

KEY

SOLVE EACH OF THE FOLLOWING. SHOW ALL WORK. IF YOU DO NOT SHOW THE WORK YOU WILL NOT RECEIVE THE CREDIT.

1). $x - 48 = 110$ $+48 \quad +48$ $x = 158$	2). $\frac{1}{3}z - 8 = -4$ $+8 \quad +8$ $\frac{1}{3}z = 4$ $(3) \frac{1}{3}z = 4(3)$ $z = 12$
3). $32 = 12 + 4(z - 1)$ $32 = 12 + 4z - 4$ $32 = 4z + 8$ $-8 \quad -8$ $24 = 4z$ $\frac{24}{4} = \frac{4z}{4}$ $z = 6$	4). $5(x + 2) - 7 = 5x + 3$ $5x + 10 - 7 = 5x + 3$ $5x + 3 = 5x + 3$ all real solutions

SOLVE EACH OF THE FOLLOWING. GRAPH THE SOLUTIONS ON THE NUMBER LINE PROVIDED. SHOW ALL WORK.

5). $-3(x - 1) > -3x - 2$ $-3x + 3 > -3x - 2$ $+3x \quad +3x$ $3 > -2$ $0 > -5$ all real solutions $(-\infty, \infty)$ 	6). $2 + \frac{1}{3}y > \frac{2}{3}$ $-2 \quad -2$ $\frac{1}{3}y > \frac{2}{3} - \frac{2}{3}$ $\frac{1}{3}y > 0$ $(3) \frac{1}{3}y > 0(3)$ $y > 0$ open
7). $-8 \leq c - 3 < -1$ $-8 \leq c - 3$ $+3 \quad +3$ $-5 \leq c$ $c - 3 < -1$ $+3 \quad +3$ $c < 2$ $-5 \leq c < 2$ 	9). $a - 6 < -4$ or $a - 1 > 5$ $+6 \quad +6$ $+1 \quad +1$ $a < 2$ or $a > 6$

- 10). GIVE THE DOMAIN AND RANGE FOR EACH RELATION. TELL WHETHER THE RELATION IS A FUNCTION OR NOT.

$\{(3,4), (-1,2), (2,-3), (5,0)\}$

Function $\rightarrow$ no repeating x-values

Domain $\{3, -1, 2, 5\}$

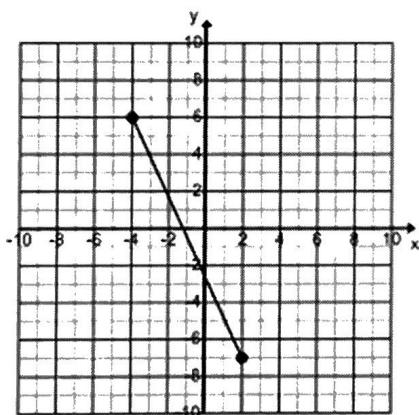
Range $\{4, 2, -3, 0\}$

Function? (Yes or No) YES

- 11). USING THE GRAPH BELOW, DETERMINE BOTH THE DOMAIN AND THE RANGE:

DOMAIN $[-4, 2]$

RANGE $[-7, 6]$



- 12). DETERMINE A RELATIONSHIP BETWEEN THE X AND Y VARIABLES. WRITE AN EQUATION.

EQUATION.

x	0	1	2	3	4
y	0	5	10	15	20

Linear Relationship

$$\text{Slope} = \frac{\Delta y}{\Delta x} = \frac{5}{1}$$

$$y = mx + b$$

$$b = 0$$

Equation:

$$y = 5x$$

- 13). $\{(3,0), (2,-1), (1,-2), (0,-3)\}$

EQUATION

$$y = x - 3$$

x	0	1	2	3
y	-3	-2	-1	0

$$b = -3$$

$$m = \frac{\Delta y}{\Delta x} = 1$$

14). EVALUATE THE FUNCTION $F(x) = 6x - 1$ WHEN $x = 0$ AND WHEN $x = 5$.

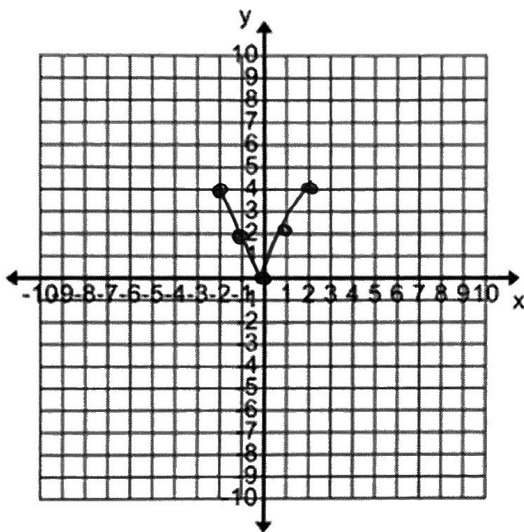
$$f(0) = 6(0) - 1 = 0 - 1$$

$$f(0) = -1$$

$$f(5) = 6(5) - 1 = 30 - 1$$

$$f(5) = 29$$

15). GRAPH THE FUNCTION: $y = 2|x|$ D: $\{-2, -1, 0, 1, 2\}$ (Domain)
absolute value ∇



x	$2 x $	y
-2	$2 -2 $	4
-1	$2 -1 $	2
0	$2 0 $	0
1	$2 1 $	2
2	$2 2 $	4

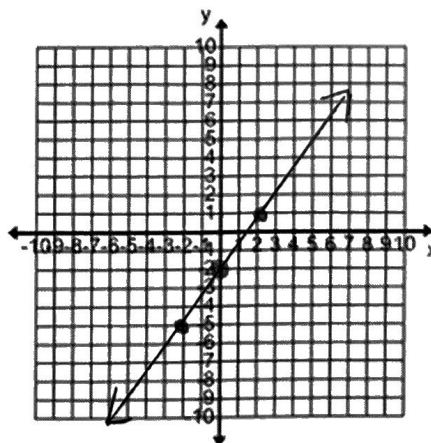
(Standard Form)

