

$$\textcircled{1} \quad x+3=12$$

$$x+3 \cancel{-3} = 12 - 3$$

$$x = 9$$

$$\textcircled{2} \quad d-1 = -12$$

$$d-1 \cancel{+1} = -12 + 1$$

$$d = -11$$

3

$$-8z = 24$$

$$\frac{-8z}{-8} = \frac{24}{-8}$$

$$z = -3$$

4

$$5n + 40 = 55$$

$$5n + 40 - 40 = 55 - 40$$

$$5n = 15$$

$$\frac{5n}{5} = \frac{15}{5}$$

$$n = 3$$

$$\textcircled{5} \quad -3y - 11 = 6y + 34$$

$$-3y - 11 + 11 = 6y + 34 + 11$$

$$-3y = 6y + 45$$

$$-3y - 6y = 6y + 45 - 6y$$

$$-9y = 45$$

$$\frac{-9y}{-9} = \frac{45}{-9}$$

$$y = -5$$

$\textcircled{6.}$

$$4x < -24$$

$$\frac{4x}{4} < \frac{-24}{4}$$

$$x < -6$$



$$(-\infty, -6)$$

$$7. \quad -4x \leq 12$$

$$\frac{-4x}{-4} \geq \frac{12}{-4} \quad \text{divide by a negative and turn the alligator around.}$$

$$x \geq -3$$



$$[-3, \infty)$$

8. The perimeter of a rectangle is to be no greater than 100 centimeters and the width must be 10 centimeters. Find the maximum length of the rectangle.

