

$\overline{AD} \cong \overline{DC}$

$\overline{BE} \cong \overline{EC}$

Midsegments of Triangles

Midsegment

1.) parallel with the base.

\overline{DE} is parallel with \overline{AB}

2.) segment bisector for the legs of the triangle.

Cut the legs into equal pieces.

\overline{DE} is a midsegment.

$\overline{EC} = 8$ $\overline{DE} = 10$

$20 * \frac{1}{2} = 10$

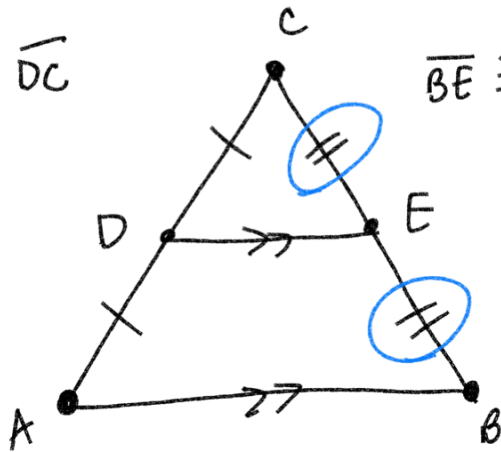
\overline{DE} is a midsegment

$\overline{AD} = 12$

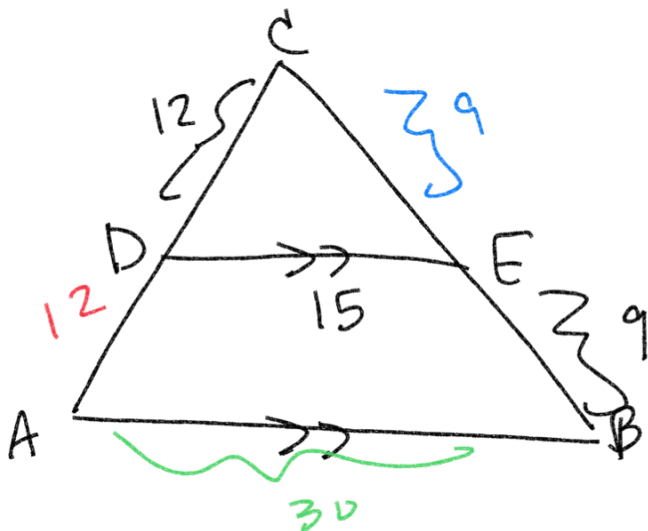
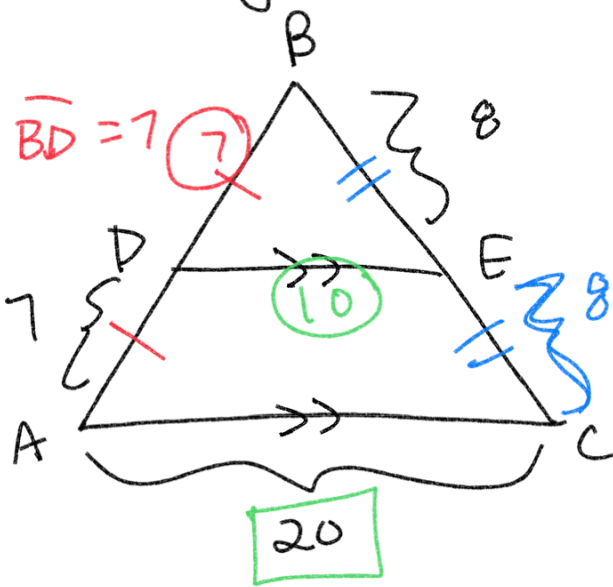
$\overline{CE} = 9$

$\overline{AB} = 30$

$15 * 2 = 30$

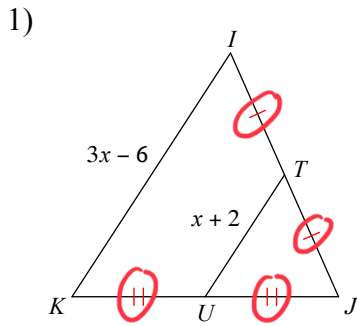


Midsegment is half the length of the base



Assignment

Solve for x.

