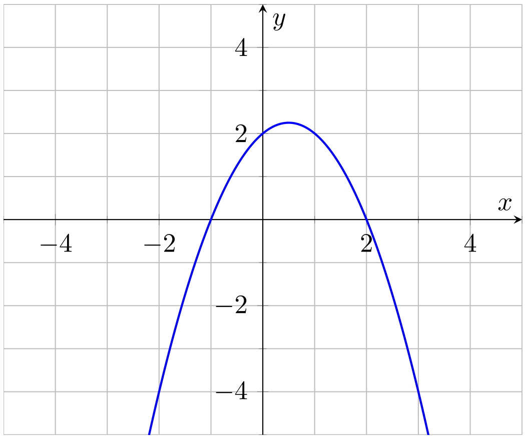
E. The domain is $D = \mathbb{R}$ and the range is $R = [4, \infty)$.

F. The domain is $D = (-\infty, -2]$ and the range is $R = \mathbb{R}$.

G. The domain is $D = [4, \infty)$ and the range is $R = \mathbb{R}$.

H. The domain is $D = \mathbb{R}$ and the range is $R = (-\infty, 4]$.

6. Find the interval on which the function $f(x)$ below is negative.



A. The function $f(x)$ is negative on $(-\infty, -1) \cup (2, \infty)$.

B. The function $f(x)$ is negative on $(-\infty, 2) \cup (-3, \infty)$.

C. The function $f(x)$ is negative on $(0, -3)$.

D. The function $f(x)$ is negative on $(-\infty, 0) \cup (-1, \infty)$.

E. The function $f(x)$ is negative on $(0, -3)$.

F. The function $f(x)$ is negative on $(-1, 2)$.

G. The function $f(x)$ is negative on $(0, -3)$.

H. The function $f(x)$ is negative on $(0, -3)$.

7. Perform the indicated multiplication and simplify the product.

$$(6\sqrt{2})(8\sqrt{5})$$

A. $52\sqrt{10}$

B. $39\sqrt{10}$

C. $48\sqrt{10}$

D. $56\sqrt{7}$

E. $48\sqrt{7}$

F. $39\sqrt{7}$

G. $56\sqrt{10}$

H. $52\sqrt{7}$

8. Consider the functions $f(x) = \frac{1}{x}$ and $g(x) = 4x^3 + 3$. Find $f \circ g$.

A. $(f \circ g)(x) = \frac{4}{x^3} + 3$

B. $(f \circ g)(x) = \frac{1}{4x^3} - 3$

C. $(f \circ g)(x) = \frac{4}{x^3} - 3$

D. $(f \circ g)(x) = \frac{1}{4x^3 - 3}$

E. $(f \circ g)(x) = \frac{1}{4x^3} + 3$

F. $(f \circ g)(x) = \frac{1}{4x^3 + 3}$

G. $(f \circ g)(x) = \frac{1}{4x^3} - \frac{1}{3}$

H. $(f \circ g)(x) = \frac{1}{4x^3} + \frac{1}{3}$

9. Represent each expression by using radical notation, and evaluate the expression.

$$(0.000001)^{-\frac{1}{6}}$$

A. $-\sqrt[6]{0.000001} = -\frac{1}{10}$

B. $\frac{1}{\sqrt[7]{0.000001}} = \frac{1}{10}$

C. $-\sqrt[6]{0.000001} = -2$

D. $\frac{1}{\sqrt[7]{0.000001}} = 1$

E. $\frac{1}{\sqrt[6]{0.000001}} = 10$

F. $-\sqrt[7]{0.000001} = -10$

G. $\frac{1}{\sqrt[6]{0.000001}} = \frac{1}{2}$

H. $-\sqrt[7]{0.000001} = -1$

10. Solve the rational equation. Be sure to check for extraneous solutions.

$$\frac{9}{\phi+4} - \frac{6}{\phi+5} = \frac{3}{\phi}$$

A. $\phi = -\frac{48}{5}$

B. $\phi = 0$ or $\phi = -\frac{19}{2}$

C. $\phi = -\frac{31}{3}$

D. $\phi = -\frac{51}{5}$

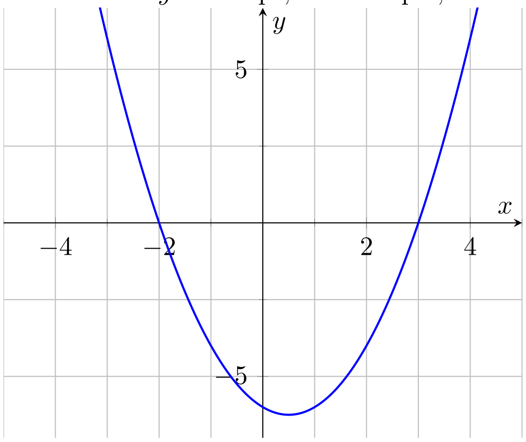
E. $\phi = -10$

F. $\phi = 0$ or $\phi = -\frac{46}{5}$