$$P = 2L + 2W$$



$$100 = 2(x) + 2(10)$$

$$100 = 2x + 20$$

$$100 - 20 = 2x + 20 - 20$$

$$80 = 2x$$

$$\frac{80}{2} = \frac{2x}{2}$$

$$40 = x$$

9) graph

$$y = -3x + 4$$

$$y = -3(0) + 4$$

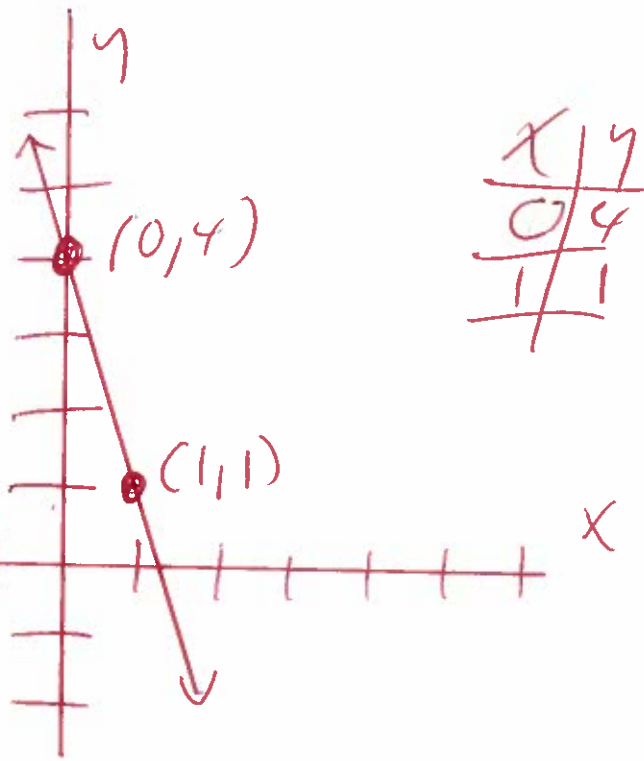
$$y = 0 + 4$$

$$y = 4$$

$$y = -3(1) + 4$$

$$y = -3 + 4$$

$$y = 1$$



10) find the slope of the line that goes through the two points

$$(-2, -5) \text{ and } (-3, -9)$$

$x_1 \quad y_1 \quad x_2 \quad y_2$

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

$$m = \frac{(-5) - (-9)}{(-2) - (-3)}$$

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

$$m = \frac{4}{1}$$

$$m = 4$$

11. Solve for y

$$y - 3 = -5(x - (-7))$$

$$y - 3 = -5(x + 7)$$

$$y - 3 = -5x - 35$$

$$y - 3 + 3 = -5x - 35 + 3$$

$$y = -5x - 32$$

12. Find the slope-intercept form of the line whose slope is 2 and that passes through the point $(-5, 11)$

$$\text{slope} = 2 = m \quad \text{point} = \begin{pmatrix} -5 & 11 \\ x_1 & y_1 \end{pmatrix}$$

$$y - y_1 = m(x - x_1)$$

$$y - (11) = 2(x - (-5))$$

$$y - 11 = 2(x + 5)$$

$$y - 11 = 2x + 10$$

$$y - \cancel{11} + \cancel{11} = 2x + 10 + 11$$

$$y = 2x + 21$$

(13) Find the value given x

$$x^2 - 4x + 3 = \quad x = -3$$

$$(-3)^2 - 4(-3) + 3 =$$

$$(-3)(-3) - 4(-3) + 3 =$$

$$9 + 12 + 3 =$$

$$21 + 3 =$$

$$24 =$$

(14) $f(x) = x + 4$ find $f(-5)$, $f(0)$, $f(3)$

$$f(-5) = (-5) + 4$$

$$f(-5) = -5 + 4$$

$$f(-5) = -1$$

$$f(0) = (0) + 4$$

$$f(0) = 0 + 4$$

$$f(0) = 4$$

$$f(3) = (3) + 4$$

$$f(3) = 3 + 4$$

$$f(3) = 7$$

15 Solve the system

$$3x + y = 15$$

$$4x - y = 13$$

$$\hline 7x + 0 = 28$$

$$7x = 28$$

$$\frac{7x}{7} = \frac{28}{7}$$

$$x = 4$$

Subst

$$3x + y = 15$$

$$3(4) + y = 15$$

$$12 + y = 15$$

$$\cancel{12} + y - \cancel{12} = 15 - 12$$

$$y = 3$$

$$(x, y) = (4, 3)$$

(16) If $P(x) = x^2 + x + 4$ find $P(8)$

$$P(8) = (8)^2 + (8) + 4$$

$$P(8) = (8)(8) + (8) + 4$$

$$P(8) = 64 + 8 + 4$$

$$P(8) = 72 + 4$$

$$P(8) = 76$$

(17) ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

$$9a^2 - 3ab + 2b^2 - 5a^2 - 5ab + 3b^2 =$$

$$4a^2 - 8ab + 5b^2 =$$

(18)

$$(5y^2 + 9y - 9) - (-5y + 2) =$$

$$5y^2 + 9y - 9 + 5y - 2 =$$

Change
Signs

$$5y^2 + 14y - 11 =$$

(19)

$$(-8y^2 - 7y) + (7y^2 + y - 9) =$$

$$-8y^2 - 7y + 7y^2 + y - 9 =$$

Stays
Same

$$-1y^2 - 6y - 9 =$$

$$-y^2 - 6y - 9 =$$

$$\textcircled{20} \quad (a+3)(a-7) =$$

$$a^2 - 7a + 3a - 21 =$$

$$a^2 - 4a - 21 =$$

$$\textcircled{21} \quad (9y-1)^2 =$$

$$(9y-1)(9y-1) =$$

$$81y^2 - 9y - 9y + 1 =$$

$$81y^2 - 18y + 1 =$$

(22.)

$$(3x+7)(3x+2) =$$
$$9x^2 + 6x + 21x + 14 =$$

$$9x^2 + 27x + 14 =$$

(23.)

