

Review Problems

1. Simplify each of the following.

$$\begin{array}{lll} \text{a) } \frac{(2a^2b^3)^3(-3ab^2)^2}{(6a^2b^2)^4} & \text{d) } \frac{3x^2 - 18}{18 - 3x^2} & \text{g) } \frac{5}{x-1} - \frac{2}{x} \\ \text{b) } \left(\frac{2x^3y}{3xy^2}\right)^4 \left(\frac{-3x^2y^5}{2xy^2}\right)^2 & \text{e) } \frac{2a^2 - 8a}{2a^2 - 32} \cdot \frac{5a + 20}{5a^3} & \text{h) } (3\sqrt{5} - 2)^2 \\ \text{c) } \frac{2x^2 - 50}{3x + 15} & \text{f) } \frac{3}{x} - \frac{x}{5} & \end{array}$$

2. Rationalize the denominator in each of the following.

$$\text{a) } \frac{12}{\sqrt{5} - 3} \quad \text{b) } \frac{3}{\sqrt{7} - 1} \quad \text{c) } \frac{3}{\sqrt{x} - 2}$$

3. Simplify $-x^2 - 2x + 6$ if

$$\text{a) } x = \sqrt{5} \quad \text{b) } x = 3\sqrt{2} - 1 \quad \text{c) } x = -\sqrt{7} - 1$$

4. Completely factor each of the following.

$$\text{a) } 3x^3 - 75x \quad \text{b) } 2a^6 - 162a^2 \quad \text{c) } 20a^3 + 5a^5 \quad \text{d) } (5m + 3)^2 - 16$$

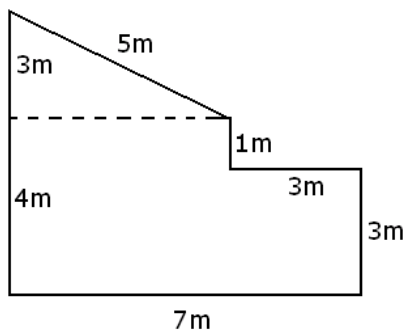
5. Graph each of the following.

$$\text{a) } y = -\frac{x}{2} + 4 \quad \text{b) } 3x - 4y = -12 \quad \text{c) } y = -2$$

6. Solve each of the following equations.

$$\begin{array}{ll} \text{a) } 2a^3 = 10a^2 & \text{e) } \frac{x+3}{2} - \frac{2x-1}{3} = -\frac{x-2}{3} \\ \text{b) } 3a^4 = 75a^2 & \text{f) } (x-5)^2 + (x+5)^2 = 2(x-1)^2 \\ \text{c) } 3a^5 = 48a & \text{g) } -(x-3)^2 - (x+1)(x-5) = 3x-4 \\ \text{d) } \frac{x-1}{3} - \frac{x+2}{4} = 5 - \frac{x}{2} & \end{array}$$

7. Compute the perimeter and area of the figure shown on the picture below. Include units in your computation and answer.

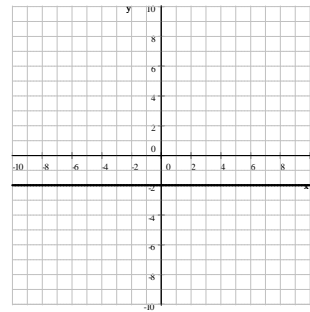
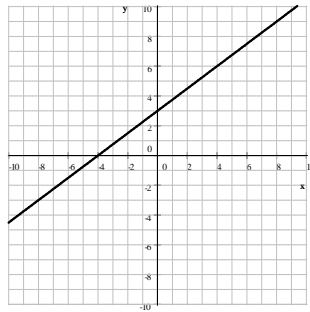
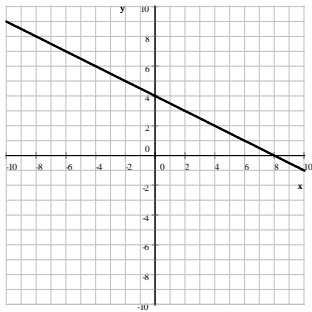


8. The difference between two numbers is 31, their sum is 23. Find these numbers.

9. One side of a rectangle is 7 in shorter than twice the other side. Find the length of the sides if the perimeter of the rectangle is 52 in.
10. The age of a father is 5 more than three times his son's age. The sum of their ages is 49. How old are they?
11. We have some coins, all quarters and dimes. The number of dimes is six less than seven times the number of quarters. How many of each types of coins do we have if the total value of all coins is \$10.80?
12. The greatest angle in a triangle is 72° . The difference between the other two angles is 12° . Find the angles in the triangle.

Answers

1. a) $\frac{b^5}{18}$ b) $\frac{4}{9}x^{10}y^2$ c) $\frac{2(x-5)}{3}$ d) -1 e) $\frac{1}{a^2}$ f) $\frac{15-x^2}{5x}$ g) $\frac{3x+2}{x^2-x}$ h) $49-12\sqrt{5}$
2. a) $-3\sqrt{5}-9$ b) $\frac{\sqrt{7}+1}{2}$ c) $\frac{3(\sqrt{x}+2)}{x-4}$
3. a) $-2\sqrt{5}+1$ b) -11 c) 0
4. a) $3x(x-5)(x+5)$ b) $2a^2(a^2+9)(a+3)(a-3)$ c) $5a^3(a^2+4)$ d) $(5m+7)(5m-1)$
5. a) $y = -\frac{x}{2} + 4$ b) $3x - 4y = -12$ c) $y = -2$



6. a) $0,5$ b) $-5,0,5$ c) $-2,0,2$ d) 10 e) -7 f) -12 g) $0, \frac{7}{2}$
7. $P = 26 \text{ m}$ $A = 31 \text{ m}^2$
8. -4 and 27
9. 11 in and 15 in
10. 11 and 38
11. 12 quarters 78 dimes
12. $48^\circ, 60^\circ, 72^\circ$