

Before we begin, are there any questions from last day's work?

Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) Find the equation of any median.
- b) Find the equation of any right bisector.

MPM 2DI

2.1 The Midpoint of a Line Segment (Day 2)

Date: Feb. 25/16

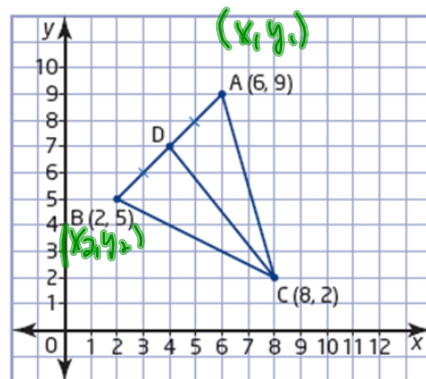
Median of a Triangle

A **median** is a line segment joining a vertex of a triangle to the midpoint of the opposite side.

For example, CD is a median for triangle ABC:

Every triangle has exactly 3 medians.

[Note a midpoint is not a median!!]
(it's only the midpoint)



hi

Ex. 1 Determine the equation of the line that the median from vertex C rests on, using the information from the graph above.

(i.e. Determine the equation of the median from C.)

We need the coordinates of D.

$$\begin{aligned} M_{AB} &= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= M_{AB} \left(\frac{6+2}{2}, \frac{9+5}{2} \right) \\ &= M_{AB} \left(\frac{8}{2}, \frac{14}{2} \right) \\ &= D(4, 7) \end{aligned}$$

We need the slope of CD.

$$\begin{aligned} m_{CD} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{7 - 2}{4 - 8} \\ &= \frac{5}{-4} \\ &= -\frac{5}{4} \end{aligned}$$

Now we can find the equation CD.

$$\begin{aligned} m &= -\frac{5}{4} \quad (4, 7) \\ y &= mx + b \\ (7) &= \left(-\frac{5}{4}\right)(4) + b \\ 7 &= -5 + b \\ 7 + 5 &= b \\ 12 &= b \\ y &= -\frac{5}{4}x + 12 \end{aligned}$$

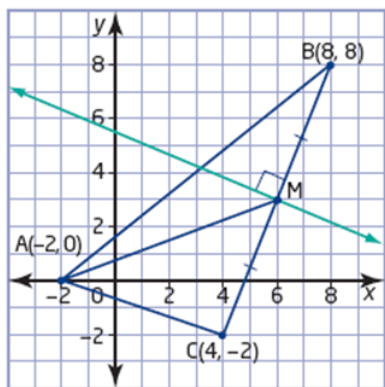
\therefore the equation of the median from C is $y = -\frac{5}{4}x + 12$

$$y = -\frac{5}{4}x + 12$$



Right Bisector

A **right (perpendicular) bisector** is a line that passes through the midpoint of a line segment and intersects it at 90° . For example, on the plane below, the right bisector is the line that passes through M, which is not to be confused with the median AM:



Every triangle has exactly 3 right bisectors.

Ex. 2 Find the slope of the right bisector M from the information in the graph above.

$$\begin{aligned}
 m_{BC} &= \frac{-2 - 8}{4 - 8} \\
 &= \frac{-10}{-4} \\
 &= \frac{5}{2}
 \end{aligned}
 \rightarrow
 \begin{aligned}
 m_{\perp} &= \frac{-1}{m_{BC}} \\
 &= \frac{-2}{5}
 \end{aligned}$$

\therefore the slope of the right bisector is $-\frac{2}{5}$.

I could have asked to find the EQUATION of the right bisector, instead of the slope.
What additional steps would be necessary?

