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

$$\frac{\kappa^2 - 49}{5\kappa + 2} = \frac{7 - \kappa}{8}$$

A. This equation has no solution.

B. $\kappa = 7$ or $\kappa = -\frac{316}{65}$

C. $\kappa = -\frac{271}{52}$

D. $\kappa = 7$ or $\kappa = -\frac{329}{65}$

E. $\kappa = 7$ or $\kappa = -\frac{58}{13}$

F. $\kappa = -\frac{316}{65}$

G. $\kappa = 7$ or $\kappa = -\frac{271}{52}$

H. $\kappa = -\frac{58}{13}$

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

$$\frac{5}{\mu+9} - \frac{2}{\mu+7} = \frac{3}{\mu}$$

A. This equation has no solution.

B. $\mu = -\frac{852}{155}$

C. $\mu = 0$ or $\mu = -\frac{914}{155}$

D. $\mu = 0$ or $\mu = -\frac{629}{93}$

E. $\mu = -\frac{158}{31}$

F. $\mu = -\frac{189}{31}$

G. $\mu = -\frac{663}{124}$

H. $\mu = 0$ or $\mu = -\frac{598}{93}$

3. Evaluate the radical expression.

$$-\sqrt{16}$$

A. 1

B. $-10$

C. $-6$

D. 0

E. $-12$

F. 4

G. $-13$

H. $-4$

4. Evaluate the radical expression.

$$\sqrt{25} + \sqrt{0.25}$$

A. $\frac{17}{2}$

B. $-\frac{1}{2}$

C. $\frac{21}{2}$

D. $\frac{7}{2}$

E. $\frac{11}{2}$

F. $\frac{23}{2}$

G. $\frac{29}{2}$

H. $\frac{19}{2}$

5. Consider the rational function $f(x) = \frac{7x+6}{5x+2}$. Evaluate $f(\frac{1}{3})$.

A. $f(\frac{1}{3}) = \frac{155}{44}$

B. $f(\frac{1}{3}) = \frac{111}{44}$

C. $f(\frac{1}{3}) = \frac{86}{33}$

D. $f(\frac{1}{3}) = \frac{39}{22}$

E. $f(\frac{1}{3}) = Undefined$

F. $f(\frac{1}{3}) = \frac{130}{33}$

G. $f(\frac{1}{3}) = \frac{25}{11}$

H. $f(\frac{1}{3}) = \frac{53}{33}$

6. Consider the rational function $f(x) = \frac{1}{3x^2+x-10}$. What are the vertical asymptotes of $f(x)$?

A. The vertical asymptotes are $y = 2$ and $y = \frac{11}{3}$

B. The vertical asymptotes are $y = \frac{2}{3}$ and $y = 2$

C. The vertical asymptotes are $x = -2$ and $x = \frac{5}{3}$.

D. The vertical asymptotes are $x = 0$ and $x = \frac{29}{12}$

E. The vertical asymptotes are $y = \frac{1}{6}$ and $y = \frac{23}{12}$

F. The vertical asymptotes are $x = \frac{17}{12}$ and $x = \frac{29}{12}$

G. The vertical asymptotes are $y = \frac{1}{6}$ and $y = \frac{2}{3}$

H. The vertical asymptotes are $x = 0$ and $x = \frac{11}{3}$

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

$$\frac{12\theta^2}{-3} \cdot \frac{12}{-10\theta^7}$$

A. $\frac{18\theta^6}{5}$

B. $\frac{2}{\theta^2}$

C. $\frac{6}{\theta^2}$

D. $\frac{8}{\theta^7}$

E. $-48\theta^4$

F. $\frac{16\theta^7}{5}$

