

1. Solve for x : $-6 \leq \frac{7-5x}{3} \leq -1$.

- a) $[2, 5]$
- b) $[1, 6]$
- c) $[-6, -1]$
- d) $[-5, -2]$

2. Which one of the following is the solution set for $\left| \frac{2x+1}{5} \right| + 1 = \frac{7}{5}$?

- a) $\left\{ \frac{1}{2}, -\frac{3}{2} \right\}$
- b) $\left\{ \frac{3}{2}, -\frac{1}{2} \right\}$
- c) $\left\{ \frac{1}{2} \right\}$
- d) $\left\{ \frac{1}{2}, -\frac{13}{2} \right\}$

3. If $f(x) = \frac{|7-x|}{\sqrt[3]{3x-3}}$, find $f(10)$.

- a) 1
- b) -1
- c) $-\frac{1}{2}$
- d) $\frac{1}{2}$

4. Find the equation of the line which is parallel to $2x + 3y - 5 = 0$ and passes through the point $(1, 3)$.

- a) $3x - 2y + 3 = 0$
- b) $y = \frac{2}{3}x + \frac{7}{3}$
- c) $3x + 2y - 9 = 0$
- d) $y = -\frac{2}{3}x + \frac{11}{3}$

5. Solve the system of linear equations below.

$$\begin{aligned} 3x - 4y &= 6 \\ 2x + 3y &= -13 \end{aligned}$$

- a) $x = 2$ and $y = 3$
- b) $x = -2$ and $y = 3$
- c) $x = 2$ and $y = -3$
- d) $x = -2$ and $y = -3$

6. Simplify the following using the rules for exponents.

$$\left(\frac{x^{-3}y^7}{7x^3y^{-10}} \right)^{-2}$$

- a) $\frac{49y^{34}}{x^{12}}$
- b) $\frac{49}{y^{34}}$
- c) $\frac{x^{12}}{49y^{34}}$
- d) $\frac{49x^{12}}{y^{34}}$

7. Given $P(x) = x^4 - 9x^2 + 7$, $Q(x) = 3x^4 - 4x^2 + 2x - 9$, evaluate $(P - Q)(-1)$.

- a) 29
- b) -13
- c) 11
- d) -11

8. Multiply $(x + 4)(x^2 - 3x + 5)$.

- a) $x^3 + 7x^2 - 7x + 20$
- b) $x^3 + x^2 - 7x + 20$
- c) $x^3 + x^2 + 17x + 20$
- d) $x^3 + 7x^2 + 17x + 20$

9. Find the remainder of

$$\frac{-2x^4 + 3x^3 - x + 1}{x - 2}$$

- a) -11
- b) -9
- c) -53
- d) -5

10. Factor $x^3 + 2x^2 + 4x + 8$ completely.

- a) $(x^2 - 4)(x - 2)$
- b) $(x^2 + 4)(x - 2)$
- c) $(x^2 + 4)(x + 2)$
- d) $(x^2 - 4)(x + 2)$

11. Factor the polynomial completely: $2(x + y)^2 - 3(x + y) + 1$

- a) $(x + y - 1)(2x + 2y - 1)$
- b) $(x + y + 1)(x + y + 2)$
- c) $(x + y - 1)(x + y - 2)$
- d) $(x + y + 1)(2x + 2y + 1)$

12. The Burj Dubai, the worlds tallest building at 2683 feet, has an observation deck on the 124th floor. An object is thrown upward with an initial velocity of 16 feet per second off the edge of the observation deck. The height of the object h at time t seconds after the object was thrown is given by the function $h(t) = -16t^2 + 16t + 1440$. How long will it take for the object to hit the ground?

- a) 9 seconds.
- b) 10 seconds.
- c) 11 seconds.
- d) 12 seconds.

13. Simplify the following rational expression.

$$\frac{x^3 - 4x^2 - 9x + 36}{x^2 - x - 12}$$

- a) $x + 3$
- b) $x - 3$
- c) $\frac{x - 3}{x + 4}$
- d) $\frac{x + 3}{x - 4}$

14. Divide the rational expressions:

$$\frac{x^2 - 4}{2x^2 - x - 6} \div \frac{x^2 + 4x + 4}{6x^2 + 11x + 3}$$

- a) $\frac{3x + 1}{2x + 3}$
- b) $\frac{3x + 1}{x + 2}$
- c) $3x + 1$
- d) $\frac{(x + 2)^3}{(3x + 1)(2x + 3)^2}$

15. Add the rational expressions and simplify:

$$\frac{x}{x^2 - 36} + \frac{4}{x}$$

- a) $\frac{5x^2 - 144}{(x + 6)^2x}$
- b) $\frac{5x^2 - 144}{(x - 6)^2x}$
- c) $\frac{x + 4}{x^2 + x - 36}$
- d) $\frac{5x^2 - 144}{x(x + 6)(x - 6)}$

