

Name: KEY!

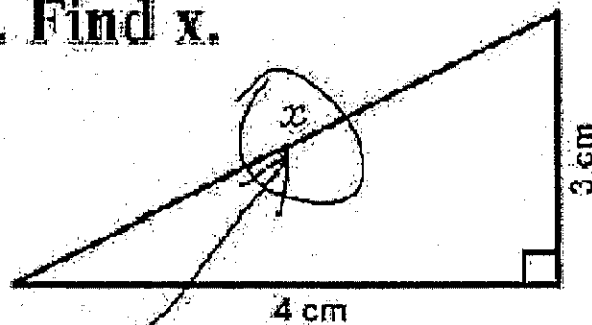
Hour: _____

Unit J:

Coordinate Geometry

Geometry 1st Semester

3. Find x .



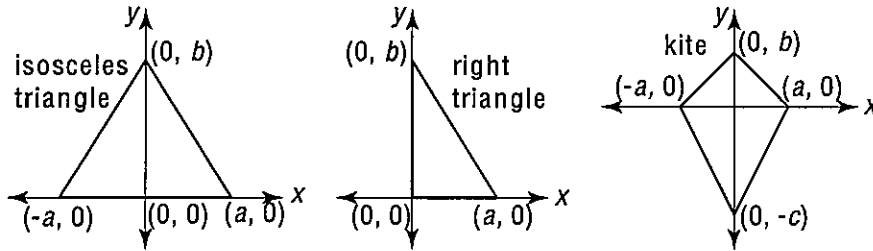
Here it is

Lesson 11-5: Proofs with the Coordinate Plane

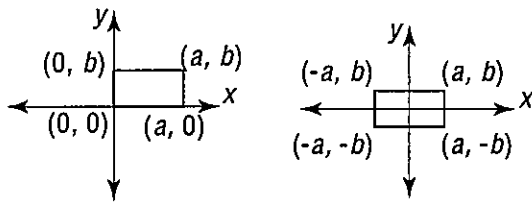
Vocabulary

Convenient Locations: a location in which its key points are described w/ the fewest number of variables.

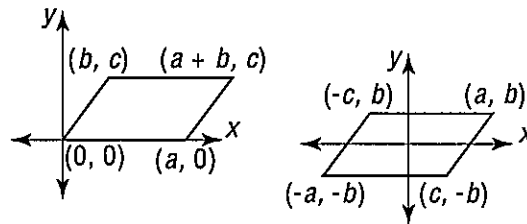
Examples:



rectangle (two convenient locations)



parallelogram (two convenient locations)



MEMORIZE!

Remember...

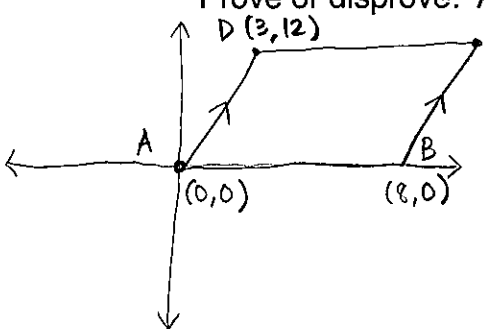
Slope (m) = $\frac{y_2 - y_1}{x_2 - x_1}$ for any two points (x_1, y_1) and (x_2, y_2) .

Parallel lines have the same slope.

Perpendicular lines have slopes that are opposites & reciprocals.

Practice

1. Given: ABCD with vertices $A = (0, 0)$, $B = (8, 0)$, $C = (11, 12)$, and $D = (3, 12)$.
 Prove or disprove: ABCD is a parallelogram.



↳ opposite sides are //

Slopes:

$$AD: \frac{12-0}{3-0} = \frac{12}{3} = 4 \quad \left. \vphantom{\frac{12}{3}} \right\} \text{parallel}$$

$$BC: \frac{12-0}{11-8} = \frac{12}{3} = 4 \quad \left. \vphantom{\frac{12}{3}} \right\} \text{parallel}$$

$$AB: \frac{0-0}{8-0} = \frac{0}{8} = 0 \quad \left. \vphantom{\frac{0}{8}} \right\} \text{parallel}$$