16). GRAPH THE LINE $-3x + 2y = -4$ BY COMPLETING THE CHART AND GRAPHING THE POINTS:

x	y
0	$-\frac{2}{2}$
-2	$-\frac{5}{2}$
2	1

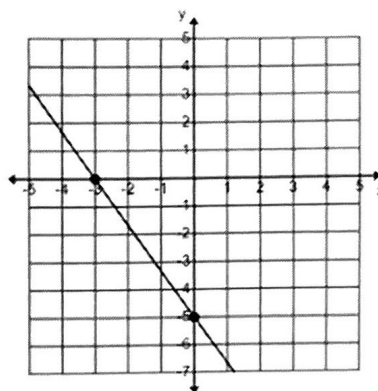
$$\begin{array}{r} -3x + 2y = -4 \\ +3x \quad \quad +3x \\ \hline \end{array}$$

$$\begin{array}{r} 2y = \frac{3x - 4}{2} \\ \frac{2y}{2} = \frac{3x - 4}{2} \\ y = \frac{3}{2}x - 2 \end{array}$$



17). FROM THE GRAPH DETERMINE THE X AND Y INTERCEPTS

x-intercept = -3 ($y=0$)
 y-intercept = -5 ($x=0$)



18). FOR THE EQUATION BELOW, DETERMINE THE X-INTERCEPT AND THE Y-INTERCEPT
 AND THEN GRAPH THE LINE

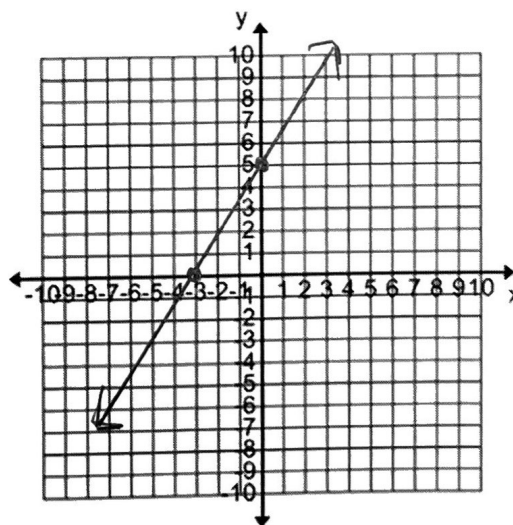
$$-5x + 3y = 15 \quad (\text{Std Form})$$

x-intercept = -3

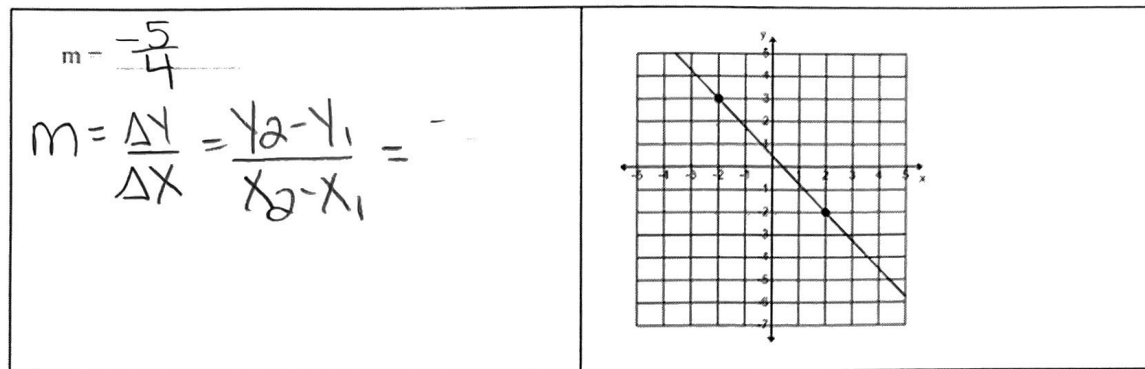
y-intercept = 5

$$\begin{aligned} \text{x-int (y=0)} \\ -5x = 15 \quad x = -3 \end{aligned}$$

$$\begin{aligned} \text{y-int (x=0)} \\ 3y = 15 \quad y = 5 \end{aligned}$$



19). FROM THE GRAPH DETERMINE THE SLOPE OF THE LINE

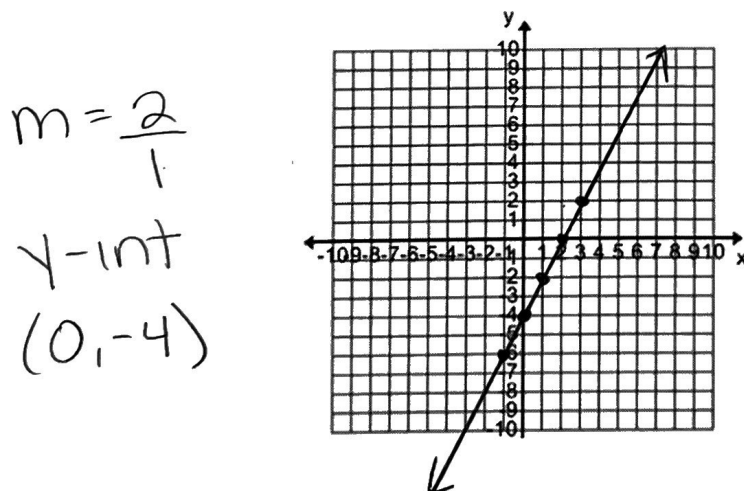


20). FROM THE EQUATION, DETERMINE THE SLOPE OF THE LINE:

