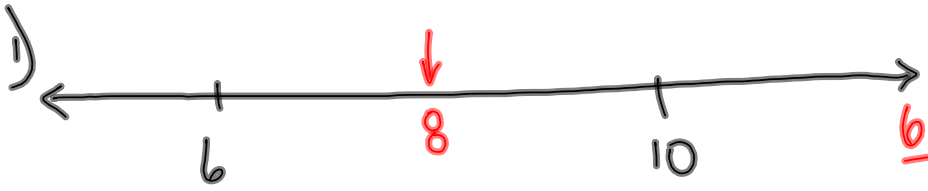
How do we find midpoints?

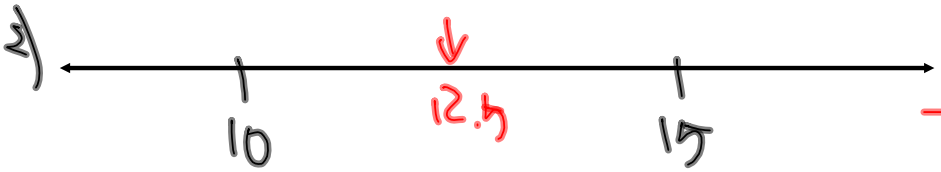
Do Now Find the midpoint

1)



$\frac{6+10}{2}$

2)



$\frac{10+15}{2}$

What is the midpoint of $\overline{AB}$, where $A(0,3)$ & $B(6,5)$?

$$\left(\frac{0+6}{2}, \frac{3+5}{2}\right)$$

Given: (x_1, y_1) & (x_2, y_2)

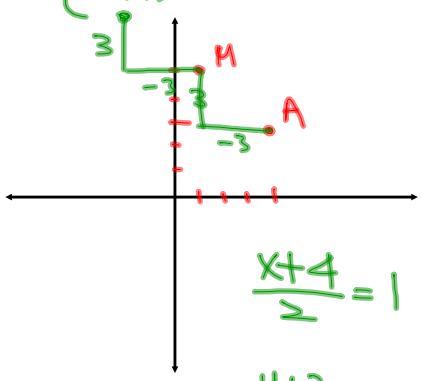
Midpt: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

1) Let $M(1,6)$ be the midpt of $\overline{AB}$, $A(4,3)$.
Find the coordinates of pt. B.

$X: 1-4=-3$ $\quad y: 6-3=3$

$1-3=-2$ $\quad 6+3=9$

$(-2,9) \rightarrow (-2,9)$



$\frac{x+4}{2}=1$, $x+4=2$, $x=-2$

$\frac{y+3}{2}=6$, $y+3=12$, $y=9$

2) Let $M(k, 2-k)$ be the midpt of $\overline{AB}$ where $A(6,k)$. Find the coordinates of B.

x-value of midpt $= \frac{x_1+x_2}{2}$ $\quad$ y-value of midpt $= \frac{y_1+y_2}{2}$

$k=\frac{x+6}{2}$ $\quad$ $2-k=\frac{y+k}{2}$ $\quad (2k-6, 4-3k)$

$2k=x+6$ $\quad$ $2(2-k)=y+k$

$2k-6=x$ $\quad$ $4-2k=y+k$

$4-3k=y$

$A(6,k)$ $\xrightarrow{k-6}$ $M(k,2-k)$ $\xrightarrow{2-2k}$ $B(2k-6, 4-3k)$

3) C is a point on $\overline{AB}$ where $AC:CB = 2:1$

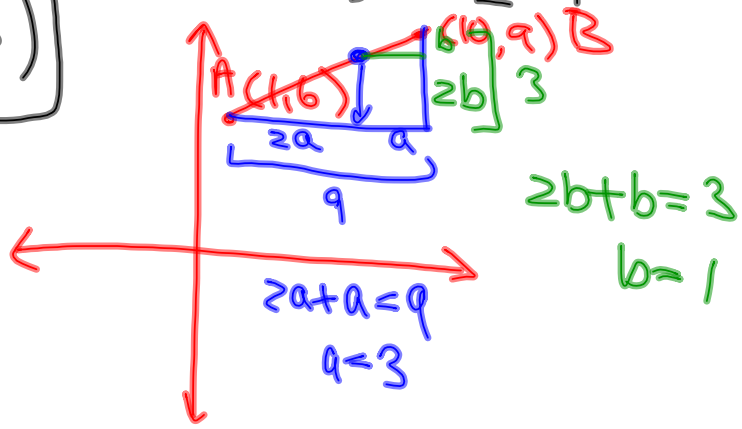
If A(1,6) & B(10,9)

Find C.

$10-1=9$ $\quad 6:3$

$9-6=3$ $\quad 2:1$

$\boxed{(7,8)}$



$2b+b=3$

$b=1$

$2a+a=9$

$a=3$