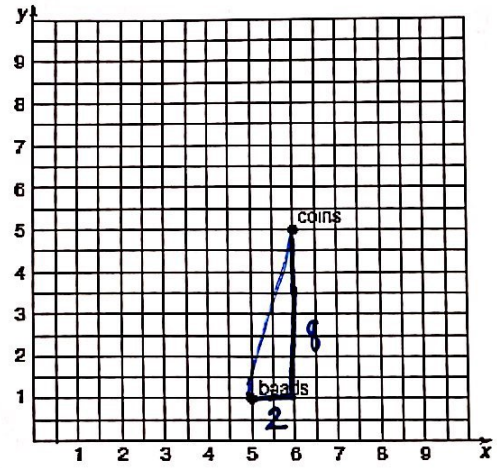
Day 1 – Distance and Midpoint Formula – Notes

How would you find the distance between the coins and beads?



$8^2 + 2^2 = c^2$

$\sqrt{68} = \sqrt{c^2}$

$c \approx 8.2$

The **Distance Formula** allows you to find the distance between two points. The subscripts (x_1, y_1) only indicate that there is a first and second point. However, whichever point is first or second is up to you.

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

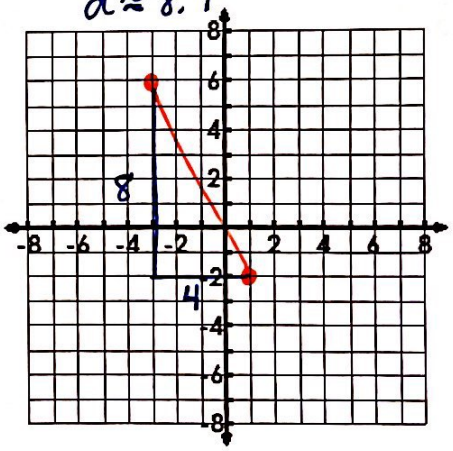
1. Find the distance between (1, -2) and (-3, 6).

$d = \sqrt{(-3-1)^2 + (6--2)^2}$

$d = \sqrt{(-4)^2 + (8)^2}$

$d = \sqrt{80}$

$d \approx 8.9$



$8^2 + 4^2 = c^2$

$80 = c^2$

$8.9 \approx c$

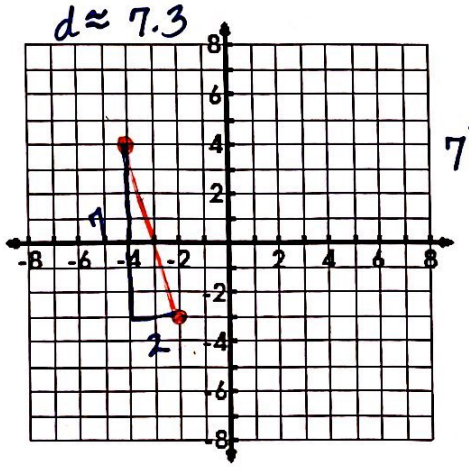
2. Find the distance between (-2, -3) & (-4, 4).

$d = \sqrt{(-2--4)^2 + (4--3)^2}$

$d = \sqrt{(2)^2 + (7)^2}$

$d = \sqrt{53}$

$d \approx 7.3$



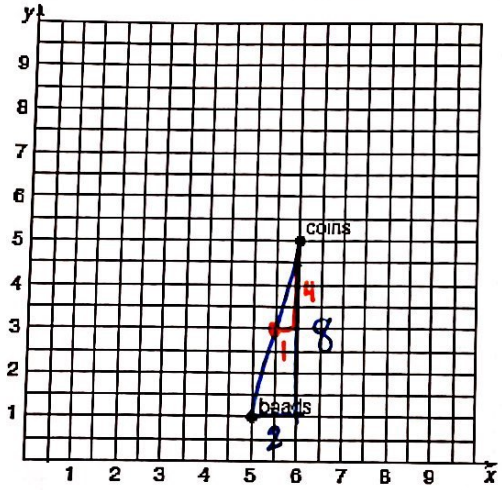
$7^2 + 2^2 = c^2$

$53 = c^2$

$c = 7.3$

Finding the Midpoint

How would you find the midpoint between the coins and beads?



m (5,3)

The **Midpoint Formula** allows you to find the **midpoint** or **center** between two points.

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

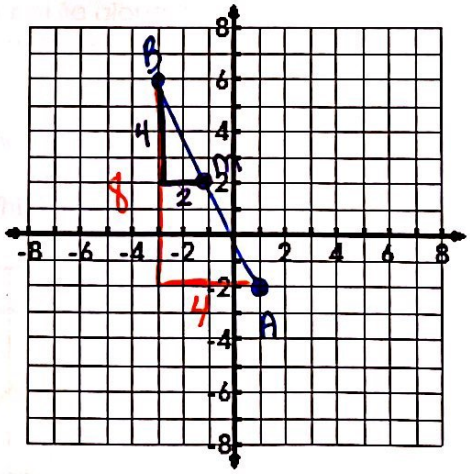
5. Find the midpoint between (1, -2) and (-3, 6).

A B

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

$$y = \frac{-2+6}{2} = \frac{4}{2} = 2$$

m (-1, 2)



6. M is the midpoint of segment AB. The coordinates of A are (-2, 3) and the coordinates of M are (1, 0). Find the coordinates of B.

$2 \cdot 1 = \frac{-2+x}{2} \cdot 2$ $\quad 2 \cdot 0 = \frac{3+y}{2} \cdot 2$

$2 = -2 + x$ $\quad 0 = 3 + y$

$4 = x$ $\quad -3 = y$

B(4, -3)