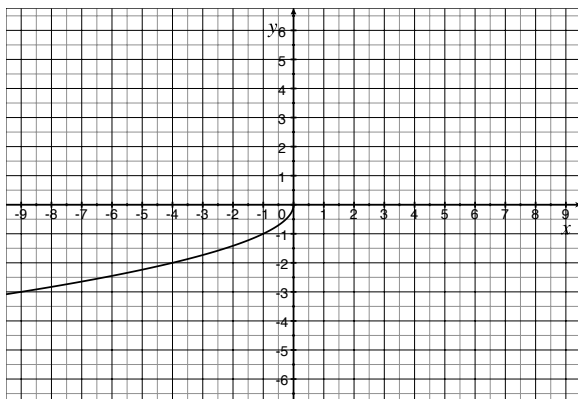
16. A formula for total electrical resistance of two parallel resistors with resistances R_1 and R_2 is given by

$$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2}.$$

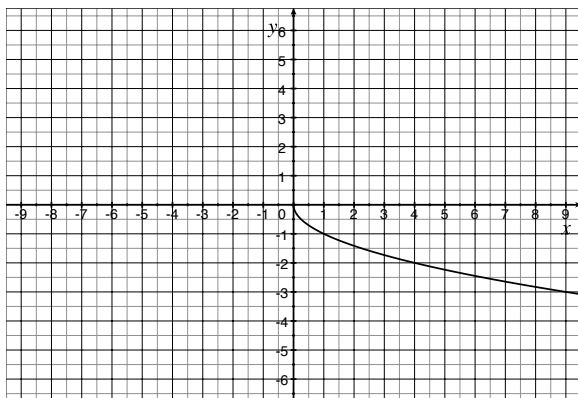
If you have a resistor with resistance $R_1 = 30$ Ohms and you wish to add a second resistor with resistance R_2 so that the total resistance is 10 Ohms, what must R_2 be?

- a) 20 Ohms
- b) 15 Ohms
- c) 30 Ohms
- d) -20 Ohms

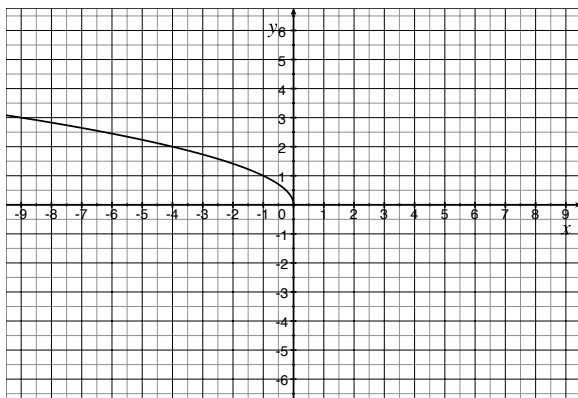
17. Find the graph of the function $f(x) = -\sqrt{-x}$.



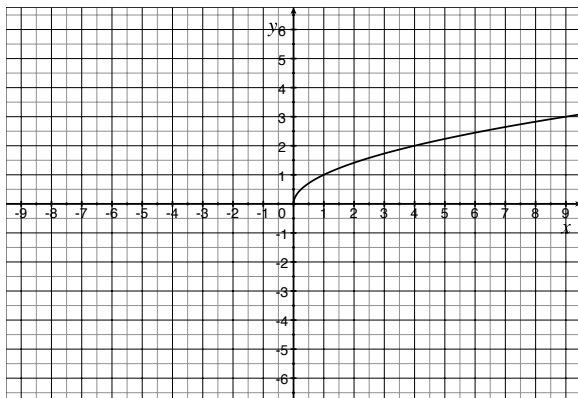
a)



b)



c)



d)

18. Simplify the radical expression: $\sqrt[4]{x^5y^8z^9}$

- a) $xy^2z^2\sqrt[4]{xz}$
- b) xy^2z^3
- c) $xy^2z^2\sqrt[4]{x}$
- d) $xy^2z^2\sqrt[4]{xyz}$

19. Rationalize the denominator of the following expression:

$$\frac{\sqrt{a}-2}{\sqrt{a}+3}$$

- a) $\frac{a-5\sqrt{a}+6}{a-9}$
- b) $\frac{a-5\sqrt{a}+6}{a-3}$
- c) $\frac{\sqrt{a^2-5a+6}}{a-9}$
- d) $\frac{a^2-5\sqrt{a}+6}{a-3}$

20. Solve the radical equation:

$$\sqrt{2x+3} = x$$

- a) $x = 3$
- b) $x = 3, x = -1$
- c) $x = 1$
- d) $x = 1, x = -3$

21. Multiply the following:

$$\sqrt{-3}\sqrt{-15}$$

- a) $3i\sqrt{5}$
- b) $3\sqrt{5}$
- c) $-3i\sqrt{5}$
- d) $-3\sqrt{5}$

22. Determine the number and type of the solution(s) of the quadratic equation

$$3x^2 + \sqrt{12}x - 1 = 0.$$

- a) no real solution
- b) exactly one real solution
- c) two real solutions
- d) three complex solutions

23. Solve: $3\left(\frac{1}{x-1}\right)^2 - \frac{5}{x-1} - 2 = 0$

a) $x = \frac{1}{4}, x = -\frac{1}{2}$

b) $x = \frac{10}{3}, x = -2$

c) $x = \frac{3}{2}, x = -2$

d) $x = -\frac{1}{3}, x = 2$

24. Find the vertex of the graph of $f(x) = x^2 + 6x + 7$ and determine whether the graph opens up or down.

a) Vertex: $(-3, -2)$, opens up

b) Vertex: $(3, -2)$, opens up

c) Vertex: $(-3, -2)$, opens down

d) Vertex: $(3, -2)$, opens down

25. Find the distance between $(0, 0)$ and the midpoint C of the line segment joining the points $A(-3, 4)$ and $B(-1, -2)$.

a) $\sqrt{10}$

b) $2\sqrt{5}$

c) $2\sqrt{10}$

d) $\sqrt{5}$

1. A
2. A
3. A
4. D
5. D
6. D
7. C
8. B
9. B
10. C
11. A
12. B
13. B
14. B
15. D
16. B
17. A
18. A
19. A
20. A
21. D
22. C
23. C
24. A
25. D