Midpoint Formula:

When given (x_1, y_1) and (x_2, y_2) the midpoint $= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

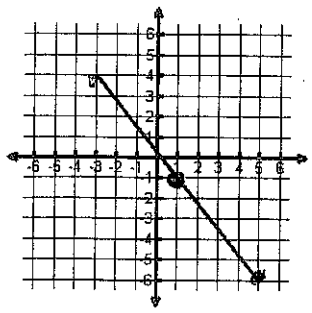
Ex 1: Find the midpoint.

(-3, 4) (5, -6)

x_1 y_1 x_2 y_2

x= $\frac{-3+5}{2} = 1$

y= $\frac{4+-6}{2} = -1$



midpoint (1, -1)

Ex. 2: Find the midpoint given two points.

x_1 y_1 x_2 y_2

(8, 11) and (-2, -1)

$x_M = \frac{8+-2}{2} = 3$

$y_M = \frac{11+-1}{2} = 5$

(3, 5)

Ex. 3 Find the endpoint, given the midpoint and an endpoint.

Midpoint (3, 6) and Endpoint (-1, 2)

x y

$x_M = \frac{x_1 + x_2}{2}$

x_1 y_1

$2 \cdot 3 = \frac{-1 + x_2}{2} \cdot 2$

$6 = -1 + x_2$

$+1 \quad +1$

$7 = x$

$2 \cdot 6 = \frac{2 + y_2}{2} \cdot 2$

$12 = 2 + y_2$

$-2 \quad -2$

$10 = y$

endpoint (7, 10)