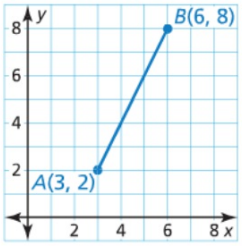
Find the coordinates of point P along the directed line segment AB so that the ratio of AP to PB is 3 to 2.



SOLUTION

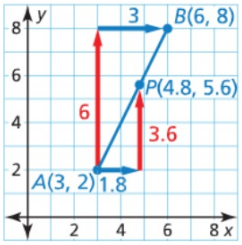
In order to divide the segment in the ratio 3 to 2, think of dividing, or *partitioning*, the segment into 3 + 2, or 5 congruent pieces.

Point P is the point that is $\frac{3}{5}$ of the way from point A to point B.

Find the rise and run from point A to point B. Leave the slope in terms of rise and run and do not simplify.

$$\text{slope of } \overline{AB}\text{: } m = \frac{8-2}{6-3} = \frac{6}{3} = \frac{\text{rise}}{\text{run}}$$

To find the coordinates of point P, add $\frac{3}{5}$ of the run to the x-coordinate of A, and add $\frac{3}{5}$ of the rise to the y-coordinate of A.



$$\text{run: } \frac{3}{5} \text{ of } 3 = \frac{3}{5} \cdot 3 = 1.8$$

$$\text{rise: } \frac{3}{5} \text{ of } 6 = \frac{3}{5} \cdot 6 = 3.6$$

▶ So, the coordinates of P are

$$(3 + 1.8, 2 + 3.6) = (4.8, 5.6).$$

The ratio of AP to PB is 3 to 2.

Find the coordinates of point P along the directed line segment AB so that AP to PB is the given ratio.

