Homework Qs??

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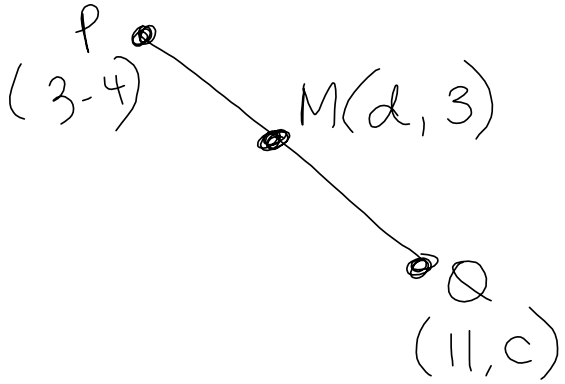


$x_m = \frac{x_1 + x_2}{2}$

$d = \frac{3 + 11}{2}$

$d = 7$

$y_M = \frac{y_1 + y_2}{2}$

$2 \times (3) = \left(\frac{-4 + c}{2}\right) \times 2$

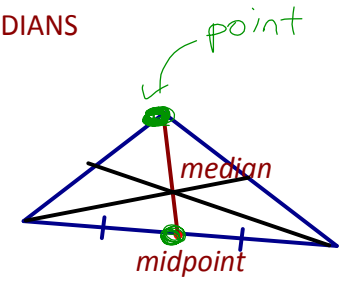
$6 = -4 + c$

$10 = c$

2.2 Equations of Medians, Altitudes and Right Bisectors

* To make an equation, you always need → slope (2 points)
$y = mx + b$ → point (x, y)

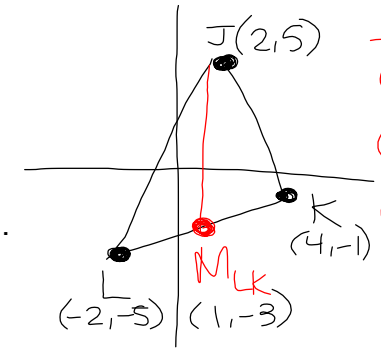
A. MEDIANS



a median joins the vertex of a triangle to the midpoint of the opposite side

$y = mx + b$

Ex. 1: Determine the equation of the median from *J* for the triangle with vertices *J*(2,5), *K*(4,-1) and *L*(-2,-5).



Strategy
① Find M_{LK}
② Find m_{median}
③ Find b

① $M_{LK} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$= \left(\frac{-2+4}{2}, \frac{-5-1}{2}\right)$

$M_{LK} = (1, -3)$

② $m_{JM} = \frac{y_2-y_1}{x_2-x_1}$

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

$m_{JM} = 8$

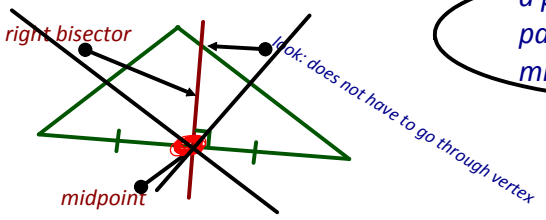
③ Find b (use $J_{x,y}(2,5)$)

$y = mx + b$
$y = 8x + b$
$5 = 8(2) + b$
$5 = 16 + b$
$5 - 16 = b$
$-11 = b$

∴ The equation of the median from J is
$y = 8x - 11$

B. PERPENDICULAR BISECTORS (also known as Right Bisectors)

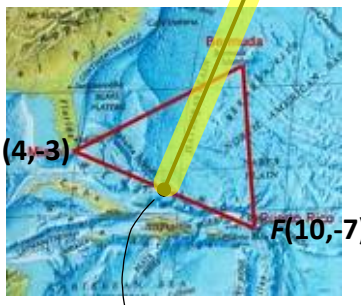
rightangle — cut in half



a perpendicular bisector passes through a midpoint at 90°

Ex. 2 Below is one of the most famous triangles... THE BERMUDA TRIANGLE! A ship plans to take the path of the perpendicular bisector from the segment *EF*. He wishes to be tracked the whole way. Can you determine the equation of his ship? E(4,-3) F(10,-7)

perpendicular bisector



① m_{EF}

② $m_{\perp}$

③ M_{EF}

① $m_{EF} = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{-7-(-3)}{10-4}$

$= \frac{-4}{6}$

$= -\frac{2}{3}$

② $m_{\perp} = \frac{3}{2}$

③ $M_{EF} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$= \left(\frac{4+10}{2}, \frac{-3-7}{2}\right)$

$= (7,-5)$

④ Find 'b'