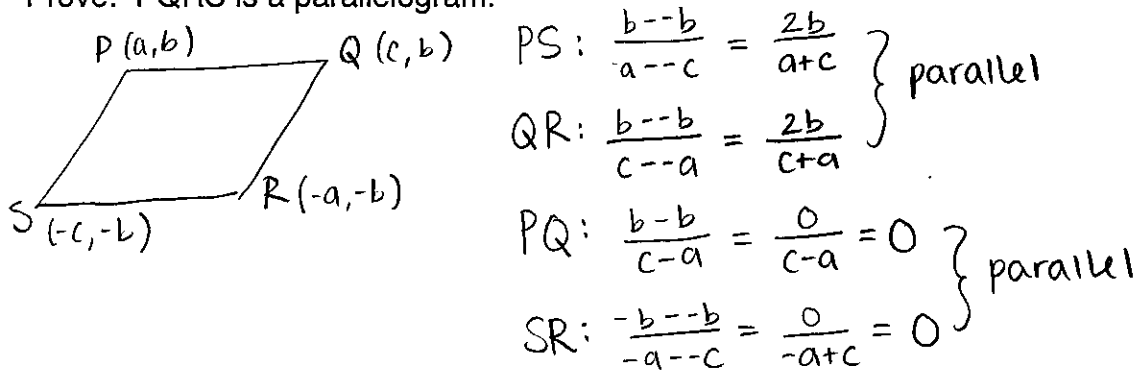
$$DC: \frac{12-12}{11-3} = \frac{0}{8} = 0 \quad \left. \vphantom{\frac{0}{8}} \right\} \text{parallel}$$

So, since opposite sides are //, ABCD is a parallelogram.

2. Write a proof argument.

Given: Quadrilateral PQRS with $P = (a, b)$, $Q = (c, b)$, $R = (-a, -b)$, and $S = (-c, -b)$, such that $a = c$ and $-a = -c$.

Prove: PQRS is a parallelogram.



Since opposite sides are \parallel , PQRS is a parallelogram.

3. If $T = (3, 6)$, $O = (-1, -2)$, and $W = (-3, 1)$, use an indirect proof to show that WO is not perpendicular to WT.

1. 2. 3.

1. WO is \perp to WT

$$2. \text{ WO: } \frac{1 - -2}{-3 - -1} = \frac{1+2}{-3+1} = \frac{3}{-2}$$

$$\text{WT: } \frac{1-6}{-3-3} = \frac{-5}{-6} = \frac{5}{6}$$

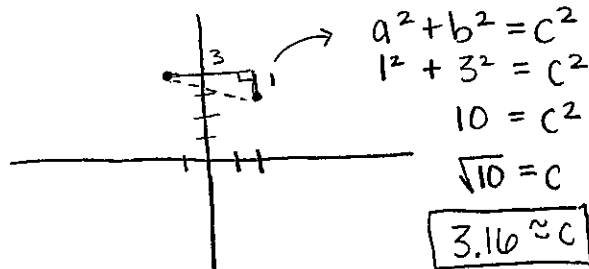
3. Since the slopes of WO & WT are not opposite reciprocals, WO is not \perp to WT.

Lesson 11-6: Distance Formula

Vocabulary

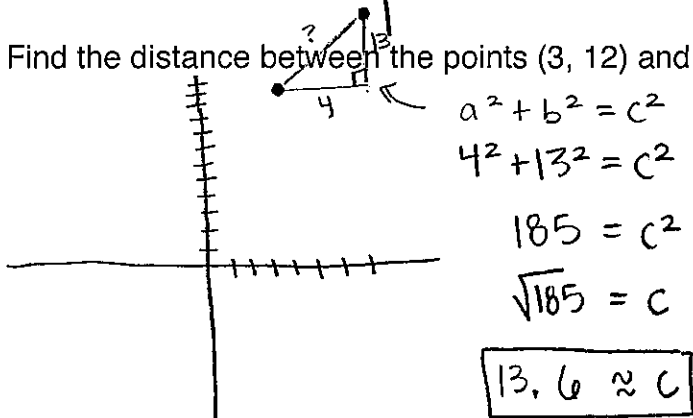
Distance Formula: to find the distance between 2 points: graph them & use Pythag!