1. $A(1, 3)$, $B(8, 4)$; 4 to 1

$P(6.6, 3.8)$

2. $A(-2, 1)$, $B(4, 5)$; 3 to 7

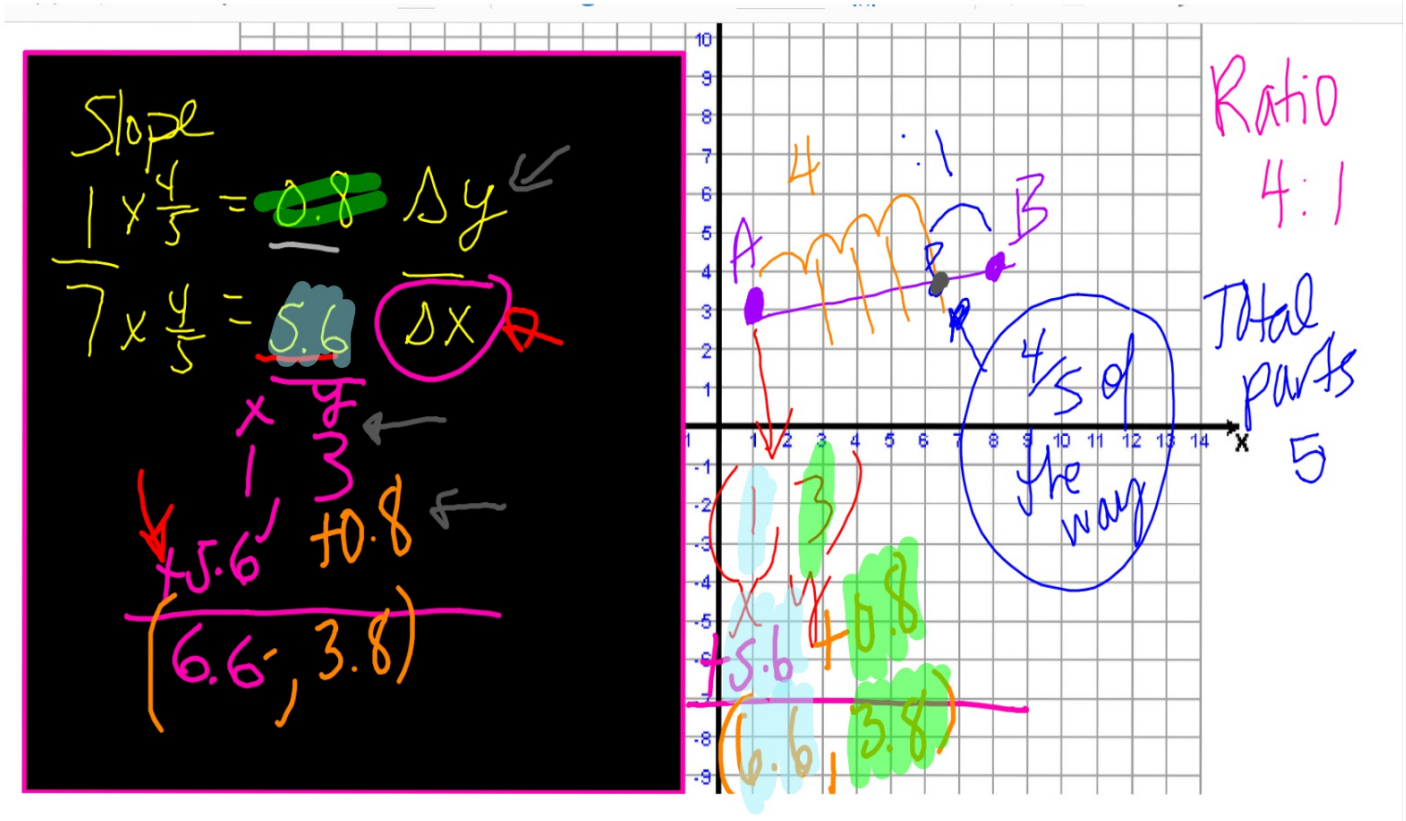
$P(-0.2, 2.2)$

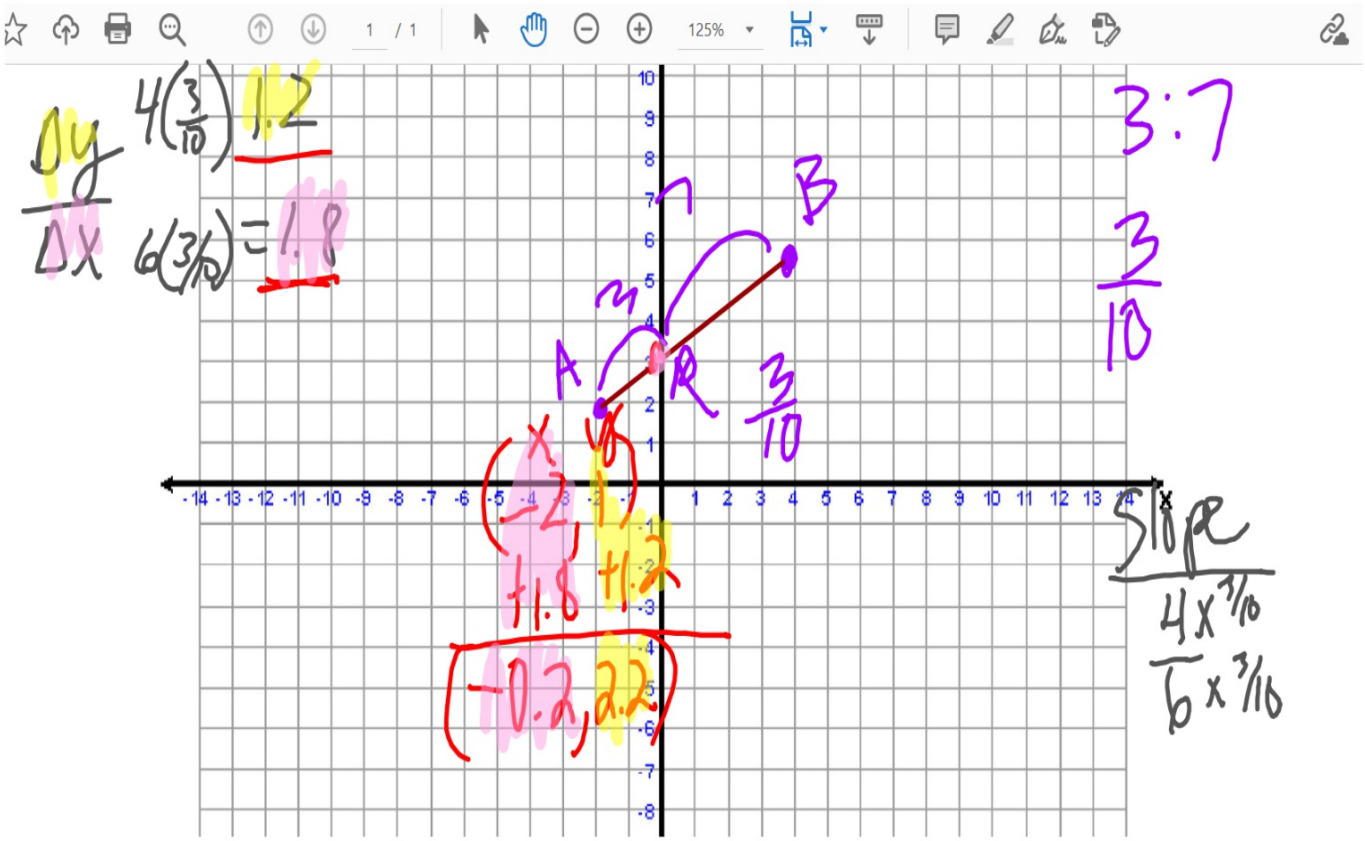
Hide Answers

[redacted]

[redacted]

***See work on next two pages!**


Slope
1 x 4/5 = 0.8 Δy
7 x 4/5 = 5.6 Δx
x y
1 3
+5.6 +0.8
(6.6, 3.8)
A
B
4
:1
4/5 of the way
(1, 3)
x y
+5.6 +0.8
(6.6, 3.8)
Ratio
4:1
Total parts
5


Δy
Δx
4(3/10) 1.2
6(3/10) = 1.8
3:7
3/10
A
B
R
3/10
(x, y)
(-2, 1)
+1.8
+1.2
(-0.2, 2.2)
Slope
4 x 3/10
6 x 3/10