

Dear Parent and Student,

This summer packet is meant for students to practice the skills needed to be successful in Honors Geometry.

-Students are expected to attempt all the problems and attempt them without a calculator. This packet will **NOT** count as a grade, however, there will be a quiz given in September, so this packet will be very helpful. Any questions please contact Mrs. Kelly through Classroom posted below or Mrs. Puitz by email listed below.

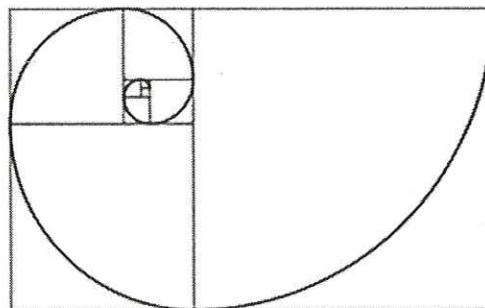
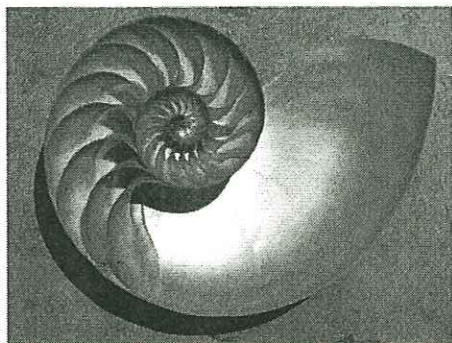
-Detailed solutions and explanations to the summer packet will be posted on the Clearview website in August and also for 8<sup>th</sup> graders on classroom "Summer 2021 Honors Geometry".

8<sup>th</sup> GRADERS only . . . .  
Sign up for Summer 2021 Honors GEOMETRY  
Classroom code      xmdvppa

Highschool students . . . .  
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Enjoy the summer!

-Clearview Regional School District Mathematics Department



## A. MULTIPLYING POLYNOMIALS

1]  $(x^3 + 3)(x - 7)$

$$x^4 - 7x^3 + 3x - 21$$

2]  $(x - 4)(x^2 + 3x - 5)$

$$x^3 + 3x^2 - 5x - 4x^2 - 12x + 20$$

$$x^3 - x^2 - 17x + 20$$

3]  $(5x - 6)(-x + \frac{1}{2})$

$$-5x^2 + \frac{5}{2}x + 6x - 3$$

$$-5x^2 - \frac{17}{2}x - 3$$

4]  $(\sqrt{2} + x)(\sqrt{8} - x)$

$$4 - x\sqrt{2} + x\sqrt{8} - x^2$$

$2\sqrt{2}x$

$$4 + x\sqrt{2} - x^2$$

## B. FACTOR EACH OF THE EXPRESSIONS

5]  $y^2 - 12y + 20$

$$(y - 10)(y - 2)$$

6]  $z^2 - z - 6$

$$(z - 3)(z + 2)$$

7]  $4ax^2 + 16ax + 16a$

$$4a(x^2 + 4x + 4)$$

$$4a(x + 2)(x + 2)$$

8]  $2x^2 + 17x + 21$

$$\begin{array}{r|l} 14 & 3 \\ \times & \\ \hline 2x & 2x \\ \hline 7 & 14 \end{array} \quad \begin{array}{r} 42 \\ 17 \\ 3 \end{array}$$

$$(x + 7)(2x + 3)$$

9]  $6x^2 - 11x - 10$

$$\begin{array}{r|l} -15 & 4 \\ \times & \\ \hline 2x & 6x \\ \hline -75 & 42 \\ -5 & \end{array}$$

$$(2x - 5)(3x + 2)$$

10]  $k^2 - 64w^2$

$$(k + 8w)(k - 8w)$$



### C. RATIONALIZE EACH RADICAL EXPRESSION

$$11) \frac{3\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \quad \boxed{\frac{3\sqrt{6}}{2}}$$

$$12) \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} \quad \boxed{\frac{\sqrt{5}}{5}}$$

