

Lesson 1.5 Locating Points Using Weighted Averages

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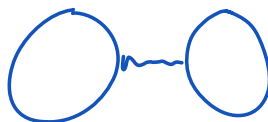


Lesson 1.5
Locating

Lesson 1.5 Locating Points Using Weighted Averages

Workbook pages 42-48

Content Objective



Students will locate points on a number line and a coordinate plane by using weighted averages.

MA.912.GR.3.1

Determine the weighted average of two or more points on a line.

MA.912.GR.3.3

Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.



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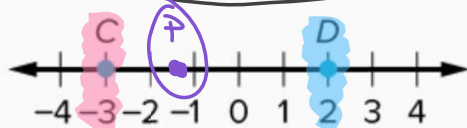
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Example 1: Find a Weighted Average on a Number Line

Find the coordinate of P that represents the weighted average for each set of points with the given conditions.

a. Enter your answers.

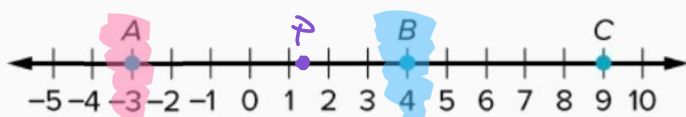
Point C weighs twice as much as point D.



$$\frac{-6 + 2}{2 + 1} = -\frac{4}{3}$$

Example 1 Check

Find the coordinate of P that represents the weighted average for the point, based on the given conditions. 1.2



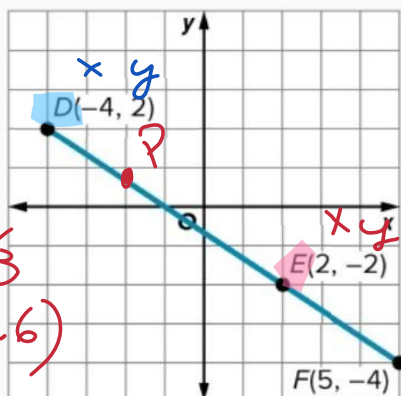
Point A has a weight of 2, and point B has a weight of 3.

$$\begin{array}{c} \text{A} \\ -3 \\ 2 \end{array} + \begin{array}{c} \text{B} \\ 4 \\ 3 \end{array} \rightarrow \frac{-3(2) + 4(3)}{2+3} = \frac{-6+12}{5} = \frac{6}{5} = 1.2$$



Example 2: Find a Weighted Average on the Coordinate Plane

Find the coordinate of P that represents the weighted average for the point, based on the given conditions.



Point D weighs twice as much as point E.

$$\begin{array}{c} \text{D} \\ -4 \\ 2 \end{array} + \begin{array}{c} \text{E} \\ 2 \\ 1 \end{array}$$

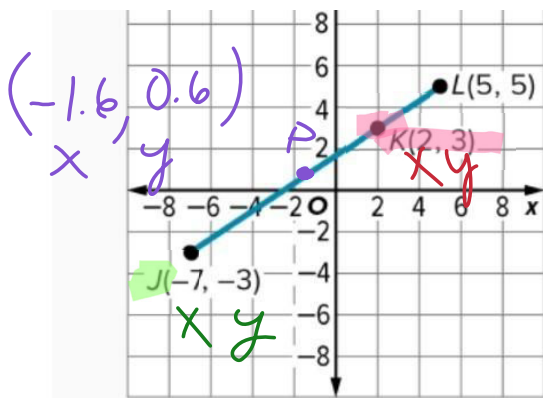
$$\frac{-4(2) + 2(1)}{2+1} = \frac{-8+2}{3} = \frac{-6}{3} = -2$$

$$\begin{array}{c} \text{D} \\ 2 \\ 2 \end{array} + \begin{array}{c} \text{E} \\ -2 \\ 1 \end{array} \rightarrow \frac{2(2) + (-2)(1)}{2+1} = \frac{4-2}{3} = \frac{2}{3} = 0.6$$

Example 2 Check

Find the coordinate of P that represents the weighted average for the point, based on the given conditions.





$$\begin{array}{c} \text{J} \\ -7 \\ 2 \end{array} \quad \begin{array}{c} \text{K} \\ 2 \\ 3 \end{array}$$

$$\frac{-7(2) + 2(3)}{2+3} = \frac{-14+6}{5} = \frac{-8}{5} = -1.6$$

$$\begin{array}{c} \text{J} \\ -3 \\ 2 \end{array} \quad \begin{array}{c} \text{K} \\ 3 \\ 3 \end{array}$$

$$\frac{-3(2) + 3(3)}{2+3} = \frac{-6+9}{5} = \frac{3}{5} = 0.6$$

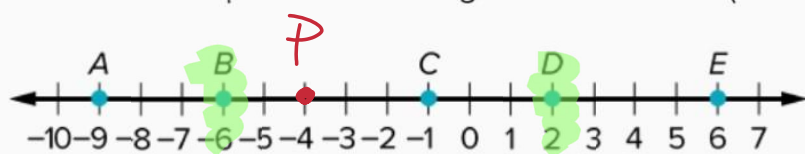
Point J has a weight of 2, and point K has a weight of 3.

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Practice

1. Use the number line to find the coordinate of P that represents the weighted average of each set of points with the given conditions. (Example 1)



Point B weighs three times as much as point D.

$$\begin{array}{c} -6 \\ 3 \end{array} \quad \begin{array}{c} 2 \\ 1 \end{array}$$

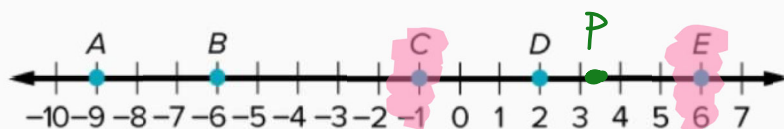
$$\frac{-18+2}{3+1} = \frac{-16}{4} = -4$$

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2. Use the number line to find the coordinate of P that represents the weighted average of each set of points with the given conditions. (Example 1)

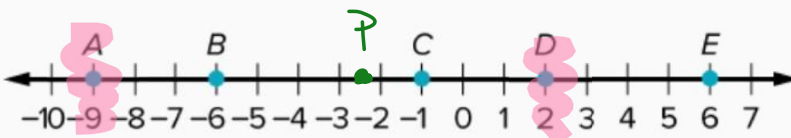


Point C has a weight of 3, and point E has a weight of 5.

$$\begin{array}{c} -1 \\ 3 \end{array} \quad \begin{array}{c} 6 \\ 5 \end{array}$$

$$\frac{-3 + 31}{3 + 5} = \frac{28}{8}$$

3. Use the number line to find the coordinate of P that represents the weighted average of each set of points with the given conditions. (Example 1)



Point A has a weight of 2, and point D has a weight of 3.

$$\begin{array}{c} -9 \\ 2 \end{array} \quad \begin{array}{c} 2 \\ 3 \end{array}$$

$$\frac{-18 + 6}{2 + 3} = \frac{-12}{5}$$

9. AMBULANCE

Some ambulances use weighted averages to find where to park between cities. The weight of a hospital is determined by the average number of emergent patients that need to be taken to the hospital on a daily basis. (Example 3)



$$\begin{array}{c} 31 \\ 4 \end{array} \quad \begin{array}{c} 24 \\ 1 \end{array}$$

$$\frac{124 + 2}{4 + 1} = 29$$

a. The Davis Medical Center usually has a weight 4 times that of Woodland Hospital. Where should the ambulance park?

