OPENER

a) What is the slope of the line that goes through A(5, -2) and B (3, 6)

Recall $m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{-2-6}{5-3}$

$= \frac{-8}{2}$

$m = -4$

b) What is the equation of that line?

$y = mx + b$

$-2 = -4(5) + b$

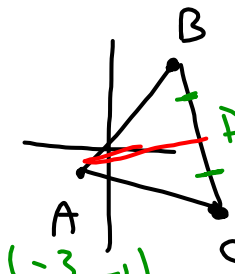
$-2 = -20 + b$

$18 = b$

$y = -4x + 18$

Continuing Midpoint questions

ex1: A triangle has the vertices at A (-3, -1), B (3, 5) and C (7, -3). Determine the equation of the median from vertex A.



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

$= \left(\frac{3+7}{2}, \frac{5-3}{2}\right)$

$= \frac{10}{2}, \frac{2}{2}$

$M_{BC} = (5, 1)$

② $m_{AD} = \frac{y_2-y_1}{x_2-x_1}$

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

$= \frac{2}{8}$

$m_{AD} = \frac{1}{4}$

$\frac{-1-1}{-3-5}$

$= \frac{-2}{-8}$

$= \frac{1}{4}$

③ $y = \frac{1}{4}x + b$ using D(5,1)

$1 = \frac{1}{4}(5) + b$

$1 = \frac{5}{4} + b$

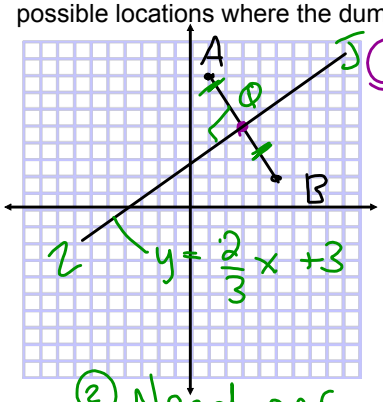
$1 - \frac{5}{4} = b$

$-\frac{1}{4} = b$

p79 #7, 11

∴ equation of the median from A is $y = \frac{1}{4}x - \frac{1}{4}$

ex2: A dumpster need to be put at equal distances between two buildings which are located at A(1, 8) and B(5, 2). Describe all possible locations where the dumpster might be located.



① M_{AB} is one location!

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

$= \frac{1+5}{2}, \frac{8+2}{2}$

$M_{AB} = 3, 5$

② Need perpendicular bisector equation - don't have 2 pts on $\overline{ZJ}$ ∴ need to use m_{AB}

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

$= \frac{8-2}{1-5}$

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

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

∴ so $m_{ZJ} = \frac{2}{3}$

③ solve for b using $M_{AB} = (3, 5)$

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

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

$5 = 2 + b$

$3 = b$

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

Therefore to find a point on the line where the dumpster can be located, choose a value of (x) then solve for y

if $x = -6$, $y = ?$

$y = \frac{2}{3}(-6) + 3$

$y = \frac{-12}{3} + 3$

$y = -4 + 3$

$y = -1$

In Summary: to find the perpendicular bisector of two points you do the following

1 - Find the Midpoint of the original points

2 - Find the slope of the original points

3 - You can now get the slope of the perpendicular bisector by creating the negative reciprocal of the slope you calculated

4 - Find the y-int of the perpendicular bisector by substituting known slope and Midpoint values for (x, y).

p79 # 7, 8,11

p80 #13ad, 14