$$\begin{array}{rcl}
 6x + 2y & = & -4 \\
 -6x & -6x & \\
 \hline
 2y & = & -6x - 4 \\
 \frac{2y}{2} & = & \frac{-6x - 4}{2} \\
 y & = & -3x - 2 \quad (y = mx + b)
 \end{array}$$

slope = -3

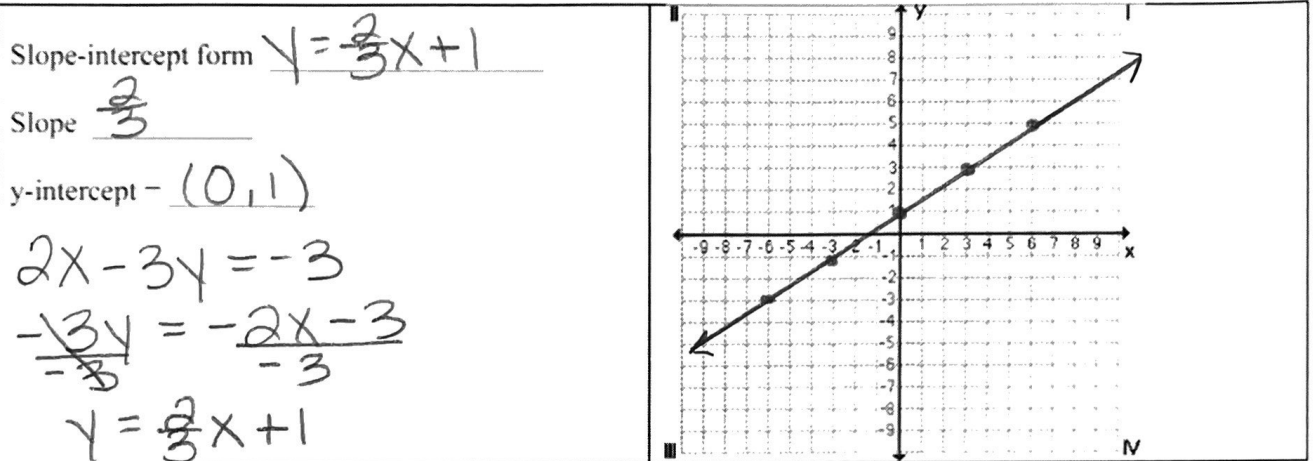
21). GRAPH THE LINE WHOSE SLOPE IS 2 AND THE Y-INTERCEPT IS -4.



$$(y = mx + b)$$

22). PUT THE EQUATION $2x - 3y = -3$ IN SLOPE INTERCEPT FORM. THEN STATE THE SLOPE AND Y-INTERCEPT AND GRAPH THE LINE.

(m) (b)



$$(y - y_1) = m(x - x_1) \quad y = mx + b$$

23). WRITE AN EQUATION OF A LINE IN BOTH POINT-SLOPE FORM AND SLOPE-INTERCEPT

FORM FOR THE LINE WHOSE SLOPE IS $-\frac{2}{3}$ AND GOES THROUGH THE POINT $(-6, 2)$

Point-slope form $y - 2 = -\frac{2}{3}(x + 6)$

(m) (x_1, y_1)

Slope-intercept form $y = -\frac{2}{3}x - 2$

$y = mx + b$ (Find b)
 $2 = -\frac{2}{3}(-6) + b$ $2 = 4 + b$ $b = -2$

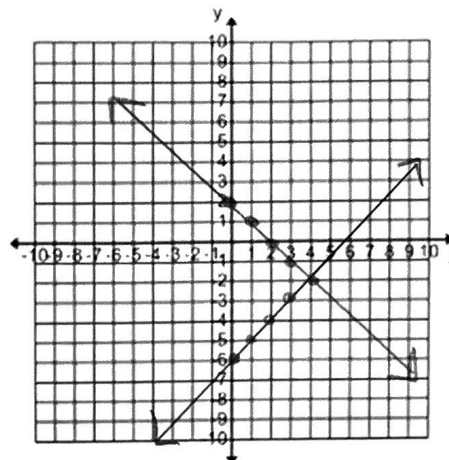
DETERMINE IF THE GIVEN POINT IS A SOLUTION TO THE SYSTEM OR INEQUALITY. SHOW ALL WORK

24). $(2, 0)$ $3x + y = 6$ $x - y = 2$ <u>YES</u> $4x = 8$ $x = 2$ $2 - y = 2$ $y = 0$ $(2, 0)$	25). $(6, -2)$ $x + y > 4$ $x - y < 10$ <u>NO</u> $6 + (-2) > 4$ $4 > 4$	26). $(-2, 3)$ $3x + 4y > 18$ $3(-2) + 4(3) > 18$ $-6 + 12 > 18$ $6 > 18$ <u>NO</u>
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SOLVE THE FOLLOWING SYSTEM BY GRAPHING:

27). $\begin{cases} y = -x + 2 \\ y = x - 6 \end{cases}$

$(4, -2)$



SOLVE EACH OF THE FOLLOWING BY SUBSTITUTION. SHOW ALL WORK.