$$13) \frac{12}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \quad \frac{12\sqrt{2}}{6}$$

$$\boxed{2\sqrt{2}}$$

$$14) \frac{xy}{\sqrt{x}} \cdot \frac{\sqrt{x}}{\sqrt{x}} \quad \frac{xy\sqrt{x}}{x}$$

$$\boxed{y\sqrt{x}}$$

### D. SOLVE EACH SYSTEM OF EQUATIONS USING SUBSTITUTION.

$$15) \begin{cases} 2x + y = 4 \\ 3x + y = 1 \end{cases} \rightarrow y = -2x + 4$$

$$3x - 2x + 4 = 1$$

$$x + 4 = 1$$

$$\boxed{x = -3}$$

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

$$(-3, 10)$$

$$\boxed{y = 10}$$

check

$$3(-3) + 10 = 1$$

$$-9 + 10 = 1$$

$$1 = 1 \quad \checkmark$$

$$16) \begin{cases} y = 3x - 27 \\ y = \frac{1}{2}x - 7 \end{cases} \quad \text{set equal}$$

$$3x - 27 = \frac{1}{2}x - 7 \quad (8, -3)$$

$$+27$$

$$+27$$

$$3x = \frac{1}{2}x + 20$$

$$-\frac{1}{2}x \quad -\frac{1}{2}x$$

$$2\frac{1}{2}x = 20$$

$$\left(\frac{2}{5}\right) \frac{5}{2}x = 20 \left(\frac{2}{5}\right)$$

$$\boxed{x = 8}$$

$$y = 3(8) - 27$$

$$y = 24 - 27$$

$$\boxed{y = -3}$$

check

$$-3 = \frac{1}{2}(8) - 7$$

$$-3 = 4 - 7$$

$$-3 = -3 \quad \checkmark$$

## E. SOLVE EACH SYSTEM OF EQUATIONS USING ELIMINATION

$$17] \begin{cases} 3k + 5g = -12 & \times 3 \\ 2k - 3g = -8 & \times 5 \end{cases}$$

$$18] \begin{cases} 2k - g = 8 & \times (-3) \\ 6k - 3g = -9 \end{cases}$$

$$\begin{array}{r} 9k + 15g = -36 \\ 10k - 15g = -40 \\ \hline 19k = -76 \end{array}$$

$$\boxed{k = -4}$$

$$\begin{array}{r} 3(-4) + 5g = -12 \\ -12 + 5g = -12 \\ 5g = 0 \\ \boxed{g = 0} \end{array}$$

check  
 $2(-4) - 3(0) = -8$   
 $-8 = -8$   
 ✓

$$\begin{array}{r} -6k + 3g = -24 \\ 6k - 3g = -9 \\ \hline 0 = -33 \end{array}$$

false  
 $\emptyset$  No Solution

## F. SIMPLIFY EACH RADICAL EXPRESSION

$$19] \sqrt{124}$$

$$\textcircled{4} \sqrt{31}$$

$$\boxed{2\sqrt{31}}$$

$$20] \sqrt{215}$$

$$5 \sqrt{43}$$

$\boxed{\text{simplified}}$

both prime

$$21] \sqrt{20x^2}$$

$$\textcircled{4} \sqrt{5} \textcircled{x^2}$$

$$\boxed{2x\sqrt{5}}$$

$$22] \sqrt{12} \cdot \sqrt{48}$$

$$\textcircled{4} \sqrt{3} \textcircled{16} \sqrt{3}$$

or  $\sqrt{576} = 24$

$$2\sqrt{3} \cdot 4\sqrt{3}$$

$$8\sqrt{9} = 8 \cdot 3 = \boxed{24}$$

$$23] \sqrt{32} + \sqrt{54} - \sqrt{98}$$

$$\textcircled{16} \sqrt{2} \textcircled{9} \sqrt{6} \textcircled{49} \sqrt{2}$$

$$4\sqrt{2} + 3\sqrt{6} - 7\sqrt{2}$$

$$\boxed{3\sqrt{6} - 3\sqrt{2}}$$

**G. EVALUATE EACH OF THE EXPRESSIONS WITHOUT THE USE OF A CALCULATOR**

24]  $45 - [3(5 - 3)]$

$45 - [3(2)]$   
 $45 - 6$

**39**

25]  $(9^2 + 4 \cdot 9 \div 4 - 6) \div 3$

$(81 + 36 \div 4 - 6) \div 3$   
 $(81 + 9 - 6) \div 3$   
 $84 \div 3$

**28**

26] What does  $2x^2 + 3x - 4$  equal when  $x = -3$ ?