$$(9a+6)(2a^2+7a+3) =$$
$$18a^3 + 63a^2 + 27a + 12a^2 + 42a + 18 =$$

$$18a^3 + 75a^2 + 69a + 18 =$$

$$(24) \quad (a-10)(a+10) =$$

$$a^2 + \cancel{10a} - \cancel{10a} - 100 =$$

$$a^2 - 100 =$$

(25) factor out the greatest common factor

$$5x + 25 =$$

$$5(x+5) =$$

26. factor

$$x^2 - 11x + 28 =$$

$$(x - 4)(x - 7) =$$

Possible
28.1
14.2
4.7

check (foil)

$$(x - 4)(x - 7)$$

$$x^2 - 7x - 4x + 28$$

$$x^2 - 11x + 28$$

Good

27. factor

$$x^2 - 3x - 10 =$$

$$(x + 2)(x - 5) =$$

Possibly
10.1
2.5

check (foil)

$$(x + 2)(x - 5)$$

$$x^2 - 5x + 2x - 10$$

$$x^2 - 3x - 10$$

Good

(28) factor

$$121x^2 - 49y^2 =$$

$$(11x)^2 - (7y)^2 =$$

$$(11x + 7y)(11x - 7y) =$$

Formula

$$a^2 - b^2 = (a+b)(a-b)$$

(29) Solve

$$(x-6)(x+4) = 0$$

$$\text{set } x-6=0 \quad \text{OR} \quad x+4=0$$

$$x - \cancel{6} + \cancel{6} = 0 + 6 \quad \text{OR} \quad x + 4 - 4 = 0 - 4$$

$$x = 6$$

OR

$$x = -4$$

30.

Solve

$$6x(x-7)=0$$

$$\text{Let } 6x=0 \quad \text{OR} \quad x-7=0$$

$$\frac{6x}{6} = \frac{0}{6} \quad \text{OR} \quad x-7+7=0+7$$

$$x=0$$

$$\text{OR } x=7$$

31.

Solve

$$(8x+9)(5x-6)=0$$

$$\text{Let } 8x+9=0 \quad \text{OR} \quad 5x-6=0$$

$$8x + \cancel{9} - \cancel{9} = 0 - 9 \quad \text{OR} \quad 5x - \cancel{6} + \cancel{6} = 0 + 6$$

$$8x = -9 \quad \text{OR} \quad 5x = 6$$

$$\frac{\cancel{8}x}{\cancel{8}} = \frac{-9}{8} \quad \text{OR} \quad \frac{\cancel{5}x}{\cancel{5}} = \frac{6}{5}$$

$$x = -\frac{9}{8}$$

OR

$$x = \frac{6}{5}$$

32

Solve

$$x^2 - 12x + 35 = 0$$

$$(x - 5)(x - 7) = 0$$

Let $x - 5 = 0$ OR $x - 7 = 0$

$$x - 5 + 5 = 0 + 5 \quad \text{OR} \quad x - 7 + 7 = 0 + 7$$

$$x = 5$$

OR

$$x = 7$$

Possible
35.1
7.5

33

Solve

$$x^2 + 2x - 35 = 0$$

$$(x - 5)(x + 7) = 0$$

Let $x - 5 = 0$ OR $x + 7 = 0$

$$x - 5 + 5 = 0 + 5 \quad \text{OR} \quad x + 7 - 7 = 0 - 7$$

$$x = 5$$

OR

$$x = -7$$

Possible
35.1
7.5

34.

Solve

$$x^2 - 7x = 0$$

$$x(x-7) = 0$$

set $x = 0$ OR $x - 7 = 0$

$$x - 7 + 7 = 0 + 7$$

$$x = 7$$

35.