G. This equation has no solution.

H. $\phi = 0$ or $\phi = -12$

11. Find the y-intercept, x-intercepts, and range of the parabola graphed below.



A. The y-intercept is $(0, -4)$. The x-intercepts are $(3, 0)$ and $(-2, 0)$. The range is $R = (-\infty, -\frac{17}{4}]$.

B. The y-intercept is $(0, -6)$. The x-intercepts are $(-2, 0)$ and $(3, 0)$. The range is $R = [-\frac{25}{4}, \infty)$.

C. The y-intercept is $(0, -6)$. The x-intercepts are $(5, 0)$ and $(-2, 0)$. The range is $R = (-\infty, -\frac{25}{4}]$.

D. The y-intercept is $(0, -4)$. The x-intercepts are $(5, 0)$ and $(-2, 0)$. The range is $R = [-\frac{17}{4}, \infty)$.

E. The y-intercept is $(0, -4)$. The x-intercepts are $(3, 0)$ and $(0, 0)$. The range is $R = [-\frac{17}{4}, \infty)$.

F. The y-intercept is $(0, -4)$. The x-intercepts are $(3, 0)$ and $(0, 0)$. The range is $R = (-\infty, -\frac{25}{4}]$.

G. The y-intercept is $(0, -6)$. The x-intercepts are $(3, 0)$ and $(0, 0)$. The range is $R = (-\infty, -\frac{17}{4}]$.

H. The y-intercept is $(0, -6)$. The x-intercepts are $(5, 0)$ and $(0, 0)$. The range is $R = [-\frac{25}{4}, \infty)$.

12. Use an augmented matrix and elementary row operations to solve the system of linear equations.

$$\left\{ \begin{array}{c} x + 3y + z = 2 \\ 3x + 2y - 3z = 1 \\ 2x + 3y - z = 2 \end{array} \right\}$$

A. $x = -\frac{2}{3}$, $y = 1$, $z = -\frac{1}{3}$

B. $x = -\frac{2}{3}$, $y = \frac{5}{4}$, $z = -\frac{7}{12}$

C. $x = -\frac{5}{12}$, $y = \frac{5}{4}$, $z = -\frac{1}{12}$

D. $x = -\frac{5}{12}$, $y = \frac{7}{4}$, $z = -\frac{1}{3}$

E. $x = -\frac{5}{12}$, $y = 1$, $z = \frac{2}{3}$

F. $x = -\frac{2}{3}$, $y = 1$, $z = -\frac{1}{12}$

G. $x = -\frac{5}{12}$, $y = \frac{5}{4}$, $z = \frac{5}{12}$

H. $x = -\frac{2}{3}$, $y = \frac{7}{4}$, $z = \frac{5}{12}$

13. Solve the logarithmic equation.

$$\log_3 x = -\frac{1}{2}$$

A. $x = \frac{\sqrt{5}}{5}$

B. $x = \frac{\sqrt{13}}{13}$

C. $x = \sqrt{13}$

D. $x = \frac{\sqrt{3}}{3}$

E. $x = \frac{\sqrt{11}}{11}$

F. $x = \sqrt{5}$

G. $x = \sqrt{3}$

H. $x = \sqrt{11}$

14. Perform the indicated operations and reduce the result to lowest terms. Assume the variables are restricted to values that prevent division by 0.

$$\frac{\frac{55\lambda^2-42\lambda-49}{21\lambda-15\lambda^2}}{77\lambda^2-6\lambda-35}$$

