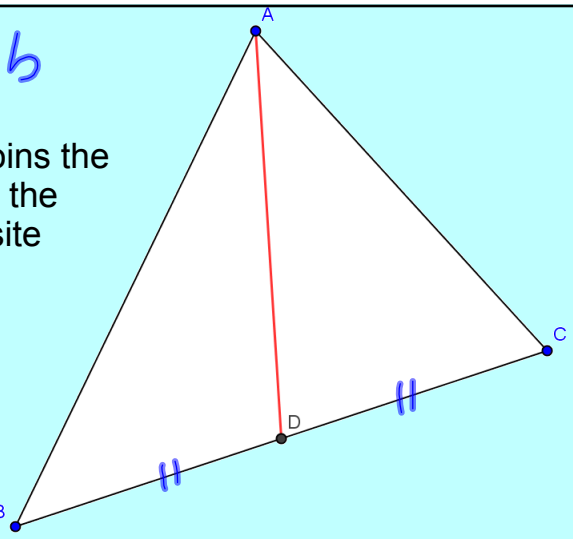
$y = mx + b$

Median: A line that joins the vertex of a triangle to the midpoint of the opposite side.



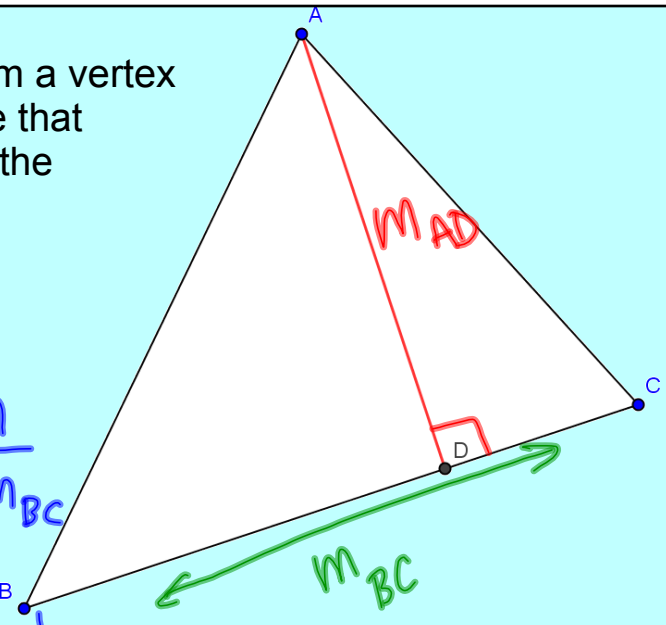
① MP_{BC}

② $m_{AD} = \frac{y_D - y_A}{x_D - x_A}$

③ sub A or D into $y = m_{AD}x + b$ (sub ✓, sub ?)

Feb 28-11:11 AM

Altitude: A line from a vertex to the opposite side that is perpendicular to the opposite side.



① m_{BC}

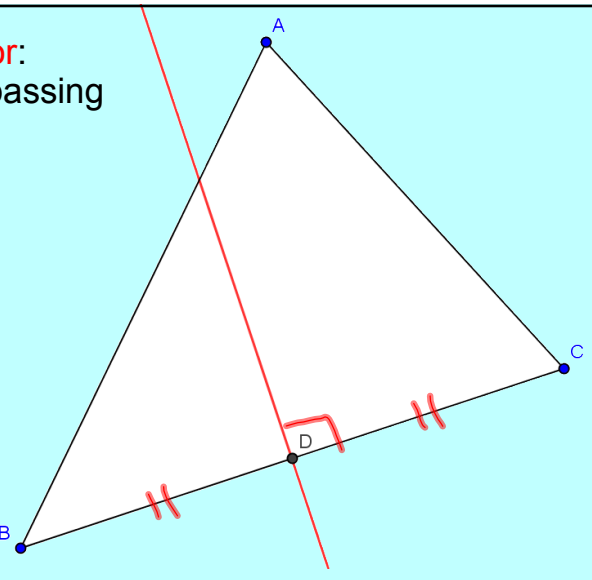
② $m_{AD} = -\frac{1}{m_{BC}}$

③ $y = m_{AD}x + b$ (b ?)

④ sub A into $y = m_{AD}x + b$

Feb 28-11:11 AM

Perpendicular Bisector:
A perpendicular line passing through the midpoint of a line segment.



① MP_{BC}

② m_{BC}

③ $m_{\perp} = -\frac{1}{m_{BC}}$

④ $y = m_{\perp}x + b$

⑤ sub D into $y = m_{\perp}x + b$

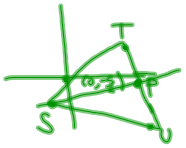
Feb 28-11:11 AM

Special Lines in Triangles

Refer to yesterday's hand-out for the characteristics of the special lines.