28). $\begin{cases} x = y + 4 \\ x + 7y = 20 \end{cases}$

$(y + 4) + 7y = 20$

$8y = 16 \quad x = 2 + 4$

$y = 2 \quad x = 6$

$(6, 2)$

29). $\begin{cases} 3x - 4y = 3 \\ y = -2x + 2 \end{cases}$

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

$3x + 8x - 8 = 3$

$11x = 11 \quad y = -2(1) + 2$

$x = 1 \quad y = 0$

$(1, 0)$

SOLVE EACH OF THE FOLLOWING BY THE ELIMINATION METHOD:

30). $\begin{cases} 2x - 4y = -4 \\ 2x + 4y = 20 \end{cases}$

$+ \quad \begin{array}{r} 2x - 4y = -4 \\ 2x + 4y = 20 \\ \hline 4x = 16 \end{array}$

$x = 4$

$2(4) - 4y = -4$

$8 - 4y = -4$

$-4y = -12$

$y = 3$

$(4, 3)$

31). $\begin{cases} x + y = 2 \\ 2x - y = 1 \end{cases}$

$+ \quad \begin{array}{r} x + y = 2 \\ 2x - y = 1 \\ \hline 3x = 3 \end{array}$

$x = 1$

$1 + y = 2$

$y = 1$

$(1, 1)$

WITHOUT GRAPHING DETERMINE THE FOLLOWING:

- A) THE TYPES OF LINES THAT MAKE UP THE SYSTEM (INTERSECTING, PARALLEL OR SAME LINE)
 B) THE NUMBER OF SOLUTIONS
 C) THE SLOPE OF EACH LINE

32). $x + y = 0$ $y = -x$
 $y = 3x - 12$

A) intersecting

B) 1

C) $m = -1, m = 3$

33). $y = 2x + 5$

$y - 2x = 1$ $y = 2x + 1$

A) parallel

B) 0

C) $m = 2, m = 2$

34). $y = \frac{3}{2}x - 4$

$-6x + 4y = 1$

A) parallel

B) 0

C) $m = \frac{3}{2}, m = \frac{3}{2}$

$-6x + 4y = 1$

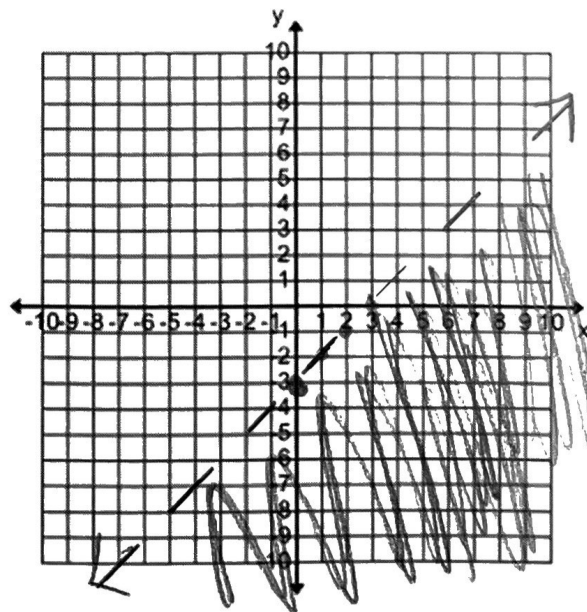
$\frac{4y}{4} = \frac{6x}{4} + \frac{1}{4}$

$y = \frac{3}{2}x + \frac{1}{4}$

GRAPH THE SOLUTIONS TO THE FOLLOWING:

35). $y < x - 3$

↑
less than

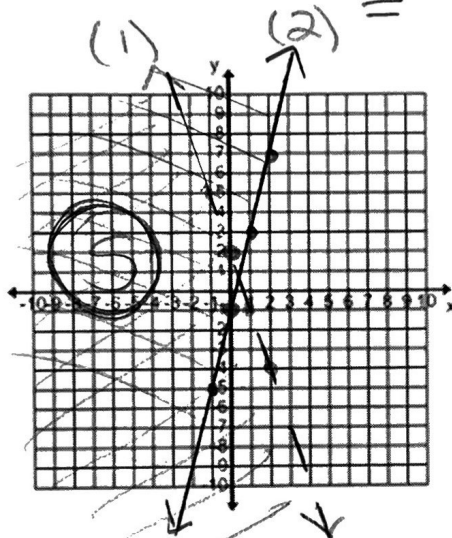


GRAPH THE SOLUTIONS TO THE FOLLOWING SYSTEMS OF INEQUALITIES. THEN DETERMINE TWO POINTS THAT ARE SOLUTIONS, AND TWO POINTS THAT ARE NOT SOLUTIONS.