$2(-3)^2 + 3(-3) - 4$   
 $2(9) - 9 - 4$   
 $18 - 9 - 4$

**5**

27]  $-21 - (-0.8)$

$-21 + .8$

**-20.2**

28]  $-0.8 - (-1.1)$

$-0.8 + 1.1$

**0.3**

29]  $\frac{15}{16} - \frac{7}{20}$

$\frac{75}{80} - \frac{28}{80}$

**$\frac{47}{80}$**

30]  $13 - (-2)$

$13 + 2$

**15**

31]  $(1\frac{1}{5})(4\frac{1}{2})$

$(\frac{6}{5})(\frac{9}{2})$

**$\frac{27}{5}$**

32]  $(7.3)(-12.1)$

$12.1$   
 $\times 7.3$   
 $363$   
 $847 \times$   
 $8833$

**-88.33**

33]  $-21.07 \div (-4.3)$

$4.9$   
 $-4.3 \overline{) -21.07}$   
 $172$   
 $387$   
 $338$

**4.9**

34]  $(5\frac{1}{3}) \div (3\frac{1}{5})$

$\frac{16}{3} \div \frac{16}{5} = \frac{16}{3} \times \frac{5}{16} = \frac{5}{3}$

**$\frac{5}{3}$**

35]  $\frac{3}{10} + \frac{1}{4}$

$\frac{6}{20} + \frac{5}{20}$

**$\frac{11}{20}$**

36]  $\frac{10}{33} \cdot \frac{3}{50}$

**$\frac{3}{55}$**

37]  $0.35 \times 0.3$

$.353$   
 $\times .3$   
 $105$

**.105**

## H. SOLVE EACH LINEAR EQUATION BELOW FOR 'X'

$$38] 3(2x - 5) - 1 = -2(x + 4)$$

$$\begin{aligned} 6x - 15 - 1 &= -2x - 8 \\ +2x & \quad +2x \\ 8x - 16 &= -8 \\ +16 & \quad +16 \\ 8x &= 8 \\ \boxed{x=1} \end{aligned}$$

$$40] \frac{t+x-p}{m} = y$$

$$t+x-p = ym$$

$$\boxed{x = ym + p - t}$$

$$42] \frac{3}{2}x - 3 = \frac{3}{4}$$

$$\begin{aligned} +3 & \quad +3 \\ \left(\frac{2}{3}\right) \frac{3}{2}x &= \frac{5}{4} \left(\frac{2}{3}\right) \end{aligned}$$

$$\boxed{x = \frac{5}{2}}$$

$$39] \left(\frac{4x+2}{3}\right)^3 = (5x-1)^3$$

$$4x+2 = 5x-3$$

$$+3 \quad -4x$$

$$\frac{5}{11} = \frac{11x}{11}$$

$$\boxed{x = \frac{5}{11}}$$

$$41] 2x - 12y = 10$$

$$+12y \quad +12y$$

$$\frac{2x}{2} = \frac{12y}{2} + \frac{10}{2}$$

$$\boxed{x = 6y + 5}$$

## I. EVALUATE EACH EXPRESSION WITHOUT A CALCULATOR. LEAVE ALL FINAL ANSWERS IN SIMPLEST FORM.

$$43] \frac{2}{3} + \frac{3}{4} + \frac{5}{6}$$

$$\frac{8}{12} + \frac{9}{12} + \frac{10}{12}$$

$$\frac{27}{12} \quad \boxed{\frac{9}{4}}$$

$$44] \frac{2x}{3} + \frac{3x}{8}$$

$$\frac{16x}{24} + \frac{9x}{24}$$

$$\boxed{\frac{25x}{24}}$$

$$45] \left(\frac{4}{3} \times \frac{3}{9}\right) \div \left(\frac{3}{4} \times \frac{8}{9}\right)$$