Ex. 1 Triangle STU has vertices at S(-2,-3), T(9,4) and U(11, -4). $P = (10,0)$

a. Find the equation of the median from S.



$y = mx + b$ $S(-2,-3)$ P = midpoint TU

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

$= \left(\frac{9+11}{2}, \frac{4+(-4)}{2}\right)$

$= (10, 0)$

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

$= \frac{0-(-3)}{10-(-2)}$

$= \frac{3}{12}$ or $\frac{1}{4}$

$y = \frac{1}{4}x + b$

$0 = \frac{1}{4}(10) + b$

$0 = \frac{10}{4} + b$

$b = -\frac{10}{4}$

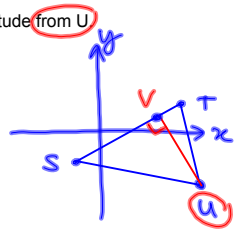
$\therefore y = \frac{1}{4}x - \frac{10}{4}$

$y = \frac{1}{4}x - \frac{5}{2}$ $\left(0, -\frac{5}{2}\right)$

Mar 2-8:32 PM

Ex.1 continues...
Triangle STU has vertices at S(-2,-3), T(9,4) and U(11, -4).

b. Find the equation of the altitude from U.



① $m_{ST} = \frac{y_T - y_S}{x_T - x_S}$

$= \frac{4-(-3)}{9-(-2)}$

$= \frac{7}{11}$

② $m_{UV} = -\frac{11}{7}$

③ $y = -\frac{11}{7}x + b$

④ sub U into $y = -\frac{11}{7}x + b$

$-4 = -\frac{11}{7}(11) + b$

$-4 = -\frac{121}{7} + b$

$-4 + \frac{121}{7} = b$

$-\frac{28}{7} + \frac{121}{7} = b$

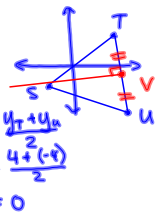
$\frac{93}{7} = b$

∴ altitude is $y = -\frac{11}{7}x + \frac{93}{7}$

Mar 4-9:52 AM

Ex.1 continues...
Triangle STU has vertices at S(-2,-3), T(9,4) and U(11, -4).

c. Find the equation of the perpendicular bisector of side TU.



① MP_{TU}

$x_{MP} = \frac{x_T + x_U}{2}$

$= \frac{9+11}{2}$

$= 10$

$y_{MP} = \frac{y_T + y_U}{2}$

$= \frac{4+(-4)}{2}$

$= 0$

MP is (10, 0)

② $m_{TU} = \frac{y_U - y_T}{x_U - x_T}$

$= \frac{-4-4}{11-9}$

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

$= -4$

③ $m_{\perp} = \frac{1}{4}$

④ $y = \frac{1}{4}x + b$

⑤ sub V into $y = \frac{1}{4}x + b$

$0 = \frac{1}{4}(10) + b$

$0 = \frac{10}{4} + b$

$-\frac{10}{4} = b$

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

∴ perpendicular bisector of TU is $y = \frac{1}{4}x - \frac{5}{2}$

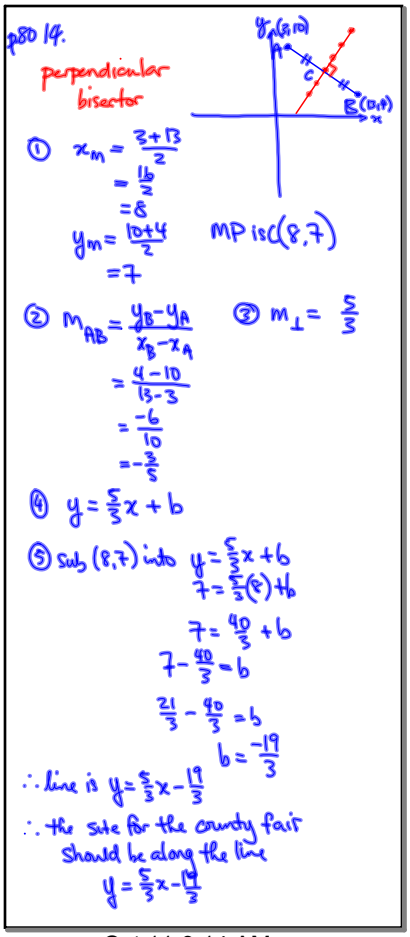
Mar 4-9:52 AM

Assigned Work:

Triangle ABC has vertices A(3, 4), B(-5, 2) and C(1, -4). Find the equation for the altitude from A to BC.

p.79 #12
p.80 #13c,14
p.102 #4
p.110 #13b

Feb 28-12:00 PM



Oct 11-9:14 AM

p.80 13(c) (4, 6) (12, -4)

Oct 11-9:38 AM