Special Lines in Triangles

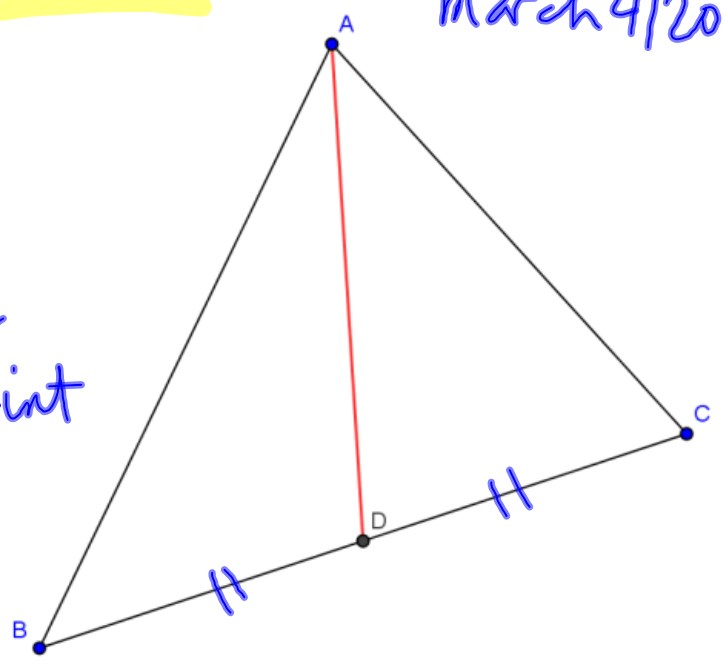
march 4/2010

Median: A line that j
vertex of a triangle tc
midpoint of the oppo
side.

$y = mx + b$
slope y-int

$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$

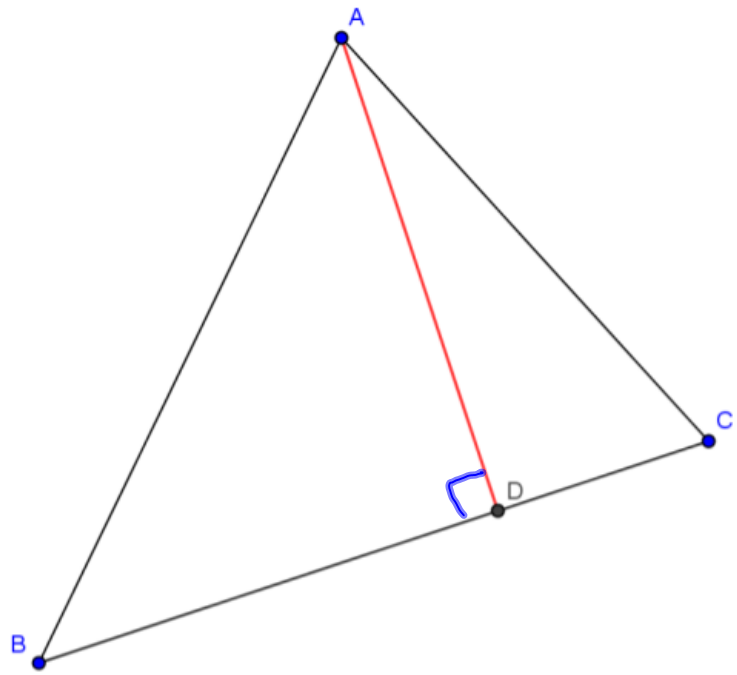
to find y-int,
sub a point into $y = mx + b$



Feb 28-11:11 AM

Special Lines in T

Altitude: A line frc
to the opposite sid
is perpendicular tc
opposite side.