Solve

$$x^3 - 12x^2 + 27x = 0$$

$$x(x^2 - 12x + 27) = 0$$

$$x(x-3)(x-9) = 0$$

set $x = 0$ OR $x - 3 = 0$ OR $x - 9 = 0$

$$x - 3 + 3 = 0 + 3 \quad \text{OR} \quad x - 9 + 9 = 0 + 9$$

$$x = 3$$

OR $x = 9$

Possibly

27.1

3.9

36

Solve

$$3x^2 - 7x - 6 = 0$$

$$(3x + 2)(x - 3) = 0$$

but $3x + 2 = 0$ OR $x - 3 = 0$

$$3x + 2 = 0 - 2 \text{ OR } x - 3 = 0 + 3$$

$$3x = -2 \text{ OR}$$

$$x = 3$$

$$\frac{3x}{3} = \frac{-2}{3}$$

$$x = \frac{-2}{3}$$

Possible

3.1

6.1

2.3

Check

$$(3x + 2)(x - 3)$$

$$3x^2 - 9x + 2x - 6$$

$$3x^2 - 7x - 6$$

Good

37

Solve

$$x^2 + 6x + 9 = 0$$

$$(x+3)(x+3) = 0$$

set $x+3=0$ OR $x+3=0$

$$x+3-3=0-3 \quad \text{OR} \quad x+3-3=0-3$$

$x = -3$ OR $x = -3$

Possible

9.1
3.3

38

Solve

$$9x^3 - 36x = 0$$

$$9x(x^2 - 4) = 0$$

$$9x((x)^2 - (2)^2) = 0$$

$$9x(x+2)(x-2) = 0$$

set $9x=0$ OR $x+2=0$ OR $x-2=0$

$$\frac{9x}{9} = \frac{0}{9} \quad \text{OR} \quad x+2-2=0-2 \quad \text{OR} \quad x-2+2=0+2$$

$x = 0$

OR $x = -2$ OR $x = 2$

for math
 $a^2 - b^2 = (a+b)(a-b)$

39. the area of the square is 121 square units. find the length of its sides.

$$A = LW$$

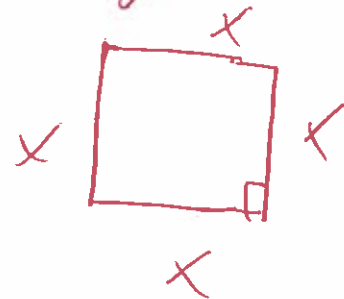
$$A = (x)(x)$$

$$121 = (x)(x)$$

$$121 = x^2$$

$$\sqrt{121} = \sqrt{x^2}$$

$$11 = x$$



40. $|2x-1|=3$

$$2x-1 = -3 \quad \text{OR} \quad 2x-1 = 3$$

$$2x - \cancel{1} + \cancel{1} = -3 + 1 \quad \text{OR} \quad 2x - \cancel{1} + \cancel{1} = 3 + 1$$

$$2x = -2 \quad \text{OR} \quad 2x = 4$$

$$\frac{\cancel{2}x}{\cancel{2}} = \frac{-2}{2} \quad \text{OR} \quad \frac{\cancel{2}x}{\cancel{2}} = \frac{4}{2}$$