36).. $\begin{cases} y < -3x + 2 & (1) \\ y \geq 4x - 1 & (2) \end{cases}$ Two points that are solutions: $(-3, 4)$ $(-9, -5)$

Two points that are not solutions: $(0, 6)$ $(1, -5)$

(many answers)



Expressions

SIMPLIFY EACH OF THE FOLLOWING: (combine like terms)

37). $(5x^2 + 2x - 7) + (x^2 - 8x + 12) = \underline{6x^2 - 6x + 5}$

38). $(x^2 - 3x + 8) - (2x^2 - 3x + 7) = \underline{-x^2 + 1}$

39). $-2a^2(3a^2 - 2a + 3) = \underline{-6a^4 + 4a^3 - 6a^2}$

40). $(7x - 3y)(2x - 9y) = \underline{14x^2 - 69xy + 18y^2}$

41). $(x + 5)(x^3 - 3x + 4) = \underline{x^4 - 3x^2 + 4x + 5x^3 - 15x + 20}$
 $\Rightarrow \underline{x^4 + 5x^3 - 3x^2 - 11x + 20}$

42). $(3x - 2)(3x + 2) = \underline{9x^2 - 4}$

43). $(4x - 5y)^2 = \underline{16x^2 - 40xy + 25y^2}$
 $(4x - 5y)(4x - 5y)$

FACTOR BY REMOVING A GREATEST COMMON FACTOR: (GCF)

44). $\frac{16x^3 - 64x^2}{16x^2 16x^2} = 16x^2(x-4)$

FACTOR AS A DIFFERENCE OF TWO SQUARES:

45). $9t^2 - 1 = (3t-1)(3t+1)$

FACTOR EACH OF THE FOLLOWING TRINOMIALS INTO A PRODUCT OF TWO BINOMIALS: ↗ 3 terms () ()

46). $z^2 - 11z + 18 = (x-9)(x+2)$ 47). $s^2 - 20s + 36 = (x-18)(x-2)$

m: 18 A: -11
 $-9, -2$

m: 36 A: -20
 $-18, -2$

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY EITHER THE SQUARE ROOT METHOD, FACTORING OR THE QUADRATIC FORMULA. ↗ b=0

48). $x^2 - 3x - 4 =$

$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-4)}}{2(1)} = \frac{3 \pm \sqrt{9+16}}{2} = \frac{3 \pm \sqrt{25}}{2}$

* Does not Factor *

USE THE PROPERTY OF EXPONENTS TO SIMPLIFY THE FOLLOWING:

49). $(4x^1y^2)(3x^{-4}y^5) = \frac{12y^7}{x^3}$

51). $\frac{12x^2y^3z^{-2}}{21x^1y^2z^3} = \frac{4xy}{7z^5}$

52). $-4^0 = 1$

50). $(2x)^3(3x)^3 = 2^3x^3 \cdot 3^3x^3 = 216x^6$

non-real solution

WRITE THE FOLLOWING IN SIMPLEST RADICAL FORM. REMEMBER TO RATIONALIZE THE DENOMINATOR WHEN NECESSARY.

53) $\sqrt{144} = \boxed{12}$

54) $\sqrt{180} = \sqrt{36 \cdot 5} = \boxed{6\sqrt{5}}$

55) $\frac{\sqrt{24}}{2} = \frac{\sqrt{4 \cdot 6}}{2} = \frac{2\sqrt{6}}{2} = \boxed{\sqrt{6}}$

Rationalize Den. $\rightarrow \frac{4\sqrt{21}}{\sqrt{21} \cdot \sqrt{21}} = \frac{4\sqrt{21}}{21} = \boxed{\frac{4\sqrt{21}}{21}}$

57) $\sqrt{6} + 2\sqrt{6} = \boxed{3\sqrt{6}}$

58) $4\sqrt{7} + 8\sqrt{63} = 4\sqrt{7} + 8\sqrt{9 \cdot 7} = 4\sqrt{7} + 24\sqrt{7} = \boxed{28\sqrt{7}}$

59) $3\sqrt{45} - \sqrt{20} = 3\sqrt{9 \cdot 5} - \sqrt{4 \cdot 5} = 9\sqrt{5} - 2\sqrt{5} = \boxed{7\sqrt{5}}$

60) $(6 - \sqrt{11})(6 + \sqrt{11}) = 36 + 6\sqrt{11} - 6\sqrt{11} - 11 = 36 - 11 = \boxed{25}$

61) $(1 + 2\sqrt{5})(5 + \sqrt{5})$

SOLVING QUADRATIC EQUATIONS REVIEW

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY TAKING THE SQUARE ROOT.

$b = 0$

1. $x^2 - 8 = 10$ $+8 + 8$ $\sqrt{x^2} = \sqrt{18}$ $x = \pm \sqrt{18}$ $= \pm \sqrt{9 \cdot 2}$ $\boxed{x = \pm 3\sqrt{2}}$	2. $-x^2 + 25 = 25$ $x^2 = 0$ $x = \pm 0$ $\boxed{x = 0}$
3. $\sqrt{(x+2)^2} = \sqrt{9}$ $x+2 = \pm 3$ $\swarrow \searrow$ $x+2 = 3$ $x+2 = -3$ $\boxed{x = 1}$ $\boxed{x = -5}$	4. $2x^2 + 10 = 0$ $2x^2 = -10$ $\sqrt{x^2} = \sqrt{-5}$ $\boxed{x = \pm \sqrt{-5}}$