G. $\frac{2}{3\theta}$

H. $\frac{24}{5\theta^5}$

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

$$\frac{21t^2 - 44t - 121}{55t - 15t^2} \div (77t^2 + 100t - 33)$$

A. $\frac{1}{5t(11t-3)}$

B. $5t(11t - 3)$

C. $-\frac{1}{5t(11t-3)}$

D. $(3t + 11)(3t - 11)$

E. $(11t + 7)(11t - 7)$

F. $(7t + 3)(7t - 3)$

G. $1$

H. $-1$

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

$$\frac{4v+4}{v^2+3v} - \frac{6v-7}{-v}$$

A. $\frac{6v^2+11v-17}{v(v+3)}$

B. $\frac{6v^2+14v-17}{v(v+3)}$

C. $\frac{6v^2+19v-17}{v(v+3)(v-1)}$

D. $\frac{6v^2+13v-17}{v(v+3)(v-1)}$

E. $\frac{6v^2+15v-17}{v(v+3)}$

F. $\frac{6v^2+9v-17}{v(v+3)}$

G. $\frac{6v^2+10v-17}{v(v+3)(v-1)}$

H. $\frac{6v^2+17v-17}{v(v+3)(v-1)}$

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

$$\frac{7x+6}{x^2+4x-5}+\frac{2}{x+5}-\frac{1}{1-x}$$

A. $\frac{12x-11}{(x+5)(x-1)}$

B. $\frac{8x+7}{(x+5)(x-1)}$

C. $\frac{13x-12}{(x+4)(x-1)}$

D. $\frac{7x+6}{(x+5)(x-1)}$

E. $\frac{10x+9}{(x+5)(x-1)}$

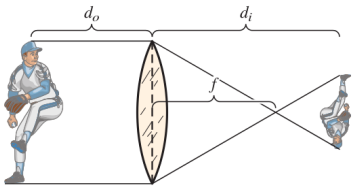
F. $\frac{15x-14}{(x+4)(x-1)}$

G. $\frac{5x+4}{(x+4)(x-1)}$

H. $\frac{17x+16}{(x+4)(x-1)}$

11. Lens Formula The relationship between the focal length $f$ of a lens, the distance $d_o$ of an object from the lens, and the distance $d_i$ of an image from the lens is $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$. So

$$f = \frac{1}{\frac{1}{d_o} + \frac{1}{d_i}}.$$




Determine $f$ when $d_o$ =14 ft and $d_i$ =0.1 ft. Round your answer to the nearest thousandth.

A. $f = 0.198$ ft

B. $f = 0.664$ ft

C. $f = 0.585$ ft

D. $f = 0.49$ ft

E. $f = 0.769$ ft

F. $f = 0.39$ ft

G. $f = 0.099$ ft

H. $f = 0.295$ ft

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

$$\frac{\frac{1}{cn^2} + \frac{1}{c^2 n}}{\frac{1}{n} + \frac{1}{c}}$$

A. 1

B. $\frac{c+n}{cn}$

C. $\frac{1}{cn}$

D. $-\frac{c(c+n)}{(c-n)^2}$

E. $\frac{n}{c}$

F. $\frac{c+n}{c^2 n^2}$

G. $\frac{1}{c-n}$

H. $-\frac{c+n}{c}$

13. Evaluate the radical expression.

$$\sqrt[3]{54\zeta^4}$$

A. $9\zeta^4\sqrt[3]{2}$

B. $6\zeta\sqrt[3]{2\zeta}$

C. $-4\zeta\sqrt[3]{2\zeta}$

D. $3\zeta\sqrt[3]{2\zeta}$

E. $3\zeta^4\sqrt[3]{2}$

F. $-4\zeta^4\sqrt[3]{2}$

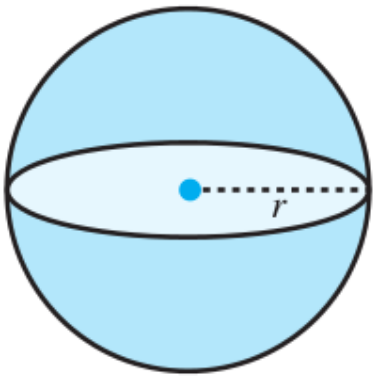
G. $9\zeta\sqrt[3]{2\zeta}$

H. $6\zeta^4\sqrt[3]{2}$

14. The volume of a spherical tank is given by

$$V = \frac{4}{3}\pi r^3.$$

If a spherical tank has a volume of $V = 905$ in$^3$, approximate its radius to the nearest tenth of an inch.




