1. The function $f(x) = \frac{x}{x-6}$ is best described as

A. a rational function whose graph is a parabola.

B. not a rational function, but an absolute value function whose graph has a V-shape.

C. a rational function whose graph is a line.

D. a rational function whose graph will have a vertical asymptote.

2. Reduce the rational expression $\frac{6k^2+13k-8}{4k^2-2k}$ to lowest terms. Assume that the variables are restricted to values that prevent division by 0.

A. $\frac{3k+8}{8k+8}$

B. $\frac{3}{4k+8}$

C. $\frac{3}{4k}$

D. $\frac{3k+8}{5k-10}$

E. $\frac{4k}{2k}$

F. $\frac{3k+8}{2k}$

G. $\frac{6k-8}{2k}$

H. $\frac{5k+7}{2k}$

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

$$\frac{121n^2 - 121n\mu + 121\mu^2}{7n\mu} \cdot \frac{4n^2\mu}{11n^2 - 11n\mu + 11\mu^2}$$

A. $\frac{7(n-\mu)}{44(\mu+n)}$

B. $\frac{7}{44(n-\mu)}$

C. $\frac{7}{44(\mu-n)}$

D. $\frac{44n}{7}$

E. $\frac{7(n+\mu)}{44(n-\mu)}$

F. $\frac{44}{7n}$

G. $\frac{7}{44n}$

H. 1

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

$$\frac{\xi^4 - s^4}{-4\xi - 3s} \cdot \frac{15\xi s}{20\xi^2 + 20\xi s} \cdot \frac{4\xi + 3s}{11\xi^2 + 11s^2}$$

A. $-\frac{3s(\xi - s)}{44}$

B. $-\frac{44}{3s(\xi - s)}$

C. $\frac{\xi}{11\xi(\xi - s)}$

D. $-\frac{1}{11\xi(\xi - s)}$

E. $\frac{1}{11\xi(\xi - s)}$

F. $\frac{3s(\xi - s)}{44}$

G. $\frac{44}{3s(\xi - s)}$

H. $-\frac{\xi}{11\xi(\xi - s)}$

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

$$-\frac{3\varphi-5}{-\varphi+3}+\frac{2\varphi+7}{\varphi^2+\varphi-12}$$

A. $\frac{3\varphi^2+14\varphi-13}{(\varphi-3)(\varphi+4)}$

B. $\frac{3\varphi^2+9\varphi-13}{(\varphi-3)(\varphi+4)}$

C. $\frac{3\varphi^2+8\varphi-13}{(\varphi-3)(\varphi+4)}$

D. $\frac{3\varphi^2+13\varphi-13}{(\varphi-3)(\varphi+5)(\varphi-1)}$

E. $\frac{3\varphi^2+3\varphi-13}{(\varphi-3)(\varphi+5)(\varphi-1)}$

F. $\frac{3\varphi^2+4\varphi-13}{(\varphi-3)(\varphi+5)(\varphi-1)}$

G. $\frac{3\varphi^2+12\varphi-13}{(\varphi-3)(\varphi+5)(\varphi-1)}$

H. $\frac{3\varphi^2+11\varphi-13}{(\varphi-3)(\varphi+4)}$

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

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

A. $\frac{a^2+14a+6}{(a-2)(a+6)(a-1)}$

B. $\frac{a^2+12a+6}{(a-2)(a+6)(a-1)}$

C. $\frac{a^2+9a+6}{(a-2)(a+6)(a-1)}$

D. $\frac{a^2+20a+6}{(a-2)(a+6)(a-1)}$

E. $\frac{a^2+15a+6}{(a-1)(a+6)}$

F. $\frac{a^2+21a+6}{(a-1)(a+6)}$

G. $\frac{a^2+18a+6}{(a-1)(a+6)}$

H. $\frac{a^2+22a+6}{(a-1)(a+6)}$

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

$$\frac{k-2}{3k-1}+\frac{4k-7}{21k^2+11k-6}\cdot\frac{7k+6}{7-4k}$$

A. $\frac{-2k-5}{3k-1}$

B. $\frac{k-3}{3k-1}$

C. $-\frac{3k^2-4k-19}{(3k-1)(4k-7)}$

D. $\frac{0k^2-4k-19}{(3k-1)(4k-7)}$

E. $\frac{k-4}{3k-1}$

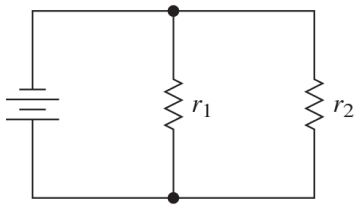
F. $\frac{3k^2-4k-19}{(3k-1)(4k-7)}$

G. $-\frac{0k^2-4k-19}{(3k-1)(4k-7)}$

H. $\frac{-2k-2}{3k-1}$

8. Electrical Resistance The total resistance R in a parallel circuit with two individual resistors r_1 and r_2 can be calculated by using the formula $\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2}$. So

$$R = \frac{1}{\frac{1}{r_1} + \frac{1}{r_2}}.$$



Determine R when r_1 =46 Ω and r_2 =54 Ω

A. $R = \frac{912}{67}$ Ω

B. $R = \frac{1935}{88}$ Ω

C. $R = \frac{720}{31}$ Ω

D. $R = \frac{1357}{82}$ Ω

E. $R = \frac{2773}{106}$ Ω

F. $R = \frac{437}{42}$ Ω

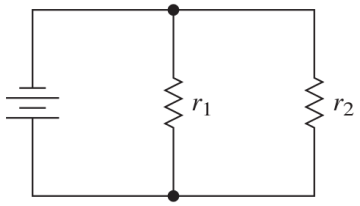
G. $R = \frac{621}{25}$ Ω

H. $R = \frac{2322}{97}$ Ω

9. Electrical Resistance The total resistance R in a parallel circuit with two individual resistors r_1 and r_2 can be calculated by using the formula

$$\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2}.$$

Solve this formula for r_1. State your answer in the form of a simple fraction, not a complex fraction.