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY COMPLETING THE SQUARE. $a=1$

$$ax^2 + bx = c$$

1. $x^2 - 6x + 18 = 0$

$$x^2 - 6x + 9 = -18 + 9$$

$$(x-3)^2 = -9$$

$$x-3 = \pm \sqrt{-9}$$

$$+3 +3 \quad \boxed{x = 3 \pm \sqrt{-9}}$$

$$b = -6$$

$$\left(\frac{-6}{2}\right)^2$$

$$(-3)^2$$

$$9$$

2. $x^2 + 2x - 15 = 0$

$$x^2 + 2x + \left(\frac{2}{2}\right)^2 = 15 + \left(\frac{2}{2}\right)^2$$

$$x^2 + 2x + 1 = 15 + 1$$

$$(x+1)^2 = 16 \quad x+1 = 4 \quad \boxed{x = 3}$$

$$x+1 = \pm 4 \quad x+1 = -4 \quad \boxed{x = -5}$$

3. $-4x^2 - 16x + 19 = -17$

$$-4x^2 - 16x = -36$$

$$x^2 + 4x + \left(\frac{4}{2}\right)^2 = -\frac{36}{4} + \left(\frac{4}{2}\right)^2$$

$$(x+2)^2 = -7 \quad x+2 = \pm \sqrt{-7}$$

$$\boxed{x = -2 \pm \sqrt{-7}}$$

4. $2x^2 - 16x + 20 = 0$

$$2x^2 - 16x = -20$$

$$x^2 - 8x + \left(\frac{8}{2}\right)^2 = -10 + \left(\frac{8}{2}\right)^2$$

$$(x-4)^2 = 6 \quad x-4 = \pm \sqrt{6} \quad x = 4 + \sqrt{6} = \boxed{8}$$

$$x-4 = \pm 4 \quad x = 4 - 4 = \boxed{0}$$

5. $x^2 - 3x = 7$

$$x^2 - 3x + \left(\frac{-3}{2}\right)^2 = 7 + \left(\frac{-3}{2}\right)^2$$

$$\left(x - \frac{3}{2}\right)^2 = \frac{37}{4}$$

$$x - \frac{3}{2} = \pm \sqrt{\frac{37}{4}}$$

$$x = \frac{3}{2} \pm \frac{\sqrt{37}}{2} = \boxed{\frac{3 \pm \sqrt{37}}{2}}$$

6. $x^2 + 15x = 12$

$$x^2 + 15x + \left(\frac{15}{2}\right)^2 = 12 + \left(\frac{15}{2}\right)^2$$

$$\left(x + \frac{15}{2}\right)^2 = \frac{273}{4}$$

$$x + \frac{15}{2} = \pm \sqrt{\frac{273}{4}}$$

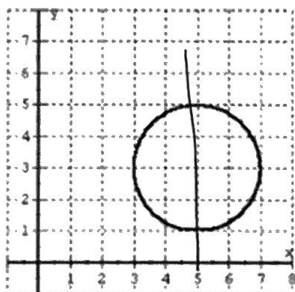
$$\boxed{x = \frac{-15 \pm \sqrt{273}}{2}}$$

SOLVE THE FOLLOWING QUADRATIC EQUATIONS BY USING THE QUADRATIC FORMULA (or Factor)

1. $x^2 + 5x + 14 = 0$ $x = \frac{-5 \pm \sqrt{(5)^2 - 4(1)(14)}}{2(1)}$ $= \frac{-5 \pm \sqrt{31}}{2}$ (non-real solution)	2. $3x^2 - 2x - 1 = 0$ $x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(-1)}}{2(3)}$ $= \frac{2 \pm \sqrt{16}}{6} = \frac{2 \pm 4}{6}$ $\frac{2+4}{6} = 1 \quad \frac{2-4}{6} = -\frac{1}{3}$
3. $-5x^2 + 9x = -3$ $5x^2 - 9x - 3 = 0$ $x = \frac{9 \pm \sqrt{(-9)^2 - 4(5)(-3)}}{2(5)} = \frac{9 \pm \sqrt{141}}{10}$ $x = 2.09$ $x = -.29$	4. $3x^2 - 2x = -6$ $3x^2 - 2x + 6 = 0$ $x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(6)}}{2(3)}$ $x = \frac{2 \pm \sqrt{-68}}{6} \text{ (non Real)}$
5. $-7x^2 = 21x$ $7x^2 + 21x = 0$ $7x(x+3) = 0$ $7x = 0 \quad x+3 = 0$ $x = 0$ $x = -3$	6. $5x^2 = 4x + 10$ $5x^2 - 4x - 10 = 0$ $x = \frac{4 \pm \sqrt{(-4)^2 - (4)(5)(-10)}}{2(5)}$
	$x = \frac{4 \pm \sqrt{216}}{10}$ $x = 1.87$ $x = -1.07$

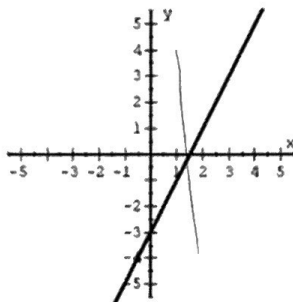
TYPES OF FUNCTIONS REVIEW

STATE WHETHER THE FOLLOWING ARE FUNCTIONS. IF THEY ARE FUNCTIONS, STATE THE DOMAIN AND RANGE.