$$12 \div \frac{2}{3}$$

$$\frac{12}{1} \times \frac{3}{2}$$

$$\boxed{18}$$

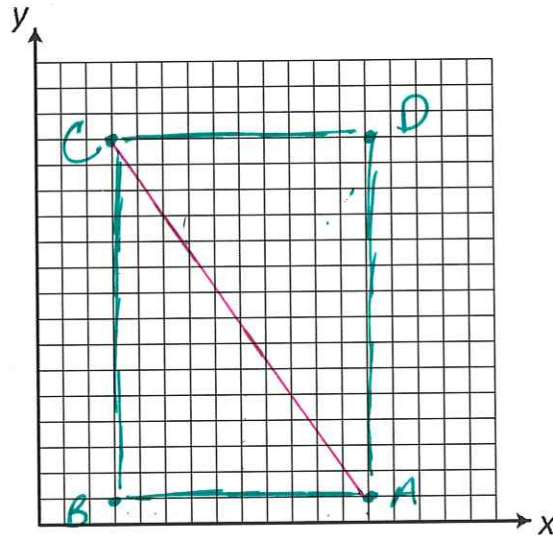
$$46] \left(\frac{mt}{p}\right) \left(\frac{pt}{m}\right)$$

$$\boxed{t^2}$$



**J. USE THE DISTANCE AND MIDPOINT FORMULAS TO ANSWER THE FOLLOWING QUESTIONS**

A rectangle has vertices located at A(13,1) B(3,1) C(3,15) and D(13,15)  
Graph the rectangle on the grid provided.



47] What is the length of the rectangle from A to B? from B to C?

$$A \text{ to } B = 10 \quad B \text{ to } C = 14$$

count                      count

48] What is the length of a diagonal from A to C? (13,1) (3,15)

$$AC = \sqrt{(13-3)^2 + (1-15)^2}$$

$$\sqrt{10^2 + (-14)^2}$$

$$\sqrt{100 + 196} = \sqrt{296}$$

$\boxed{2\sqrt{74}}$

49] What are the coordinates of the midpoint between A and C? (13,1) (3,15)

$$\frac{13+3}{2}, \frac{1+15}{2}$$

$$\frac{16}{2}, \frac{16}{2}$$

(8,8)

50] What is the slope of . . .

- Line AB?  $\circ$
- Line BC? *undefined*
- A line perpendicular to diagonal  $\overline{AC}$ ?

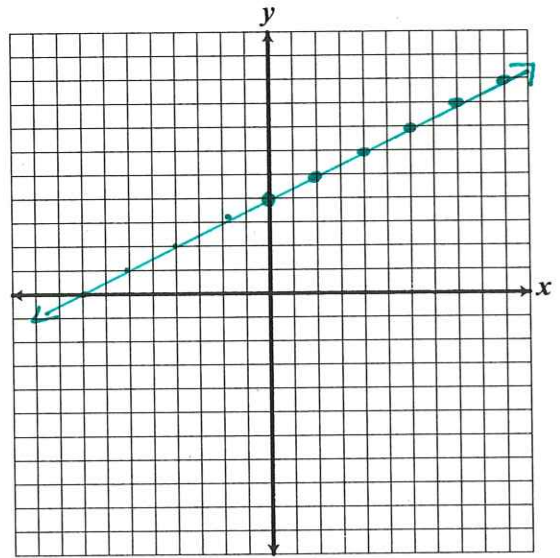
$$m \text{ of } AC = \frac{-14}{10} = \frac{-7}{5} \quad \frac{1}{m} = \frac{5}{7}$$