Example: $(-1, 4)$ & $(2, 3)$

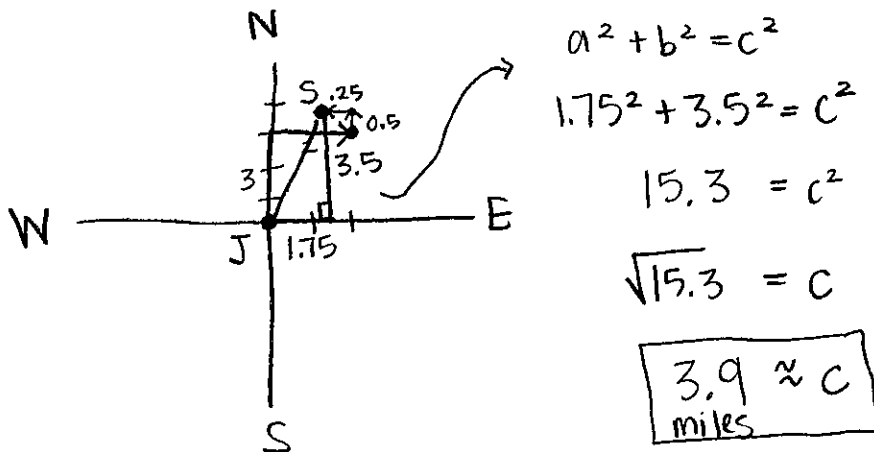


Practice

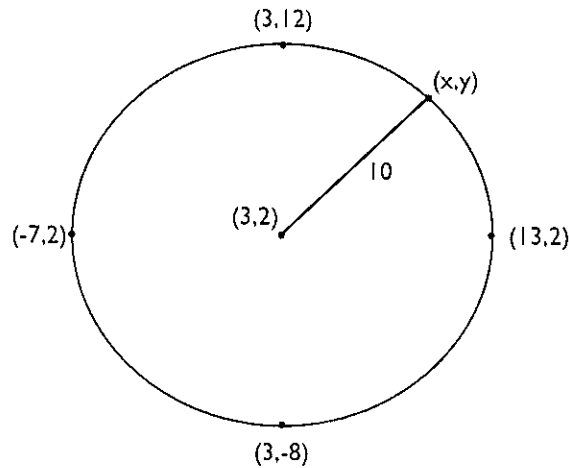
1. Find the distance between the points $(3, 12)$ and $(7, 25)$.



2. Justin Bieber likes to bike a route from his house to Selena Gomez's. He rides 3 miles north, 2 miles east, then 0.5 miles north, and 0.25 miles west. How far apart do they live?



Lesson 11-7: Equations of Circles



Vocabulary

Equation for a Circle: the circle w/ center (h, k) & radius r is the set points (x, y) satisfying:

Formula: $(x-h)^2 + (y-k)^2 = r^2$

Practice

1. Write an equation for the circle with center $(0, -4)$ and radius 7.

$$(x-0)^2 + (y-(-4))^2 = 7^2$$
$$x^2 + (y+4)^2 = 49$$

2. Find the center and radius of the circle with equation: $(x+1)^2 + (y+3)^2 = 25$.

Center: $(-1, -3)$

Radius: 5

3. What is the general form of an equation for a circle with center $(0, 0)$?

$$(x-0)^2 + (y-0)^2 = r^2$$
$$x^2 + y^2 = r^2$$

Lesson 11-8: Means & Midpoints

Vocabulary

Number Line Midpoint Formula: the midpoint of a segment w/ endpoints a & b is $\frac{a+b}{2}$

Coordinate Plane Midpoint Formula: the midpoint of a segment w/ endpoints (x_1, y_1) & (x_2, y_2) is $(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$

Midpoint Connector Theorem: the segment connecting the midpoints of 2 sides of a \triangle is \parallel to & $\frac{1}{2}$ the length of the 3rd side.

Practice

1. Find the midpoint of the segment.

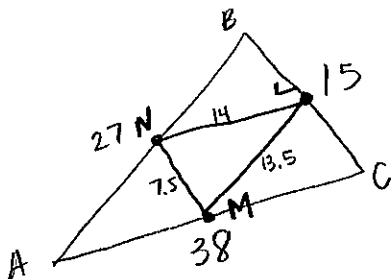
$$3 \text{-----} 11$$

$$\frac{3+11}{2} = \frac{14}{2} = \boxed{7}$$

2. Find the midpoint of the segment connecting $(3, 15)$ and $(9, 8)$.

$$\begin{aligned} & \begin{matrix} x_1 & y_1 & & x_2 & y_2 \\ & & & & \end{matrix} \\ & \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \left(\frac{3+9}{2}, \frac{15+8}{2} \right) \\ & = \left(\frac{12}{2}, \frac{23}{2} \right) = \boxed{(6, 11.5)} \end{aligned}$$

3. Triangle ABC has side lengths 15, 27, and 38. Triangle LMN is formed by connecting the midpoints of ABC. What are the side lengths of triangle LMN?



$$14, 7.5, 13.5$$