1. The height of a baseball is given by $h(t) = -16t^2 + 60t + 20$, where $h(t)$ represents the height of the ball in feet and t is the number of seconds that have elapsed since the ball was released. Determine the highest point that the ball reaches. Determine how many seconds into the flight the maximum height is reached.

A. The baseball will reach its maximum height of 79.25 feet after 3.875 seconds.

B. The baseball will reach its maximum height of 75.25 feet after 1.875 seconds.

C. The baseball will reach its maximum height of 73.25 feet after 3.875 seconds.

D. The baseball will reach its maximum height of 80.25 feet after 3.875 seconds.

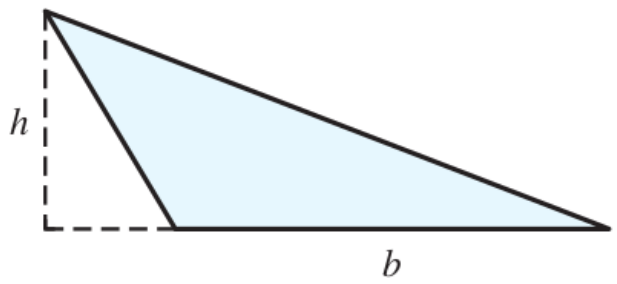
E. The baseball will reach its maximum height of 76.25 feet after 1.875 seconds.

F. The baseball will reach its maximum height of 71.25 feet after 3.875 seconds.

G. The baseball will reach its maximum height of 72.25 feet after 1.875 seconds.

H. The baseball will reach its maximum height of 77.25 feet after 1.875 seconds.

2. The base of a triangle (see the figure) is 4 cm longer than the height. Find the base and the height if the area of this triangle is 85 cm2. If necessary, round your answer to the nearest tenth.



A. The height is 12.1 cm.

B. The height is 11.2 cm.

C. The height is 11.3 cm.

D. The height is 11.7 cm.

E. The height is 11.5 cm.

F. The height is 12 cm.

G. The height is 11 cm.

H. The height is 10.3 cm.

3. Use the properties of logarithms to express the logarithm in terms of logarithms of simpler expressions. Each logarithmic term should have only one variable, and no exponents or radicals. Assume that the argument of each logarithm is a positive real number.

$$\log\left(\frac{b}{12}\right)$$

A. $12\log(b)$

B. $\log(12) - \log(b)$

C. $\log(b) \cdot \log(12)$

D. $\frac{\log(b)}{\log(12)}$

E. $\log(b) + \log(12)$

F. $\log(b) - \log(12)$

G. $\frac{\log(12)}{\log(b)}$

H. $\frac{1}{12}\log(b)$

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

$$\frac{4j+5}{j^2-49} - \frac{6}{j+7} - \frac{7}{j-7}$$

A. $\frac{-7j-2}{j-7}$

B. $\frac{-6j-6}{(j+7)(j-7)}$

C. $\frac{-4j}{j-7}$

D. $\frac{-5j+1}{j-7}$

E. $\frac{-13j+3}{(j+7)(j-7)}$

F. $\frac{-8j+4}{j-7}$

G. $\frac{-9j-2}{(j+7)(j-7)}$

H. $\frac{-10j+1}{(j+7)(j-7)}$

5. Reduce the rational expression

$$\frac{4b^2 - 3b\alpha - \alpha^2}{3b^2 - 11b\alpha + 8\alpha^2}$$

to lowest terms. Assume that the variables are restricted to values that prevent division by 0.