$y = mx + b$

$y = \frac{3}{2}x + b$

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

$-5 = \frac{21}{2} + b$

$-5 - \frac{21}{2} = b$

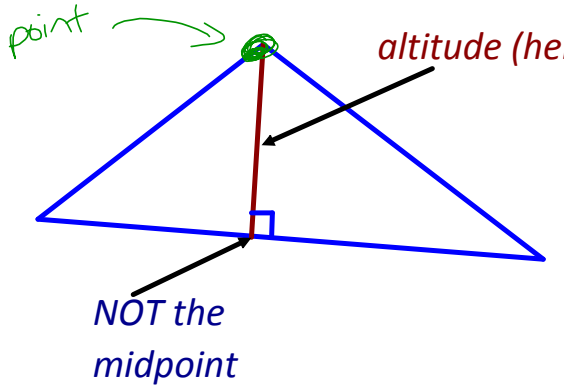
$-\frac{10}{2} - \frac{21}{2} = b$

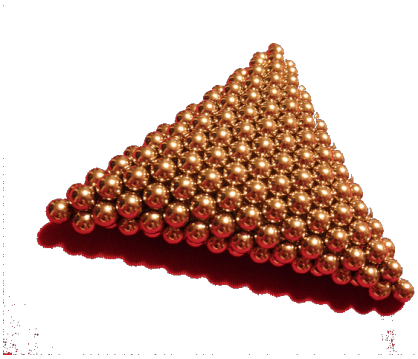
$-\frac{31}{2} = b$

∴ Equation of the ship is $y = \frac{3}{2}x - \frac{31}{2}$

C. ALTITUDES

An altitude joins the vertex of a triangle to its opposite side at 90º



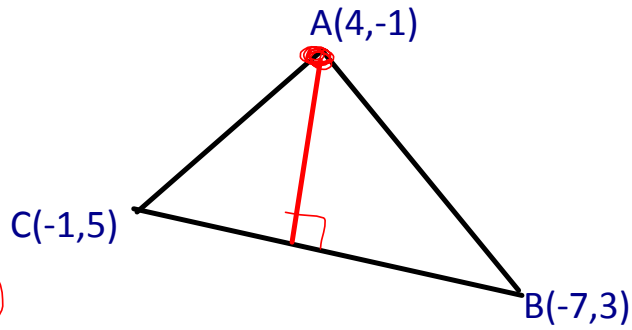


Ex. 3 Determine the equation of the altitude from *A*.

① m_{CB}

② $m_{\perp}$

③ find b (using $m_{\perp}$ and A)



① $m_{CB} = \frac{y_2 - y_1}{x_2 - x_1}$

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

$= \frac{2}{6}$

$= \frac{1}{3}$

② $m_{\perp} = -3$

③ find b

$y = mx + b$

$y = -3x + b$

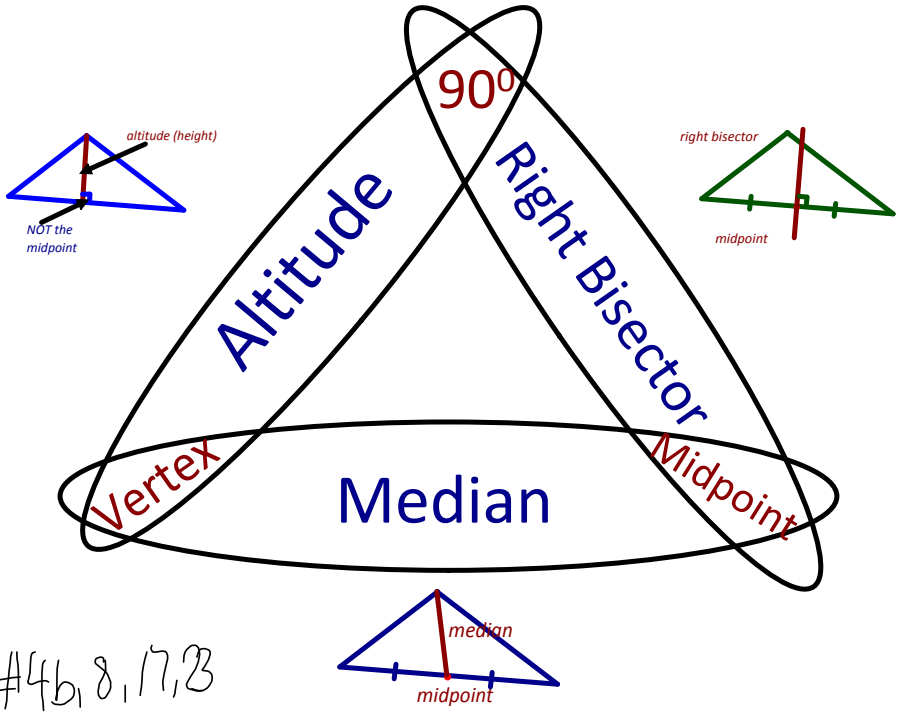
$-1 = -3(4) + b$

$-1 = -12 + b$

$-1 + 12 = b$

$11 = b$

$\therefore y = -3x + 11$



p. 66 #4b, 8, 17, 23

p. 90 # 18

p. 100 #4