K. GRAPH EACH LINEAR EQUATION ON THE COORDINATE PLANES PROVIDED.

$$51] \frac{4y}{4} = \frac{16}{4} + \frac{2x}{4}$$

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

$$m = \frac{1}{2} \quad b = 4$$



$$52] 2x + 5y = 10$$

x & y intercepts

$$x = 0$$

$$y = 0$$

$$2(0) + 5y = 10$$

$$2x + 5(0) = 10$$

$$5y = 10$$

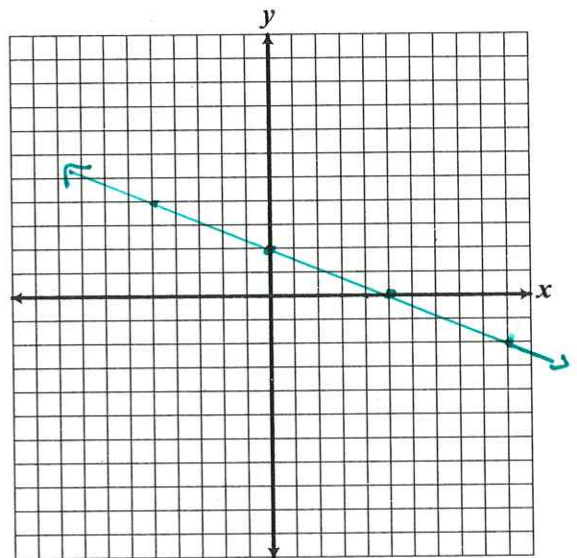
$$2x = 10$$

$$y = 2$$

$$x = 5$$

$$(0, 2)$$

$$(5, 0)$$



$$53] \frac{x}{4} - \frac{y}{3} = 2$$

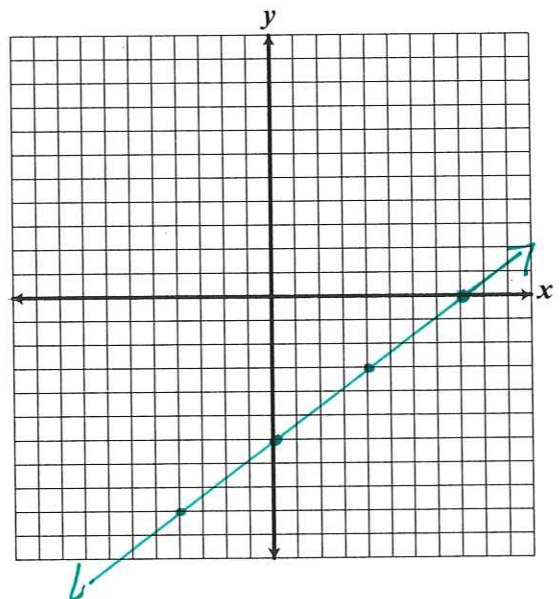
clear fraction  
multiply by 12

$$3x - 4y = 24$$

$$\frac{-4y}{-4} = \frac{-3x}{-4} + \frac{24}{-4}$$

$$y = \frac{3}{4}x - 6$$

$$m = \frac{3}{4} \quad b = -6$$





L. WRITE THE EQUATION OF THE LINE FROM THE GIVEN INFORMATION.

54] Write an equation in slope-intercept form of the line that passes through (2,5) and has slope = -3.

$$y = mx + b$$

$$5 = -3(2) + b$$

$$5 = -6 + b$$

$$11 = b$$

$$y = -3x + 11$$

55] Write an equation in slope-intercept form of the line passing through (0,1) and is perpendicular to the line  $2x + 4 = y$ .

y-intercept

$$m = 2 \quad \perp m = -\frac{1}{2}$$

$$y = -\frac{1}{2}x + 1$$

56] Write an equation in slope-intercept form of the line passing through (4,6) and is parallel to the line  $y = \frac{2}{3}x + \frac{10}{3}$ .

