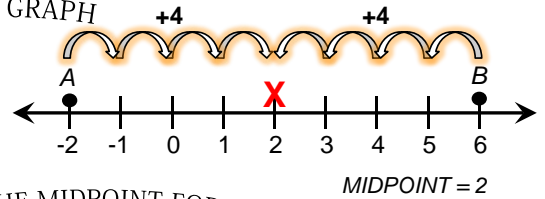# FINDING THE MIDPOINT

THE MIDPOINT IS THE HALFWAY POINT BETWEEN TWO POINTS. IN OTHER WORDS, IT IS THE POINT THAT IS IN THE MIDDLE. THE EXAMPLE TO THE RIGHT SHOWS THE MIDPOINT BETWEEN TWO POINTS ON A NUMBER LINE.
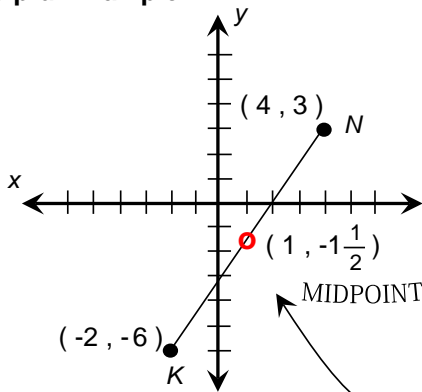
USING A GRAPH

+4   +4

A   B

-2 -1   0   1   2   3   4   5   6

MIDPOINT = 2

THE MIDPOINT FORMULA HELPS US FIND THE MIDPOINT. ALL YOU NEED TO DO IS ADD THE COORDINATES AND DIVIDE THEM BY TWO. IT IS LIKE FINDING THE AVERAGE OF THE TWO POINTS.

USING THE MIDPOINT FORMULA

Point A: -2
Point B: 6 $(-2 + 6) \div 2 = (4) \div 2 = 2$

MIDPOINT = 2

THE EXAMPLES ABOVE ARE ONLY ONE-DIMENSIONAL. WHEN YOU NEED TO FIND THE MIDPOINT IN TWO-DIMENSIONAL SPACE, OR ON THE CARTESIAN COORDINATE SYSTEM, YOU WILL NEED TO FIND THE AVERAGE OF THE X-VALUES AND THE Y-VALUES.

Helpful Example

x   y

Point K: (-2 , -6)
Point N: (4 , 3)

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

(4 , 3) N

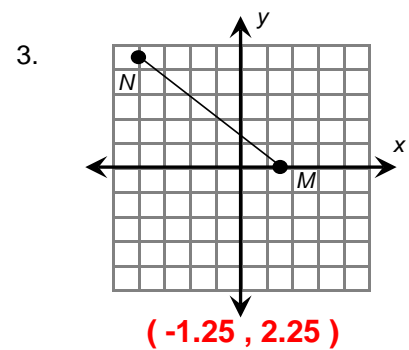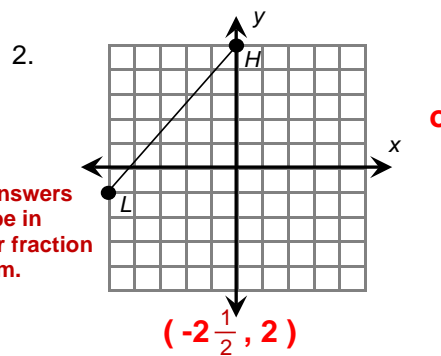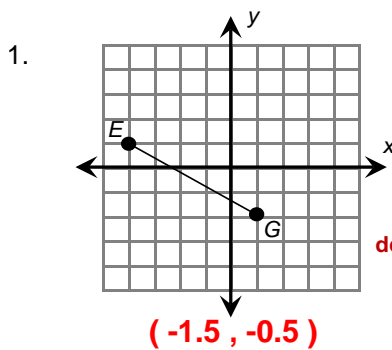(1 , -1½)

MIDPOINT

(-2 , -6)

K

$x \Rightarrow$ -2 + 4 = $\boxed{2}$
$y \Rightarrow$ -6 + 3 = $\boxed{-3}$

ADD THE X-VALUES AND THE Y-VALUES.

$\left(\dfrac{2}{2} , \dfrac{-3}{2} \right)$ DIVIDE BOTH OF THE NEW VALUES BY TWO.

$(1 , -1\frac{1}{2})$ **THESE ARE THE COORDINATES OF THE MIDPOINT.**

Now your turn. Find the midpoint for the two points.

1.

E

G

These answers can be in decimal or fraction form.

(-1.5 , -0.5)

2.

H

o

L

(-2$\frac{1}{2}$, 2)

3.

N

M

(-1.25 , 2.25)

4. Point U: (-1$\frac{1}{2}$, -3)
    Point X: (8 , 5$\frac{1}{2}$)
    (3$\frac{1}{4}$, 1$\frac{1}{4}$)

5. Point D: (1.5 , -7.5)
    Point J: (-10 , -2.5)
    (-4.25 , -5)

6. Point H: (7 , -3)
    Point Y: (-6 , -8)
    (0.5 , -5.5)

7. Point M: (3 , 6)
    Point Z: (0 , 12)
    (1.5 , 9)

8. Point C: (-17 , -18)
    Point F: (-5 , 4)
    (-11 , -7)

9. Point W: (7 , 32)
    Point Y: (3.5 , 30)
    (5.25 , 31)

10. Point P: (6.5 , -5.5)
    Point R: (-12 , 9.5)
    (-2.75 , 2)

11. Point A: (-$\frac{1}{2}$, 15)
    Point B: (-$\frac{1}{4}$, 20)
    (-$\frac{3}{8}$, 17$\frac{1}{2}$)