

1. Simplify each of the following expressions. Show all work.

$$\begin{array}{lll} \text{a) } |3|-10-2|| & \text{c) } |3-10|-2|| & \text{e) } -3^2+40\div 4\cdot 2 \\ \text{b) } |3-|10-2|| & \text{d) } 25-5(8-2(-4)) & \text{f) } \frac{30-2\cdot 5^2}{-3^2+10-1} \end{array}$$

2. Simplify each of the following expressions. Show all work.

$$\begin{array}{lll} \text{a) } \frac{6-\sqrt{24}}{6} & \text{d) } \sqrt{3}(2-5\sqrt{3}) & \text{g) } (\sqrt{5}-2)^3 \\ \text{b) } \sqrt{18}-3\sqrt{50}+\sqrt{98} & \text{e) } (3\sqrt{5}-1)(4+\sqrt{5}) & \text{h) } (2\sqrt{7}-3)-(\sqrt{7}-2)^2 \\ \text{c) } \frac{\sqrt{48}}{\sqrt{75}} & \text{f) } (\sqrt{5}-2)^2 & \end{array}$$

3. Simplify  $-x^2+6x-4$  if

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

4. Rationalize the denominator in each of the following.

$$\text{a) } \frac{6}{\sqrt{5}-3} \quad \text{b) } \frac{3\sqrt{2}-5}{\sqrt{2}+1} \quad \text{c) } \frac{1}{\sqrt{x}-5}$$

5. Simplify each of the following expressions. Show all work.

$$\begin{array}{lll} \text{a) } \frac{(3xyx^2)(-2xy^3)^3}{4y^5(-x^2y)^2} & \text{d) } \frac{4x-2x^2+16}{x^3-16x} & \text{g) } \frac{3}{x-1}-\frac{2}{x} \\ \text{b) } b^2\left(\frac{2ab^2a^3b}{-ab^5a^2}\right)^3 & \text{e) } \frac{a^2-20a+36}{a^2-16a-36} & \text{h) } \frac{5}{x-2}+\frac{3}{x+2} \\ \text{c) } \frac{6x^2-10}{2} & \text{f) } \frac{2x^2+2x^3}{6x+x^2+5}\cdot\frac{4x+x^2-5}{2x^2-2} & \end{array}$$

6. Completely factor each of the following expressions.

$$\text{a) } a^2-6a+13 \quad \text{b) } 150m^2+20m^3-2m^4 \quad \text{c) } 16x^8-81 \quad \text{d) } 5xyz^2-45xy$$

7. Solve each of the following.

$$\begin{array}{ll} \text{a) } (3x-2)^2-5(x-1)^2=(2x-1)^2 & \text{f) } \frac{1}{3}|x-5|+4=9 \\ \text{b) } \frac{2}{3}(x-1)+\frac{1}{2}(x-5)=\frac{1}{6}(7x-19) & \text{g) } \frac{x-1}{3}-\frac{x-2}{4}=\frac{x}{2}-4 \\ \text{c) } (x-3)^2-(x-4)^2=(x-5)^2 & \text{h) } 3x^6=48x^2 \\ \text{d) } \frac{x-1}{3}-\frac{x-2}{4}=\frac{x}{2}-4 & \text{i) } (2x-1)^2-3x(x+5)=(2x-1)^2 \\ \text{e) } 3+|2x-1|=16 & \end{array}$$

8. Graph the straight lines determined by the equations  $y=\frac{1}{3}x+3$  and  $x-y=-5$ . Use your graph to find the coordinates of the point where the lines intersect.

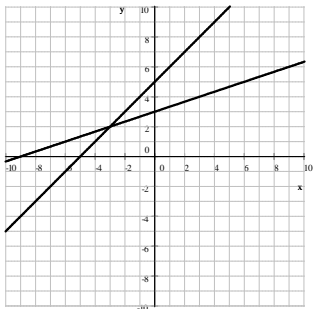
9. Solve for  $x$ .

$$\text{a) } 2x-3y=18 \quad \text{b) } ax+by=c \quad \text{c) } \frac{1}{x}+3=m$$

10. Notebooks cost \$1.20 and pencils cost \$0.40. We bought some pencils and notebooks. The number of pencils is two more than than four times the number of notebooks. How many of each did we buy if we paid a total of \$20.40?
11. One side of a recangle is twelve meters longer than three times another side. Find the dimensions of the rectangle if its area is 495 square-meters.
12. The sum of the opposite of number and ten is eleven less than twice the number. Find this number.
13. The square of a number is twelve greater than four times the number. Find this number.

## Answers

- 1.) a) 36   b) 5   c) 17   d) -55   e) 11   f) undefined
- 2.) a)  $\frac{3 - \sqrt{6}}{3} = 1 - \frac{\sqrt{6}}{3}$    b)  $-5\sqrt{2}$    c)  $\frac{4}{5}$    d)  $2\sqrt{3} - 15$    e)  $11 + 11\sqrt{5}$    f)  $9 - 4\sqrt{5}$   
 g)  $-38 + 17\sqrt{5}$    h)  $-14 + 6\sqrt{7}$
- 3.) a)  $-6 + 6\sqrt{2}$    b) 0   c) 3   4.) a)  $-\frac{3(\sqrt{5} + 3)}{2} = \frac{-3\sqrt{5} - 9}{2}$    b)  $11 - 8\sqrt{2}$    c)  $\frac{\sqrt{x} + 5}{x - 25}$
- 5.) a)  $-6x^2y^3$    b)  $\frac{-8a^3}{b^4}$    c)  $3x^2 - 5$    d)  $\frac{-2(x + 2)}{x(x + 4)} = \frac{-2x - 4}{4x + x^2}$    e)  $\frac{a - 2}{a + 2}$    f)  $\frac{x^2}{x + 1}$   
 g)  $\frac{x + 2}{x(x - 1)} = \frac{x + 2}{x^2 - x}$    h)  $\frac{4(2x + 1)}{(x + 2)(x - 2)} = \frac{8x + 4}{x^2 - 4}$
- 6.) a) does not factor   b)  $-2m^2(m + 5)(m - 15)$    c)  $(4x^4 + 9)(2x^2 + 3)(2x^2 - 3)$   
 d)  $5yx(z + 3)(z - 3)$
- 7.) a) 1   b) all real numbers   c) 4, 8   d) 10   e) -6, 7   f) -10, 20   g) 10   h) -2, 0, 2   i) 0, -5
- 8.)  $(-3, 2)$    9.) a)  $x = \frac{3}{2}y + 9$    b)  $x = \frac{c - by}{a}$    c)  $x = \frac{1}{m - 3}$



- 10.) 7 notebooks and 30 pencils   11.) 11 meters by 45   12.) 7   13.) -2 and 6