$$y = mx + b$$

$$6 = \frac{2}{3}(4) + b$$

$$6 = \frac{8}{3} + b$$

$$\frac{10}{3} = b$$

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

$$y = \frac{2}{3}x + \frac{10}{3}$$

57] Write an equation in slope-intercept form of the line passing through (-9,5) and is perpendicular to the line  $y = -3x + 2$ .

$$5 = \frac{1}{3}(-9) + b$$

$$m = -3 \quad \perp m = \frac{1}{3}$$

$$5 = -3 + b$$

$$8 = b$$

$$y = \frac{1}{3}x + 8$$

M. FOR #58-60 DETERMINE IF THE PAIR OF LINES ARE PARALLEL, PERPENDICULAR, OR NEITHER.

58]  $y = 2x + 5$      $m = 2$   
 $y = -2x + 4$      $m = -2$

Neither

59]  $2y + 3x = 5$      $2y = -3x + 5$   
 $3y = 2x - 7$          $y = -\frac{3}{2}x + \frac{5}{2}$

$y = \frac{2}{3}x - \frac{7}{3}$

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

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

opposite reciprocals

Perpendicular

60]  $x = 3y + 2$      $\neq \frac{x}{3} - \frac{2}{3} = \frac{3}{3}y$   
 $y = \frac{1}{3}x - 3$

$m = \frac{1}{3}$

$\frac{1}{3}x - \frac{2}{3} = y$

$m = \frac{1}{3}$

same →

Parallel

N. FOR EACH PROBLEM BELOW, THE SLOPE OF A LINE IS GIVEN. DETERMINE THE SLOPE OF THE PERPENDICULAR LINE.

61]  $m = 3/5$

$\perp m = -\frac{5}{3}$

62]  $m = -6$

$\perp m = \frac{1}{6}$

63]  $m = -1/11$

$\perp m = \frac{11}{1}$  or  $11$

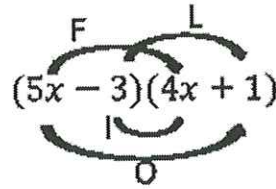
64]  $m = -\sqrt{2}$

$\perp m = \frac{+1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

positive  
 $\frac{\sqrt{2}}{2}$

**SOME HINTS:** These are just a few hints, please utilize online resources for help if necessary.

**A) MULTIPLYING POLYNOMIALS BY THE FOIL METHOD:**



$$20x^2 + 5x - 12x - 3$$

F      O      I      L

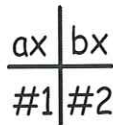
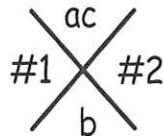
$$20x^2 - 7x - 3$$

**B) FACTORING**

Steps for Factoring a QUADRATIC Equation

$$ax^2 + bx + c$$

- 1) Factor out GCF (if possible)
- 2) Set up the **Magic X**
  - ac goes on top, b goes on the bottom
  - find the pair that multiplies to the top and adds to the bottom
- 3) Set up the **Magic T**
  - put ax on the top two and the pair we found for the bottom two
  - treat each side as a fraction and reduce
- 4) you now have your factors



Example →

$$3x^2 + 11x + 10$$

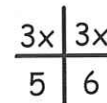
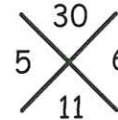
$$= (3x + 5)(x + 2)$$

$$(3)(10) = 30$$

$$\text{GCF} = 1$$

$$(5)(6) = 30$$

$$5 + 6 = 11$$



- 1) Factor out GCF
- 2) **Magic X**  
What pair multiplies to equal top and adds to bottom?
- 3) **Magic T**  
Reduce
- 4) You have your factors

**C) RATIONALIZE THE DENOMINATOR**

- 1) Multiply the "top" and bottom by the square root in the denominator.
- 2) Simplify the numerator if necessary. The denominator will become the square root of a perfect square.
- 3) Reduce the fraction if necessary.

$$\frac{5}{\sqrt{10}} = \frac{5 \cdot \sqrt{10}}{\sqrt{10} \cdot \sqrt{10}} = \frac{5\sqrt{10}}{\sqrt{100}} = \frac{5\sqrt{10}}{10} = \frac{\sqrt{10}}{2}$$