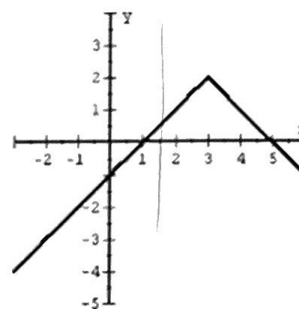
$$(x - 5)^2 + (y - 3)^2 = 4$$

Function? NO



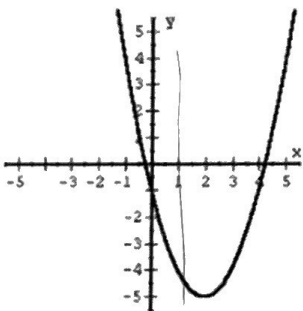
$$y = 2x - 3$$

Function? YES, LINEAR



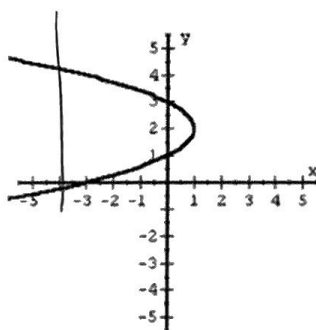
$$y = -|x - 3| + 2$$

Function? YES, ABSOLUTE VALUE



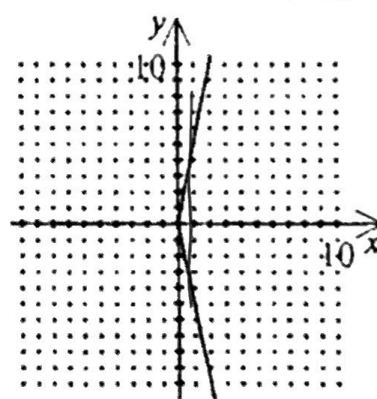
$$y = (x - 2)^2 - 5$$

Function? YES, QUADRATIC



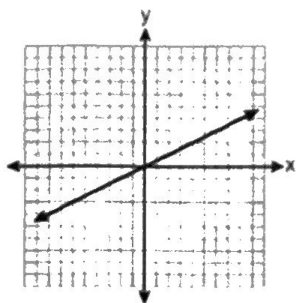
$$x = -(y - 2)^2 + 1$$

Function? NO

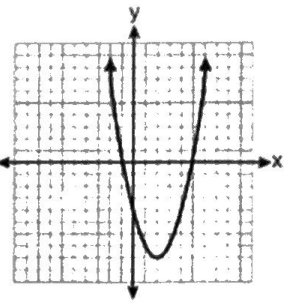


NO

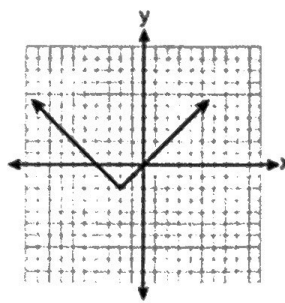
IDENTIFY EACH TYPE OF FUNCTION AS LINEAR, QUADRATIC, EXPONENTIAL OR ABSOLUTE VALUE.



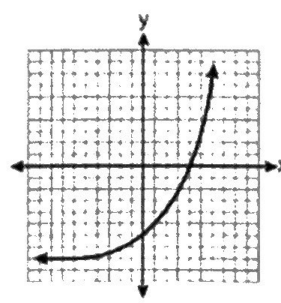
LINEAR



QUADRATIC



ABSOLUTE VALUE

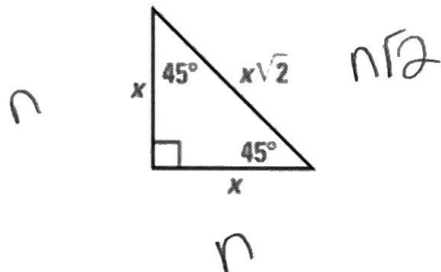


EXPONENTIAL

RIGHT TRIANGLE AND TRIGONOMETRY REVIEW

45°-45°-90° Triangle Theorem

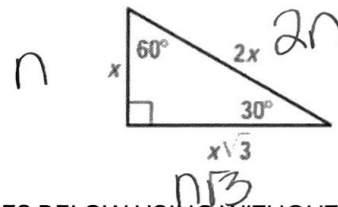
$$\text{hypotenuse} = \text{leg} \cdot \sqrt{2}$$



30°-60°-90° Triangle Theorem

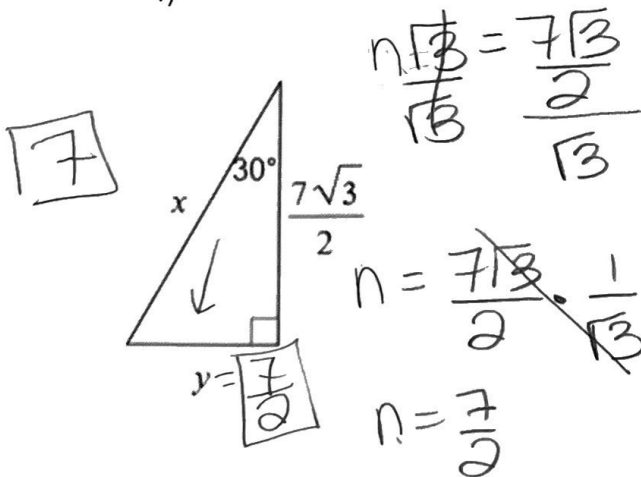
$$\text{hypotenuse} = 2 \cdot \text{shorter leg}$$

$$\text{longer leg} = \text{shorter leg} \cdot \sqrt{3}$$

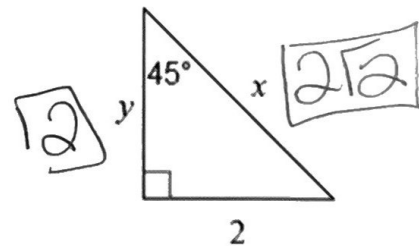


FIND THE MISSING SIDES OF THE SPECIAL RIGHT TRIANGLES BELOW USING WITHOUT THE USE OF A CALCULATOR. ALL ANSWERS MUST BE COMPLETELY SIMPLIFIED AND RATIONALIZED (NO RADICALS IN THE DENOMINATOR). THE ANSWERS MUST ALSO BE EXACT (NO DECIMALS).