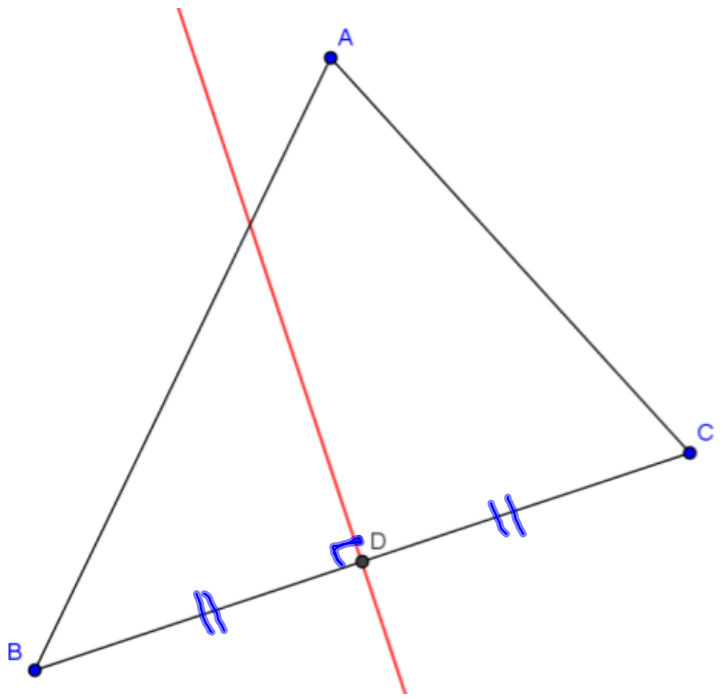


Feb 28-11:11 AM

Special Lines in Tria

Perpendicular Bisect

A perpendicular line p
through the midpoint
of a line segment.



Feb 28-11:11 AM

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

1. Find the equation of the median from S.

2. Find the equation of the altitude from U.

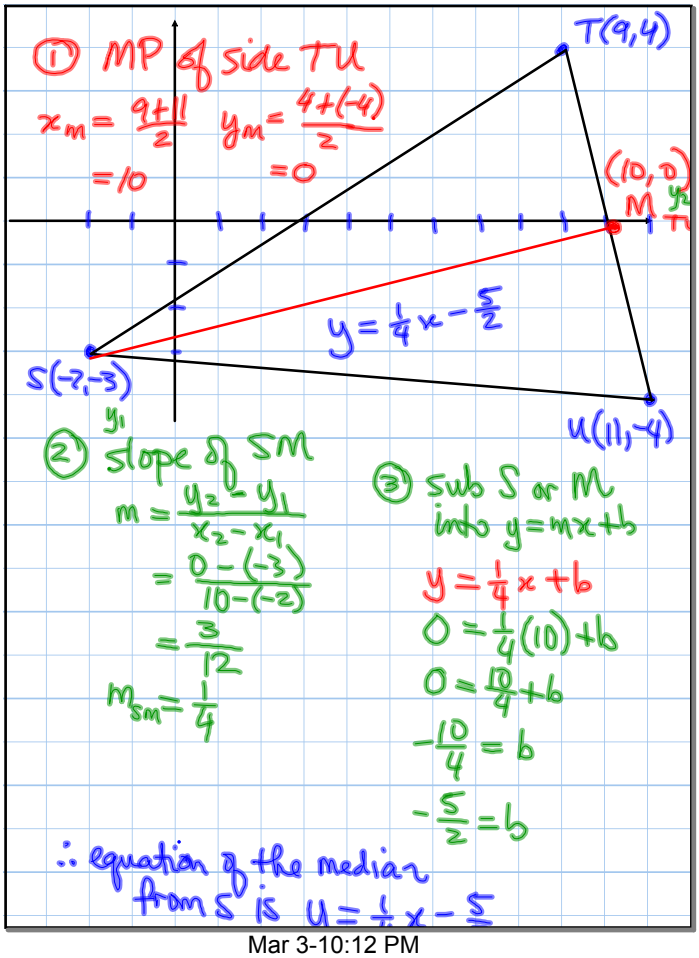
3. Find the equation of the perpendicular bisector of side TU.

