

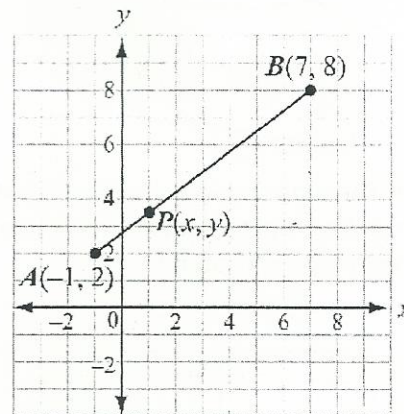
1. Given the points $A(-1, 2)$ and $B(7, 8)$, find the coordinates of the point P on directed line segment \overline{AB} that partitions \overline{AB} in the ratio $\frac{1}{3}$. Plot P .

$$k_1 = 1 \quad k_2 = 3 - 1 = 2$$

$$x_p = \frac{1(7) + 2(-1)}{3} = \frac{7-2}{3} = \frac{5}{3}$$

$$y_p = \frac{1(8) + 2(2)}{3} = \frac{8+4}{3} = \frac{12}{3} = 4$$

$\left(\frac{5}{3}, 4\right)$



2. Find the coordinates of P so that P partitions the segment \overline{AB} in the ratio 5:1 if $A(2, 4)$ and $B(8, 10)$.

$A(2, 4) \quad \overset{5}{\text{---}} \quad \overset{1}{\text{---}} \quad B(8, 10)$

$x_p = \frac{5(8) + 1(2)}{5+1} = \frac{40+2}{6} = \frac{42}{6} = 7$
 $y_p = \frac{5(10) + 1(4)}{5+1} = \frac{50+4}{6} = \frac{54}{6} = 9$

$(7, 9)$

3. Find the coordinates of P so that P partitions the segment \overline{AB} in the ratio 1 to 3 if $A(-5, 4)$ and $B(7, -4)$.

$A(-5, 4) \quad \overset{1}{\text{---}} \quad \overset{3}{\text{---}} \quad B(7, -4)$

$x_p = \frac{1(7) + 3(-5)}{1+3} = \frac{7-15}{4} = \frac{-8}{4} = -2$
 $y_p = \frac{1(-4) + 3(4)}{1+3} = \frac{-4+12}{4} = \frac{8}{4} = 2$

$(-2, 2)$

4. Find the coordinates of P so that P partitions the segment \overline{AB} in the ratio 3:4 if $A(-9, 9)$ and $B(5, -2)$.

$A(-9, 9) \quad \overset{3}{\text{---}} \quad \overset{4}{\text{---}} \quad B(5, -2)$

$x_p = \frac{3(5) + 4(-9)}{3+4} = \frac{15-36}{7} = \frac{-21}{7} = -3$
 $y_p = \frac{3(-2) + 4(9)}{3+4} = \frac{-6+36}{7} = \frac{30}{7}$

$\left(-3, \frac{30}{7}\right)$

5. Find the coordinates of P so that P partitions the segment \overline{AB} in the ratio $\frac{2}{5}$ if $A(-8, -4)$ and $B(6, 19)$.

$A(-8, -4) \quad \overset{2}{\text{---}} \quad \overset{3}{\text{---}} \quad B(6, 19)$

$x_p = \frac{2(6) + 3(-8)}{5} = \frac{12-24}{5} = \frac{-12}{5}$
 $y_p = \frac{2(19) + 3(-4)}{5} = \frac{38-12}{5} = \frac{26}{5}$

$\left(-\frac{12}{5}, \frac{26}{5}\right)$

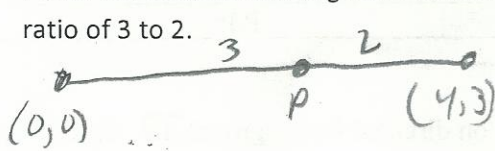
6. Given $A(4, 1)$ and $B(-3, 0)$, find the point that divides the line segment \overline{AB} two-thirds of the way from A to B .

$A(4, 1) \quad \overset{2}{\text{---}} \quad \overset{1}{\text{---}} \quad B(-3, 0)$

$x_p = \frac{2(-3) + 1(4)}{3} = \frac{-6+4}{3} = \frac{-2}{3}$
 $y_p = \frac{2(0) + 1(1)}{3} = \frac{1}{3}$

$\left(-\frac{2}{3}, \frac{1}{3}\right)$

7. For the directed line segment whose endpoints are $(0, 0)$ and $(4, 3)$, find the point that partitions the segment into a ratio of 3 to 2.

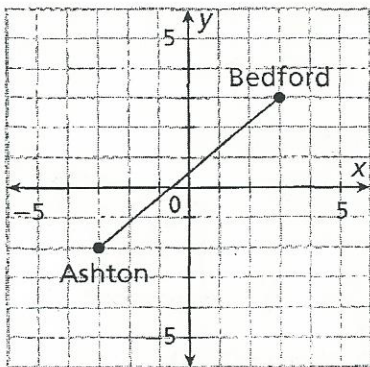


$$\left(\frac{12}{5}, \frac{9}{5} \right)$$

$$x_p = \frac{3(4) + 2(0)}{3+2} = \frac{12}{5}$$

$$y_p = \frac{3(3) + 2(0)}{3+2} = \frac{9}{5}$$

8. The map shows a straight highway between two towns. Highway planners want to build a rest stop somewhere between the two towns. He wants the rest stop to be $\frac{1}{6}$ of the way from Ashton. At what coordinate point would the rest stop be located?



$$x_R = \frac{1(3) + 5(-3)}{6} = \frac{3 - 15}{6} = \frac{-12}{6} = -2$$

$$y_R = \frac{1(3) + 5(-2)}{6} = \frac{3 - 10}{6} = \frac{-7}{6}$$

$$\left(-2, -\frac{7}{6} \right)$$