A. The radius of the container is 6.1 in.

B. The radius of the container is 5.5 in.

C. The radius of the container is 5.8 in.

D. The radius of the container is 6.3 in.

E. The radius of the container is 6.5 in.

F. The radius of the container is 6 in.

G. The radius of the container is 5.7 in.

H. The radius of the container is 5.6 in.

15. Simplify the division. Rationalize the denominator only if this step is necessary.

$$\frac{11}{\sqrt{22}}$$

A. $\frac{11\sqrt{11}}{2}$

B. $\frac{\sqrt{22}}{2}$

C. $\frac{\sqrt{22}}{\sqrt{2}}$

D. $\frac{11}{2}$

E. $\frac{121}{4}$

F. $\frac{\sqrt{2}}{11}$

G. $\frac{\sqrt{11}}{2}$

H. $\frac{\sqrt{11}}{\sqrt{2}}$

16. Multiply the radical expression by its conjugate and simplify the result. Assume that the radicands represent nonnegative real numbers, so that absolute value notation is unnecessary.

$$5 + \sqrt{13}$$

A. 8

B. 12

C. 17

D. $-12$

E. $-17$

F. 4

G. $-8$

H. $-4$

17. Solve the radical equation.

$$\sqrt{5\zeta + 2} = 3\zeta$$

A. This equation has no real solution.

B. $\zeta = \frac{5+\sqrt{100}}{18}$

C. $\zeta = \frac{5+\sqrt{90}}{18}$ or $\zeta = \frac{5-\sqrt{90}}{18}$

D. $\zeta = \frac{5+\sqrt{97}}{18}$

E. $\zeta = \frac{5+\sqrt{97}}{18}$ or $\zeta = \frac{5-\sqrt{97}}{18}$

F. $\zeta = \frac{5+\sqrt{95}}{18}$

G. $\zeta = \frac{5+\sqrt{100}}{18}$ or $\zeta = \frac{5-\sqrt{100}}{18}$

H. $\zeta = \frac{5+\sqrt{90}}{18}$

18. Solve the radical equation.

$$\sqrt{7h+9}+8=4$$

A. $h=1$

B. $h=\frac{8}{5}$

C. $h=\frac{4}{5}$

D. $h=\frac{1}{3}$

E. $h=\frac{3}{4}$

F. $h=\frac{7}{4}$

G. $h=\frac{9}{5}$

H. This equation has no real solution.

19. Represent the expression by using exponential notation, and evaluate each expression.

$$\sqrt[7]{128}$$

A. $128^{\frac{1}{8}} = -6$

B. $128^{-\frac{1}{7}} = 5$

C. $128^{\frac{1}{7}} = 2$

D. $128^{-\frac{1}{8}} = -6$

E. $128^{\frac{1}{8}} = 10$

F. $128^{-\frac{1}{8}} = 10$

G. $128^{\frac{1}{7}} = 5$

H. $128^{-\frac{1}{7}} = 2$

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

$$4^{\frac{3}{2}}$$

A. $\sqrt[3]{4^2} = \frac{64}{125}$

B. $\sqrt{4^3} = 8$

C. $\sqrt[3]{4^2} = \frac{27}{1000}$

D. $\sqrt{4^3} = 125$

E. $\sqrt{4^3} = \frac{27}{1000}$

F. $\sqrt{4^3} = \frac{64}{125}$

G. $\sqrt[3]{4^2} = 8$

H. $\sqrt[3]{4^2} = 125$

**Answers**

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