$$x = -1 \quad \text{OR} \quad x = 2$$

formula

$$|x| = a$$

$$x = -a \quad \text{OR} \quad x = a$$

$$(41) \quad |x+5| < 5$$

$$-5 < x+5 < 5$$

$$-5-5 < x+5-5 < 5-5$$

$$-10 < x < 0$$



$$(-10, 0)$$

formula

$$|x| < a$$
$$-a < x < a$$

$$(42) \quad |x+5| \geq 13$$

$$x+5 \leq -13 \text{ OR } x+5 \geq 13$$

$$x+5-5 \leq -13-5 \text{ OR } x+5-5 \geq 13-5$$

$$x \leq -18$$

OR

$$x \geq 8$$



$$(-\infty, -18] \cup [8, \infty)$$

formula

$$|x| \geq a$$
$$x \leq -a \text{ OR } x \geq a$$

$$(43) \sqrt{36a^8b^{28}}$$

$$\sqrt[2]{36a^8b^{28}}$$

$$6a^{\frac{8}{2}}b^{\frac{28}{2}} = \text{divide powers}$$

$$6a^4b^{14}$$

$$(44) \sqrt{x-2} = 4$$

$$(\sqrt{x-2})^2 = (4)^2$$

$$x-2 = 16$$

$$x-2+2 = 16+2$$

$$x = 18$$

Check

$$\sqrt{x-2} = 4$$

$$\sqrt{18-2} = 4$$

$$\sqrt{16} = 4$$

$$4 = 4 \text{ Good}$$

$$(45) \quad (x+8)^2 = 36$$

$$\sqrt{(x+8)^2} = \pm\sqrt{36}$$

$$x+8 = \pm 6$$

$$x+8 = -6$$

OR

$$x+8 = 6$$

$$x+8-8 = -6-8$$

OR

$$x+8-8 = 6-8$$

$$x = -14$$

OR

$$x = -2$$

Check

$$(x+8)^2 = 36$$

$$(-14+8)^2 = 36$$

$$(-6)^2 = 36$$

$$(-6)(-6) = 36$$

$$36 = 36$$

Good

ck

$$(x+8)^2 = 36$$

$$(-2+8)^2 = 36$$

$$(6)^2 = 36$$

$$(6)(6) = 36$$

$$36 = 36$$

Good

$$(46) \quad m^2 - 3m - 10 = 0$$

$$(m+2)(m-5) = 0$$

$$\text{or } m+2=0 \quad \text{OR} \quad m-5=0$$

$$m+2-2=0-2 \quad \text{OR} \quad m-5+5=0+5$$

$$m = -2 \quad \text{OR} \quad m = 5$$

$$1m^2 - 3m - 10 = 0 \quad \text{Use Quadratic form}$$

$$a=1, \quad b=-3, \quad c=-10$$

$$m = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$m = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-10)}}{2(1)}$$

$$m = \frac{3 \pm \sqrt{9 + 40}}{2}$$

$$m = \frac{3 \pm \sqrt{49}}{2}$$

$$m = \frac{3 \pm 7}{2}$$

$$m = \frac{3-7}{2} \quad \text{OR} \quad m = \frac{3+7}{2}$$

$$m = -\frac{4}{2} \quad \text{OR} \quad m = \frac{10}{2}$$

$$m = -2 \quad \text{OR} \quad m = 5$$

(47) use Quadratic formula

$$1x^2 + 2x + 5 = 0$$

$$a=1, b=2, c=5$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(5)}}{2(1)}$$