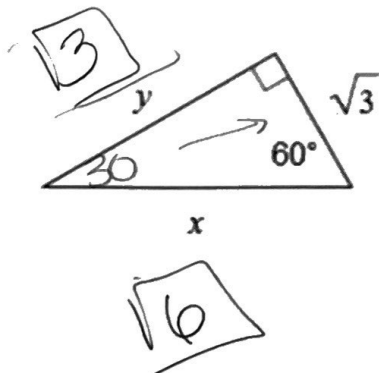
1)



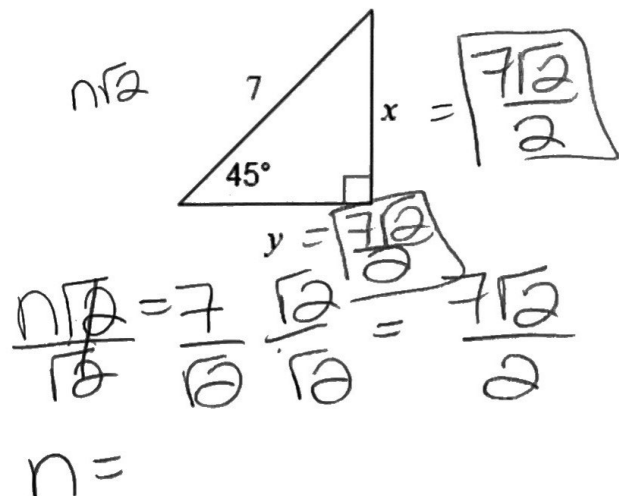
2)



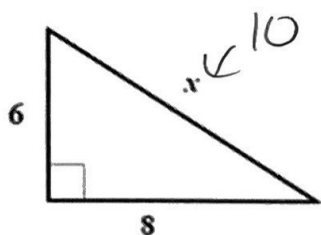
3)



4)



FIND THE MISSING SIDES OF THE RIGHT TRIANGLES BELOW USING THE PYTHAGOREAN THEOREM.

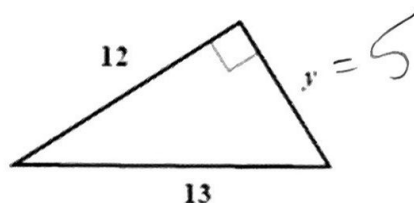


$$6^2 + 8^2 = x^2$$

$$x^2 = 100$$

$$\boxed{x = 10}$$

pyth tripple 3-4-5



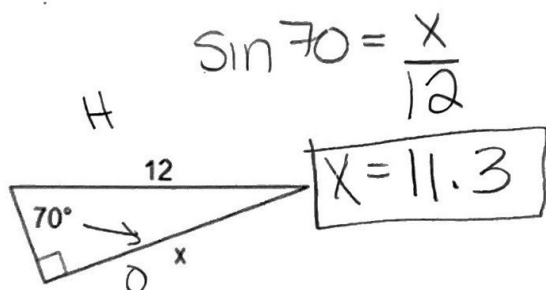
$$12^2 + y^2 = 13^2$$

$$y^2 = 25$$

$$\boxed{y = 5}$$

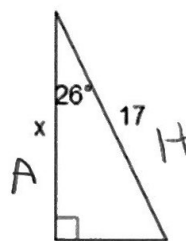
pyth tripple 5-12-13

FIND THE MISSING SIDES OR ANGLES OF THE FOLLOWING RIGHT TRIANGLES TO THE NEAREST TENTH. MAKE SURE YOUR CALCULATOR IS IN DEGREE MODE.



$$\sin 70 = \frac{x}{12}$$

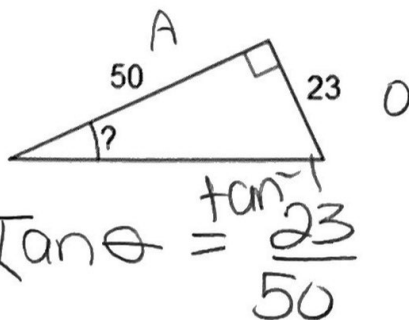
$$\boxed{x = 11.3}$$



$$\cos 26 = \frac{x}{17}$$

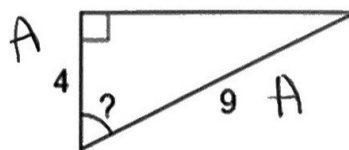
$$\boxed{x = 15.3}$$

inverse
tan
↓
 $\tan^{-1}$



$$\tan \theta = \frac{23}{50}$$

$$\boxed{\theta = 24.7^\circ}$$



$$\cos \theta = \frac{4}{9}$$

$$\theta = \cos^{-1} \left(\frac{4}{9} \right)$$

$$\boxed{\theta = 63.6^\circ}$$