4. What kind of triangle is STU? Justify your answer.

Mar 2-8:32 PM

① MP of side TU

$x_m = \frac{9+11}{2} = 10$ $y_m = \frac{4+(-4)}{2} = 0$



② slope of SM

$m = \frac{y_2 - y_1}{x_2 - x_1}$

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

$= \frac{3}{12}$

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

③ sub S or M into $y = mx + b$

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

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

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

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

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

∴ equation of the median from S is $y = \frac{1}{4}x - \frac{5}{2}$

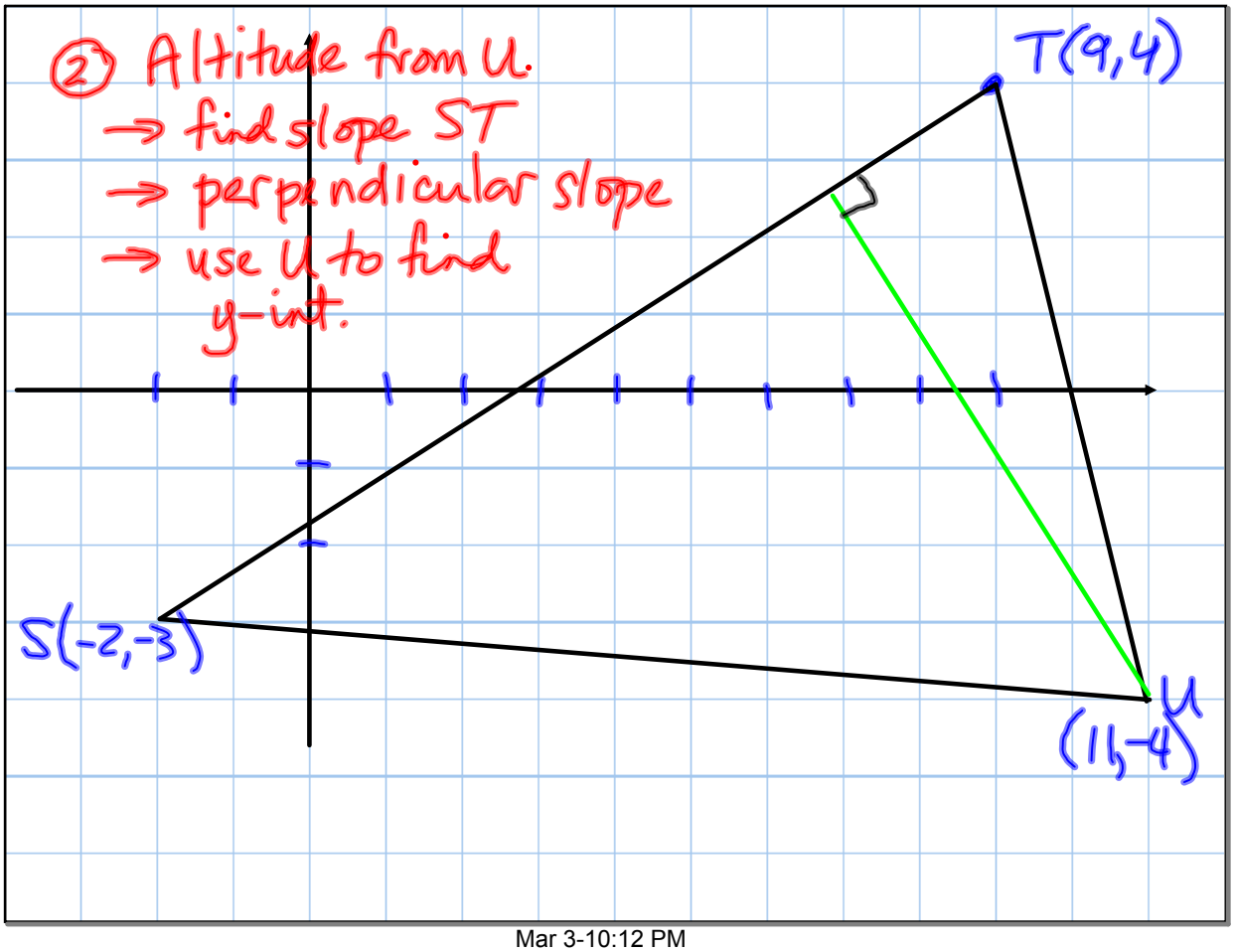
Mar 3-10:12 PM

② Altitude from U.

→ find slope ST

→ perpendicular slope

→ use U to find y-int.