A. $\frac{4b+\alpha}{6b+11}$

B. $\frac{5b-8}{3b-8\alpha}$

C. $\frac{5}{3b}$

D. $\frac{4b+\alpha}{7b-11}$

E. $\frac{6b+9}{3b-8\alpha}$

F. $\frac{5}{3b+11}$

G. $\frac{3b}{3b-8\alpha}$

H. $\frac{4b+\alpha}{3b-8\alpha}$

6. Evaluate the radical expression.

$$\sqrt{1} + \sqrt{100} + \sqrt{0.04}$$

A. $\frac{61}{5}$

B. $\frac{81}{5}$

C. $\frac{91}{5}$

D. $\frac{36}{5}$

E. $\frac{66}{5}$

F. $\frac{56}{5}$

G. $\frac{51}{5}$

H. $\frac{101}{5}$

7. Convert the logarithmic equation to exponential form.

$$\log_{\frac{2}{3}}\left(\frac{8}{27}\right) = 3$$

A. $\left(\frac{2}{3}\right)^3 = \frac{8}{27}$

B. $\left(\frac{8}{27}\right)^3 = \frac{2}{3}$

C. $3^{\frac{8}{27}} = \frac{2}{3}$

D. $(\frac{2}{3})^{\frac{8}{27}} = 3$

E. $3^{\frac{2}{3}} = \frac{8}{27}$

F. $(\frac{8}{27})^{\frac{2}{3}} = 3$

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

$$\frac{4m - 7j}{12m^2 j} \cdot \frac{48m^2 j + 84mj^2}{16m^2 - 49j^2}$$

A. $\frac{1}{m}$

B. m

C. -1

D. $\frac{1}{j}$

E. 1

F. $\frac{4m+7j}{4m-7j}$

G. $\frac{4m-7j}{4m+7j}$

H. j

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

$$\frac{77j^2 - 156j + 55}{\frac{77j^2+86j-55}{49j^2+154j+121}}$$

A. -1

B. $(11j + 5)(11j - 5)$

C. $-\frac{1}{4j(7j-5)}$

D. $(7j + 11)(7j - 11)$

E. 1

F. $(5j + 7)(5j - 7)$

G. $\frac{1}{4j(7j-5)}$

H. $4j(7j - 5)$

10. Perform the indicated multiplication and simplify the product. Assume that the variables represent nonnegative real numbers, so that absolute value notation is not necessary.

$$\sqrt[3]{2}\sqrt[3]{4}$$

A. $7\sqrt[3]{21}$

B. 7

C. $2\sqrt[3]{2}$

D. $7\sqrt[3]{14}$

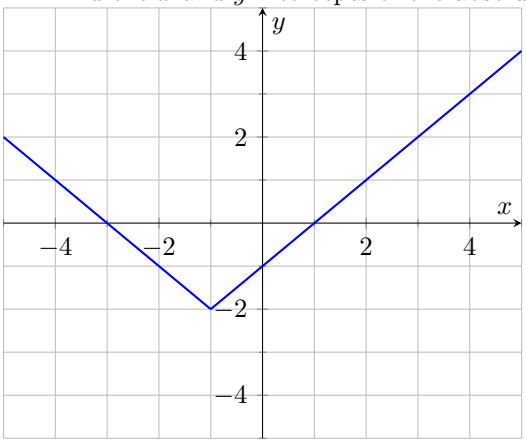
E. $2\sqrt[3]{6}$

F. 2

G. $2\sqrt[3]{4}$

H. $7\sqrt[3]{7}$

11. Find the x and y-intercepts of the absolute value function graphed below.



A. The x-intercepts are $(-7, 0)$ and $(-3, 0)$. The y intercept is $(0, -1)$.

B. The x-intercepts are $(-2, 0)$ and $(2, 0)$. The y intercept is $(0, -3)$.

C. The x-intercepts are $(-1, 0)$ and $(3, 0)$. The y intercept is $(0, -3)$.

D. The x-intercepts are $(1, 0)$ and $(5, 0)$. The y intercept is $(0, -1)$.

E. The x-intercepts are $(-6, 0)$ and $(-2, 0)$. The y intercept is $(0, -3)$.

F. The x-intercepts are $(-3, 0)$ and $(1, 0)$. The y intercept is $(0, -1)$.

G. The x-intercepts are $(-4, 0)$ and $(0, 0)$. The y intercept is $(0, -1)$.

H. The x-intercepts are $(0, 0)$ and $(4, 0)$. The y intercept is $(0, -3)$.

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

$$\left\{ \begin{array}{c} 3x = 2 \\ 3x + y - 2z = 0 \\ x - 3y = -3 \end{array} \right\}$$