Reduce:  $\frac{5}{10} = \frac{1}{2}$

**F) SIMPLIFYING RADICALS**

This is just 7

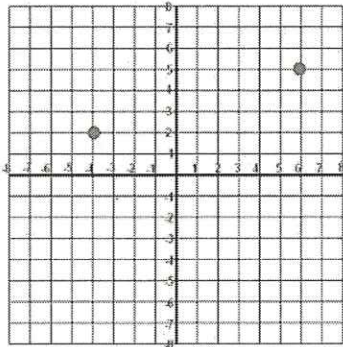
$$\sqrt{98} = \sqrt{7 \cdot 7 \cdot 2} = 7\sqrt{2}$$



## J) DISTANCE AND MIDPOINT FORMULA

### Distance Formula

used to find the length of a segment



Point A: (-4, 2)

Point B: (6, 5)

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(6 - (-4))^2 + (5 - 2)^2}$$

$$d = \sqrt{(10)^2 + (3)^2}$$

$$d = \sqrt{100 + 9}$$

$$d = \sqrt{109}$$

$$d = 10.44$$

### Midpoint Formula

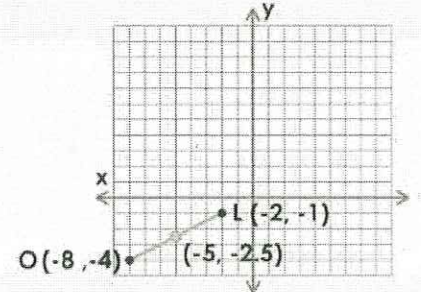
used to find the exact center between 2 points

Midpoint formula

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$= \left( \frac{-8 + -2}{2}, \frac{-4 + -1}{2} \right)$$

$$= \underline{\underline{(-5, -2.5)}}$$



## K) GRAPHING LINEAR EQUATIONS

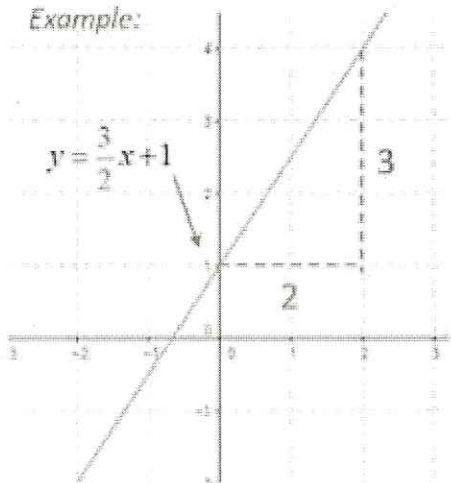
### Slope-Intercept Form

$$y = mx + b$$

slope of line

y intercept, where the line crosses the y-axis at (0, b)

Example:



## L) WRITE AN EQUATION OF A LINE

### Write an Equation in Slope-Intercept Form

A line passing through (2, 2) and (3, 4)

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

$$y = mx + b$$

$$4 = 2(3) + b$$

$$y = mx + b$$

$$m = \frac{4 - 2}{3 - 2} = 2$$

$$4 = 6 + b$$

$$-2 = b$$

$$\boxed{y = 2x - 2}$$

Find the equation of a line Through (1, 10) and Perpendicular to  $2x - y = 2$

$$\boxed{2x - y = 2} \quad L_1$$

$$y = mx + b$$

$$\boxed{y = -\frac{1}{2}x + b} \quad L_2$$

$$y = \frac{-1}{2}x + b \quad (1, 10)$$

$$10 = \frac{-1}{2}(1) + b$$

$$L_1 \text{ Slope} \cdot L_2 \text{ Slope} = -1$$

$$b = \frac{21}{2}$$

$$2 \cdot L_2 \text{ Slope} = -1$$

$$L_2 \text{ Slope} = \frac{-1}{2}$$

$$\boxed{y = -\frac{1}{2}x + \frac{21}{2}}$$