A. -1

B. $(11\lambda+5)(11\lambda-5)$

C. $-\frac{1}{3\lambda(7\lambda-5)}$

D. $\frac{1}{3\lambda(7\lambda-5)}$

E. $(7\lambda+11)(7\lambda-11)$

F. 1

G. $3\lambda(7\lambda-5)$

H. $(5\lambda+7)(5\lambda-7)$

15. Which equation would you solve in order to find two consecutive integers whose product is 156?

A. You would solve the equation $x^2 + x + 78 = 0$.

B. You would solve the equation $x^2 - x - 156 = 0$.

C. You would solve the equation $x^2 + x - 156 = 0$.

D. You would solve the equation $x^2 - x - 78 = 0$.

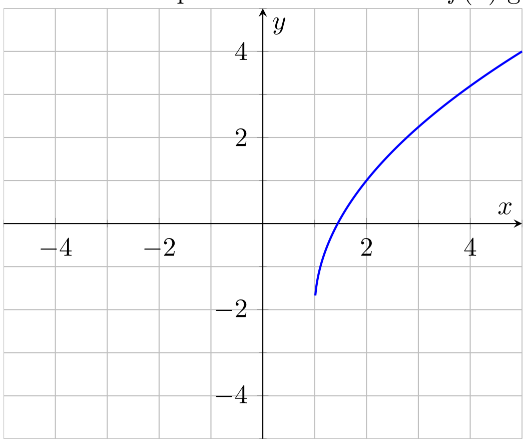
E. You would solve the equation $x^2 + x - 78 = 0$.

F. You would solve the equation $x^2 - 2x + 156 = 0$.

G. You would solve the equation $x^2 - x + 78 = 0$.

H. You would solve the equation $x^2 + 2x + 156 = 0$.

16. Find the equation of the function $f(x)$ graphed below.



A. $f(x) = 2\sqrt{x+1} + 3$

B. $f(x) = -0.5\sqrt{x-4} - 2$

C. $f(x) = -2\sqrt{x-1} - 3$

D. $f(x) = -3\sqrt{x+3} - 2$

E. $f(x) = 0.5\sqrt{x+4} - 2$

F. $f(x) = \sqrt{x-2} - 2$

G. $f(x) = -\sqrt{x-1} + 1$

H. $f(x) = 3\sqrt{x-1} - 2$

17. Suppose \$10000 is invested at 5% with interest compounded quarterly. How long will it take for this investment to double its value? Round your answer to the nearest tenth.

A. The investment will double in approximately $t = 12.97$ years.

B. The investment will double in approximately $t = 13.98$ years.

C. The investment will double in approximately $t = 13.95$ years.

D. The investment will double in approximately $t = 14.16$ years.

E. The investment will double in approximately $t = 14.4$ years.

F. The investment will double in approximately $t = 13.34$ years.

G. The investment will double in approximately $t = 14.62$ years.

H. The investment will double in approximately $t = 13.73$ years.

18. Perform the indicated operations and reduce the result to lowest terms. Assume the variables are restricted to values that prevent division by 0.

$$\frac{3\beta - 3}{\beta^2 - \beta - 20} - \frac{7\beta + 1}{\beta - 5}$$

A. $\frac{-7\beta^2-33\beta-7}{(\beta-5)(\beta+4)}$

B. $\frac{-7\beta^2-24\beta-7}{(\beta-2)(\beta+4)(\beta+1)}$

C. $\frac{-7\beta^2-20\beta-7}{(\beta-5)(\beta+4)}$

D. $\frac{-7\beta^2-31\beta-7}{(\beta-2)(\beta+4)(\beta+1)}$

E. $\frac{-7\beta^2-26\beta-7}{(\beta-5)(\beta+4)}$

F. $\frac{-7\beta^2-28\beta-7}{(\beta-2)(\beta+4)(\beta+1)}$

G. $\frac{-7\beta^2-32\beta-7}{(\beta-2)(\beta+4)(\beta+1)}$

H. $\frac{-7\beta^2-21\beta-7}{(\beta-5)(\beta+4)}$

19. Solve the quadratic equation and completely simplify your answer. $r^2 - 8r + 13 = 0$

A. $r = 4 \pm 3\sqrt{2}$

B. $r = 4 \pm 6\sqrt{5}$

C. $r = 4 \pm \sqrt{5}$

D. $r = 4 \pm 2\sqrt{15}$

E. $r = 4 \pm \sqrt{30}$

F. $r = 4 \pm 2\sqrt{15}$

G. $r = 4 \pm 2\sqrt{5}$

H. $r = 4 \pm \sqrt{3}$

20. Solve the radical equation.

$$\sqrt{5z+8} - 9 = 2$$

A. $z = \frac{457}{20}$

B. $z = \frac{111}{5}$

C. $z = \frac{113}{5}$

D. $z = \frac{437}{20}$

E. This equation has no real solution.

F. $z = 23$

G. $z = \frac{349}{15}$

H. $z = \frac{108}{5}$

Answers

1. C.
2. G.
3. H.
4. D.
5. D.
6. A.
7. C.
8. F.
9. E.
10. E.
11. B.
12. A.
13. D.
14. C.
15. C.
16. H.
17. C.
18. E.
19. H.
20. C.