A. $r_1 = r_2 - R$

B. $r_1 = \frac{Rr_2}{R-r_2}$

C. $r_1 = \frac{R-1}{Rr_2}$

D. $r_1 = R - r_2$

E. $r_1 = \frac{Rr_2}{r_2-R}$

F. $r_1 = \frac{R}{r_2-R}$

G. $r_1 = \frac{r_2-R}{Rr_2}$

H. $r_1 = \frac{Rr_2}{R-1}$

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

$$\frac{2}{\lambda - 3} = \frac{5}{\lambda + 2}$$

A. $\lambda = \frac{98}{15}$

B. $\lambda = \frac{19}{3}$

C. This equation has no solution.

D. $\lambda = \frac{16}{3}$

E. $\lambda = \frac{79}{12}$

F. $\lambda = \frac{86}{15}$

G. $\lambda = 7$

H. $\lambda = \frac{104}{15}$

11. Evaluate the radical expression.

$$\sqrt{\frac{4}{9}}$$

A. $\frac{23}{3}$

B. $\frac{17}{3}$

C. $\frac{11}{3}$

D. $-\frac{16}{3}$

E. $\frac{14}{3}$

F. $\frac{2}{3}$

G. $-\frac{1}{3}$

H. $-\frac{13}{3}$

12. Evaluate the radical expression.

$$\sqrt[4]{\frac{81}{16}}$$

A. $\frac{5}{2}$

B. Not a real number.

C. $\frac{13}{2}$

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

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

F. $\frac{3}{2}$

G. $-\frac{13}{2}$

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

13. Evaluate the radical expression.

$$9\sqrt{7} + 6\sqrt{13} - 7\sqrt{7} + 4\sqrt{13}$$

A. $2\sqrt{7} + 10\sqrt{13}$

B. $14\sqrt{20}$

C. $3\sqrt{7} + 11\sqrt{13}$

D. $11\sqrt{20}$

E. $1\sqrt{20}$

F. $13\sqrt{20}$

G. $3\sqrt{13} + 11\sqrt{7}$

H. $2\sqrt{13} + 10\sqrt{7}$

14. Evaluate the radical expression.

$$7\sqrt[4]{10} + 4\sqrt[4]{10} + 9\sqrt[4]{10}$$

A. $20\sqrt[4]{10}$

B. $11\sqrt[3]{10}$

C. $23\sqrt[3]{10}$

D. $15\sqrt[3]{10}$

E. $11\sqrt[4]{10}$

F. $15\sqrt[4]{10}$

G. $23\sqrt[4]{10}$

H. $20\sqrt[3]{10}$

15. Perform the indicated division by rationalizing the denominator and then simplifying. Assume that all variables represent positive real numbers.

$$\frac{\sqrt{y}}{\sqrt{y}-\sqrt{\rho}}$$

A. $-\frac{1}{\sqrt{\rho}}$

B. $-\frac{1}{\sqrt{y}}$

C. $\frac{1}{\sqrt{y}}$

D. $\frac{y-\sqrt{y\rho}}{y-\rho}$

E. $\frac{y+\sqrt{y\rho}}{y-\rho}$

F. $\frac{1}{\sqrt{\rho}}$

G. $\frac{y+\sqrt{y\rho}}{y+\rho}$

H. $\frac{y-\sqrt{y\rho}}{y+\rho}$

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

$$\sqrt[3]{-11x}\sqrt[3]{121x^2}$$

A. $-11x$

B. $-\sqrt[3]{110x^2}$

C. $11x$

D. $-11x\sqrt[3]{11x}$

E. $-2\sqrt[3]{11x}$

F. $\sqrt[3]{110x}$

G. $11x\sqrt[3]{11x}$

H. Not a real number.

17. Solve the radical equation.

$$\sqrt[4]{3p+5}+6=4$$

A. $p=3$

B. $p=\frac{67}{15}$

C. $p=\frac{11}{3}$

D. $p=\frac{47}{12}$

E. This equation has no real solution.

F. $p=\frac{41}{12}$

G. $p=\frac{13}{3}$

H. $p=\frac{19}{6}$

18. Solve the radical equation.

$$\sqrt{\theta} = 7$$

A. $\theta = 45$

B. $\theta = 43$

C. $\theta = 54$

D. $\theta = 49$

E. $\theta = 50$

F. $\theta = 40$

G. $\theta = 53$

H. This equation has no real solution.

19. Simplify the expression. Assume that all variables represent positive real numbers.

$$\left(25\xi^{-\frac{2}{5}}\right)^{\frac{3}{2}}$$

A. $8\xi^{\frac{1}{10}}$

B. $125\xi^{-\frac{19}{15}}$

C. $125\xi^{\frac{11}{10}}$

D. $8\xi^{-\frac{3}{5}}$

E. $125\xi^{-\frac{3}{5}}$

F. $125\xi^{\frac{1}{10}}$

G. $8\xi^{\frac{13}{30}}$

H. $8\xi^{-\frac{8}{5}}$

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

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

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

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

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

D. $-\sqrt[6]{0.000001} = -1$

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

F. $-\sqrt[7]{0.000001} = -2$

G. $\frac{1}{\sqrt[7]{0.000001}} = \frac{1}{2}$

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

Answers

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