

5.2 Special Segments in Δ 's : Coordinate Geometry

Let ΔABC have vertices :

$$A(1, -2) \quad B(2, 3) \quad C(7, 2)$$

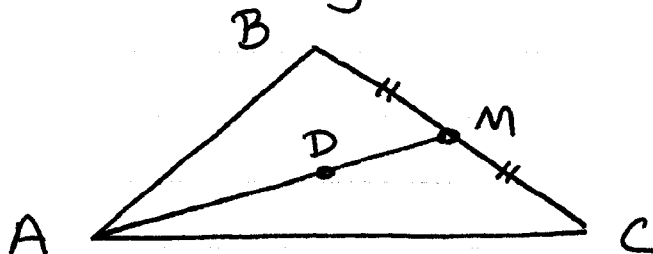
- ① Classify ΔABC by angles & sides.
- ② Find the equation of the line containing the altitude from B.
- ③ Find the equation of the line containing the median from A.
- ④ Find the equation of the line containing the perpendicular bisector of side $\overline{AB}$.
- ⑤ Find the point of intersection of the median (see #3) & the perpendicular bisector (see #4).

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Go back to the homework problem on Page 229 #30. Using the answers to this problem, complete the following questions.

⑥ Find the coordinates of the centroid of $\triangle ABC$. Call this point D.

⑦ Find the following: AD , DM , AM .



* diagram from
Page 229

⑧ Using your lengths in #7, are the following two statements True or False?

a) $AD = \frac{2}{3}(AM)$

b) $DM = \frac{1}{3}(AM)$

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Answers:

① isosceles right $\triangle$

since $AB = BC = \sqrt{26}$, we know $\overline{AB} \cong \overline{BC}$

since $m_{\overline{AB}} = 5 \neq m_{\overline{BC}} = -\frac{1}{5}$, we know

$\overline{AB} \perp \overline{BC} \neq \angle B$ must be a right $\angle$

② $y = -\frac{3}{2}x + 6$

③ $y = \frac{9}{7}x - \frac{23}{7}$

④ $y = -\frac{1}{5}x + \frac{4}{5}$

⑤ $\left(\frac{143}{52}, \frac{91}{364}\right)$
 $(2.75, .25)$

⑥ $D(10, 2)$

⑦ $AD = 2\sqrt{26}$
 $DM = \sqrt{26}$
 $AM = 3\sqrt{26}$

⑧ a) True $AD = \frac{2}{3}(AM)$ since
 $2\sqrt{26} = \frac{2}{3}(3\sqrt{26}) = 2\sqrt{26}$

b) True $DM = \frac{1}{3}(AM)$ since
 $\sqrt{26} = \frac{1}{3}(3\sqrt{26}) = \sqrt{26}$

note: this question demonstrates the relationship between the centroid, vertex & midpoint found in the Concurrency Properties Thm.