$$x = \frac{-2 \pm \sqrt{4 - 20}}{2}$$

$$x = \frac{-2 \pm \sqrt{-16}}{2}$$

$$x = \frac{-2 \pm 4i}{2}$$

$$x = \frac{-2}{2} \pm \frac{4i}{2}$$

$$x = -1 \pm 2i$$

$$x = -1 - 2i$$

OR

$$x = -1 + 2i$$

48. Graph

$$f(x) = x^2 - 7$$

$$f(-1) = (-1)^2 - 7$$

$$f(-1) = (-1)(-1) - 7$$

$$f(-1) = 1 - 7$$

$$f(-1) = -6$$

$$f(0) = (0)^2 - 7$$

$$f(0) = (0)(0) - 7$$

$$f(0) = 0 - 7$$

$$f(0) = -7$$

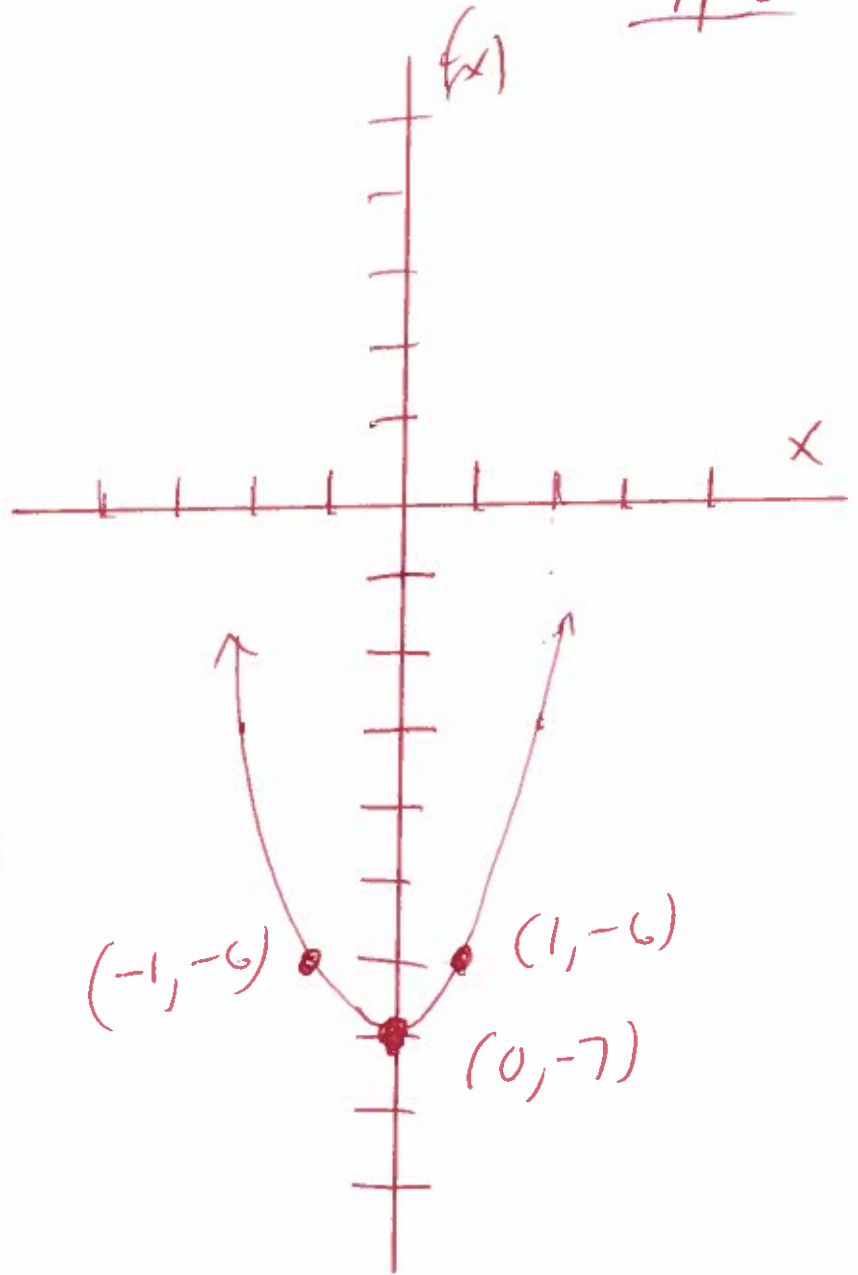
$$f(1) = (1)^2 - 7$$

$$f(1) = (1)(1) - 7$$

$$f(1) = 1 - 7$$

$$f(1) = -6$$

x	f(x)
-1	-6
0	-7
1	-6



49. Find the vertex

$$f(x) = -x^2 + 6x - 5$$

$$a = -1, b = 6, c = -5$$

$$\text{Vertex} = \left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right) \right)$$

$$\text{Vertex} = \left(\frac{-(6)}{2(-1)}, f\left(\frac{-(6)}{2(-1)}\right) \right)$$

$$\text{Vertex} = \left(\frac{-6}{-2}, f\left(\frac{-6}{-2}\right) \right)$$

$$\text{Vertex} = (3, f(3))$$

$$\text{Vertex} = (3, -(3)^2 + 6(3) - 5)$$

$$\text{Vertex} = (3, -(3)(3) + 6(3) - 5)$$

$$\text{Vertex} = (3, -(9) + 6(3) - 5)$$

$$\text{Vertex} = (3, -9 + 18 - 5)$$

$$\text{Vertex} = (3, 9 - 5)$$

$$\text{Vertex} = (3, 4)$$