A. $\begin{array}{l} x = \frac{5}{12} \\ y = \frac{11}{9} \\ z = \frac{85}{36} \end{array}$

B. $\begin{array}{l} x = \frac{2}{3} \\ y = \frac{35}{36} \\ z = \frac{35}{18} \end{array}$

C. $\begin{array}{l} x = \frac{2}{3} \\ y = \frac{11}{9} \\ z = \frac{49}{36} \end{array}$

D. $\begin{array}{l} x = \frac{5}{12} \\ y = \frac{35}{36} \\ z = \frac{49}{36} \end{array}$

E. $\begin{array}{l} x = \frac{2}{3} \\ y = \frac{11}{9} \\ z = \frac{29}{18} \end{array}$

F. $\begin{array}{l} x = \frac{5}{12} \\ y = \frac{49}{18} \\ z = \frac{29}{18} \end{array}$

G. $\begin{array}{l} x = \frac{5}{12} \\ y = \frac{35}{36} \\ z = \frac{28}{9} \end{array}$

H. $\begin{array}{l} x = \frac{2}{3} \\ y = \frac{49}{18} \\ z = \frac{28}{9} \end{array}$

13. Complete the square by filling in the missing number. $\gamma^2 + 20\gamma + \_\_\_\_\_$

A. 16

B. 64

C. $\frac{289}{4}$

D. $\frac{225}{4}$

E. $\frac{49}{4}$

F. 25

G. 100

H. $\frac{169}{4}$

14. Find the interval on which the function $f(x) = x^2 - 2x - 3$ is negative.

A. The function $f(x)$ is negative on $(6, 2)$.

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

C. The function $f(x)$ is negative on $(-1, 3)$.

D. The function $f(x)$ is negative on $(6, -1)$.

E. The function $f(x)$ is negative on $(-\infty, 6) \cup (2, \infty)$.

F. The function $f(x)$ is negative on $(-\infty, 6) \cup (-1, \infty)$.

G. The function $f(x)$ is negative on $(-\infty, 6) \cup (-1, \infty)$.

H. The function $f(x)$ is negative on $(3, 2)$.

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

$$1 + \frac{8z}{z^2 - 8z + 16} = \frac{112}{z^2 - 8z + 16}$$

A. This equation has no solution.

B. $z = \pm 4\sqrt{3}$

C. $z = \pm\sqrt{2}$

D. $z = \pm\sqrt{7}$

E. $z = \pm 4\sqrt{5}$

F. $z = \pm\sqrt{11}$

G. $z = \pm 4\sqrt{6}$

H. $z = \pm\sqrt{10}$

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

$$(0.16)^{\frac{3}{2}}$$

A. $\sqrt[3]{0.16^2} = \frac{8}{125}$

B. $\sqrt{0.16^3} = \frac{8}{125}$

C. $\sqrt{0.16^3} = 125$

D. $\sqrt[3]{0.16^2} = \frac{27}{1000}$

E. $\sqrt{0.16^3} = \frac{27}{1000}$

F. $\sqrt{0.16^3} = 1728$

G. $\sqrt[3]{0.16^2} = 1728$

H. $\sqrt[3]{0.16^2} = 125$

17. Find the exact solution to the equation.

$$4e^{3j} = 5$$

A. $j = \frac{1}{3}\ln(\frac{4}{5})$

B. $j = -\frac{1}{3}\ln(\frac{4}{5})$

C. $j = \frac{1}{3}\frac{\ln(5)}{\ln(4)}$

D. $j = -\frac{1}{3}\frac{\ln(5)}{\ln(4)}$

E. $j = -\frac{1}{3}\ln(\frac{5}{4})$

F. $j = \frac{1}{3}\frac{\ln(4)}{\ln(5)}$

G. $j = \frac{1}{3}\ln(\frac{5}{4})$

H. $j = -\frac{1}{3}\frac{\ln(4}{\ln(5)}$

18. Solve the quadratic equation. Leave the radical unsimplified. $6\phi^2 - 8\phi = -8$

A. $\phi = \frac{-8 \pm \sqrt{197}}{12}$

B. $\phi = \frac{-8 \pm \sqrt{57}}{-12}$

C. $\phi = \frac{8 \pm \sqrt{75}}{12}$

D. $\phi = \frac{-8 \pm \sqrt{60}}{-12}$

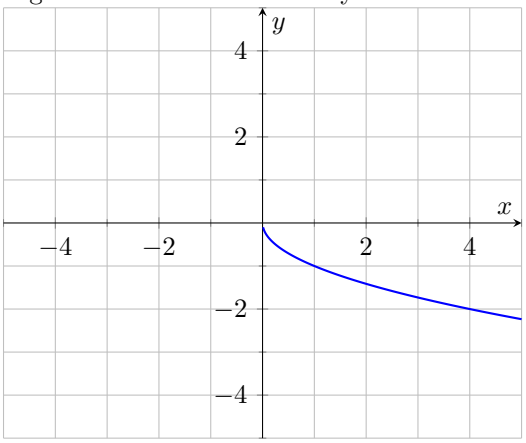
E. $\phi = \frac{-8 \pm \sqrt{61}}{12}$

F. $\phi = \frac{8 \pm \sqrt{128}}{12}$

G. This equation has no real number solutions.

H. $\phi = \frac{8 \pm \sqrt{105}}{12}$

19. Match the function graph with its formula. Use the shape of the graph of the function and your knowledge of translations to make your choices.



A. $f(x) = x$

B. $f(x) = -x$

C. $f(x) = x^3$

D. $f(x) = -|x|$

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

F. $f(x) = |x|$

G. $f(x) = -x^3$

H. $f(x) = \sqrt{x}$

20. Solve the radical equation.

$$\sqrt{r} + 5 = 8$$

A. $r = 4$

B. This equation has no real solution.

C. $r = 9$

D. $r = 12$

E. $r = 16$

F. $r = 17$

G. $r = 11$

H. $r = 10$

Answers

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