Mar 3-10:12 PM

① slope of ST $\perp$ ← perpendicular

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

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

$$m_{ST} = \frac{7}{11}$$

$$m_{\perp} = -\frac{11}{7}$$

$$y = -\frac{11}{7}x + b$$

sub $U(11,-4)$ into $y = -\frac{11}{7}x + b$

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

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

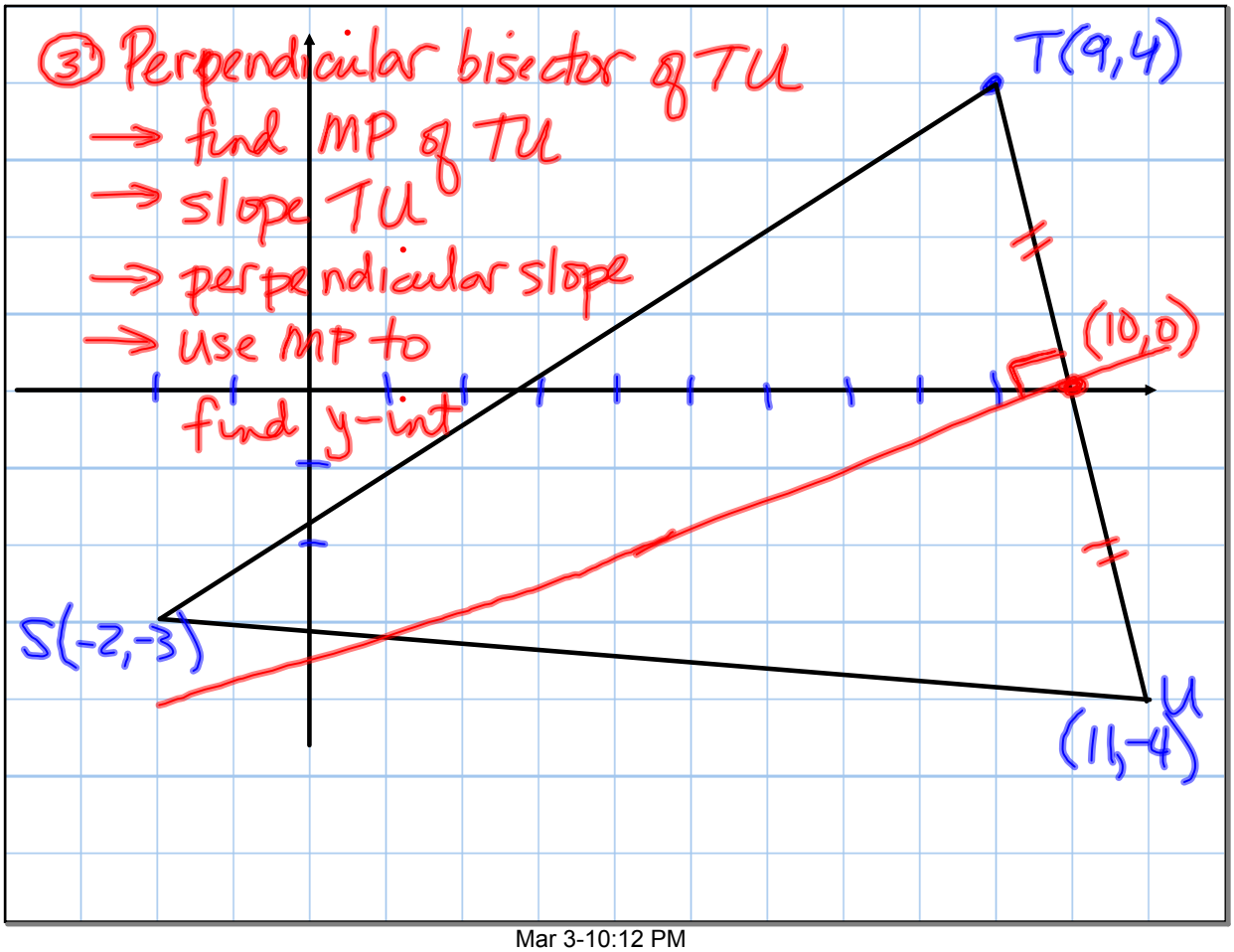
$$-\frac{4}{1} + \frac{121}{7} = b$$

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

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

∴ equation of the altitude from U is $y = -\frac{11}{7}x + \frac{93}{7}$

Mar 5-9:44 AM



Mar 3-10:12 PM

① MP of TU
$(10, 0)$

② slope of TU

$$m_{TU} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4-4}{11-9} = \frac{-8}{2} = -4$$

③ $\perp$ slope

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

④ sub MP $(10, 0)$ into $y = \frac{1}{4}x + b$

$$0 = \frac{1}{4}(10) + b$$
$$0 = \frac{10}{4} + b$$
$$-\frac{10}{4} = b$$
$$-\frac{5}{2} = b$$

$\therefore$ equation of $\perp$-bisector is $y = \frac{1}{4}x - \frac{5}{2}$

Mar 5-9:59 AM

④ What kind of Δ is STU?
$\rightarrow$ suspect isosceles triangle

calculate ST, SU, and TU

$$d_{ST} = \sqrt{(-2-9)^2 + (-3-4)^2} = \sqrt{121 + 49} = \sqrt{170}$$

$$d_{SU} = \sqrt{(-2-11)^2 + (-3-(-4))^2} = \sqrt{169 + 1} = \sqrt{170}$$

$$d_{TU} = \sqrt{(9-11)^2 + (4-(-4))^2} = \sqrt{4 + 64} = \sqrt{68}$$

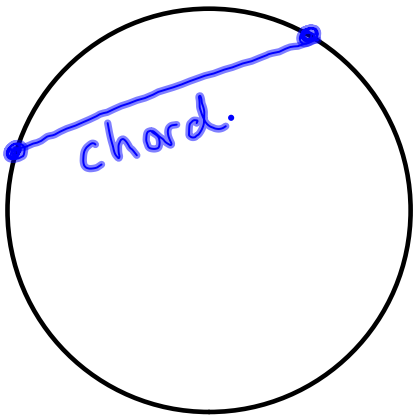
$\therefore$ the Δ is isosceles

Mar 5-10:06 AM

Assigned Work:

Complete Ex.1 ✓
p. 174 # 13, 14, 15

* chord



Feb 28-12:00 PM