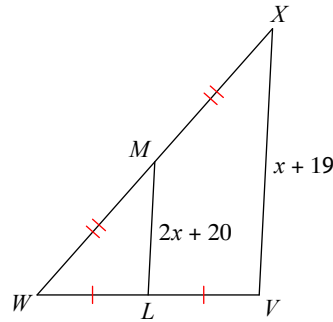


UT midsegment
 midsegment = $\frac{1}{2}$ base
 or
 2 midsegment = 1 base

$$2(x+2) = 3x-6$$

$$2x+4 = 3x-6$$

$$+6 \quad +6$$



2 midseg = base

$$2(2x+20) = x+19$$

$$4x+40 = x+19$$

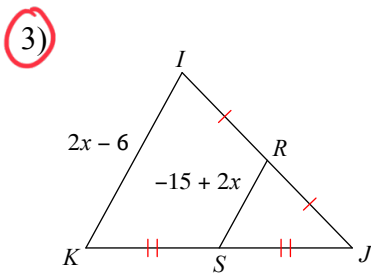
$$-x \quad -x$$

$$3x+40 = 19$$

$$-40 \quad -40$$

$$\frac{3x}{3} = \frac{-21}{3}$$

X = -7



2 midseg = base

$$2(-15+2x) = 2x-6$$

$$-30+4x = 2x-6$$

$$+6 \quad +6$$

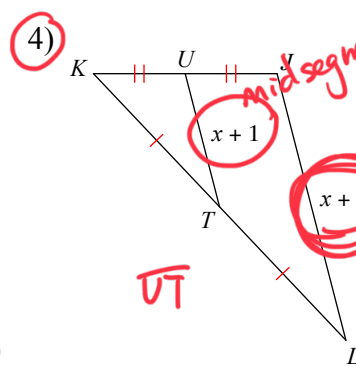
$$-24+4x = 2x$$

$$-4x \quad -4x$$

$$-24 = -2x$$

$$\frac{-24}{-2} = \frac{-2x}{-2}$$

X = 12



2 midseg = base

$$2(x+1) = x+10$$

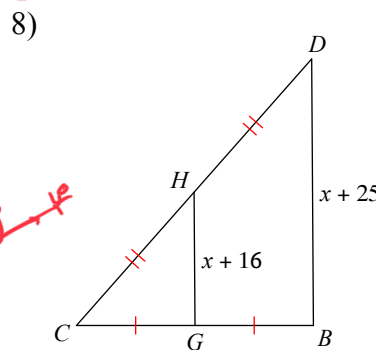
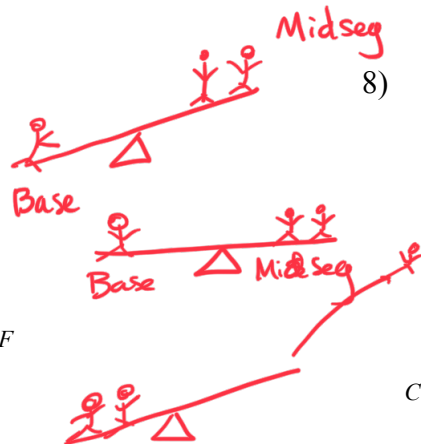
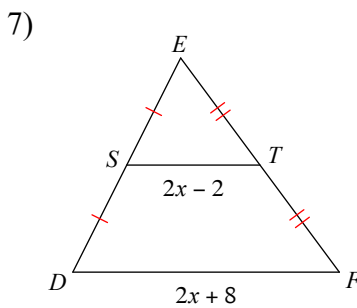
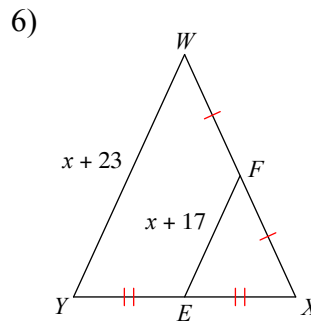
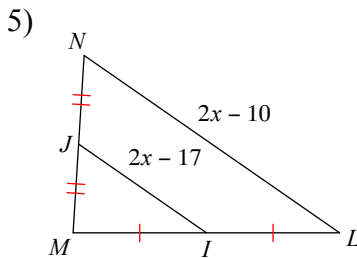
$$2x+2 = x+10$$

$$-2 \quad -2$$

$$2x = x+8$$

$$-x \quad -x$$

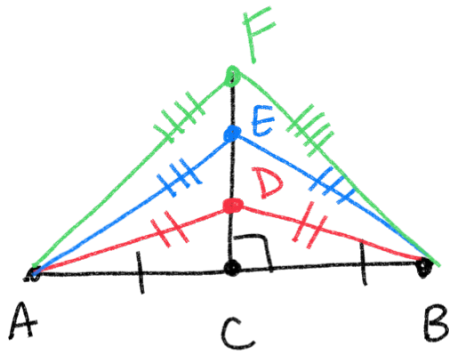
X = 8



Perpendicular Bisector

90° angle "right"

Divide into two equal pieces



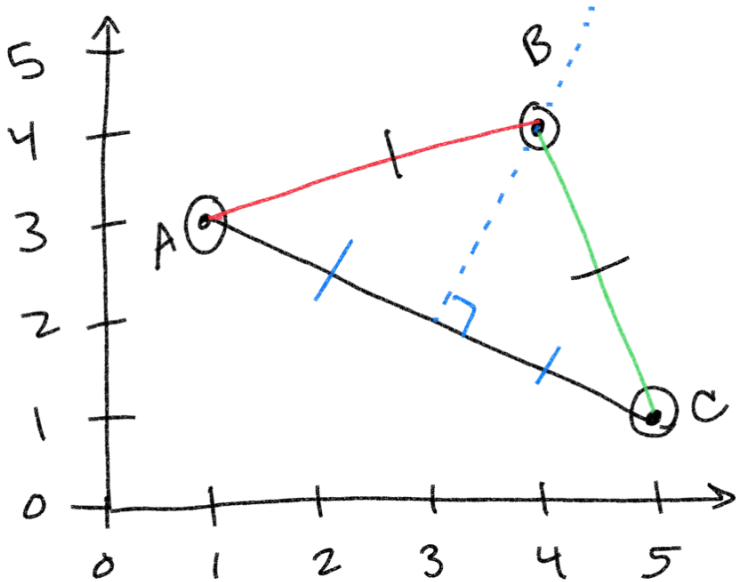
$$\overline{AD} \cong \overline{DB}$$

$$\overline{AE} \cong \overline{EB}$$

$$\overline{AF} \cong \overline{FB}$$

Any point on the perpendicular bisector will create a triangle with equal legs

$$\overline{AC} \cong \overline{CB}$$



A B C
 (1,3), (4,4), (5,1)

Question is (4,4) on the perpendicular bisector of \overline{AC} ?
 if B is on the perpendicular bisector, then $\overline{AB} \cong \overline{BC}$

$$\overline{AB} \quad \begin{matrix} x & y \\ A: & (1,3) \end{matrix} \quad \begin{matrix} x & y \\ B: & (4,4) \end{matrix}$$

Distance formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Distance of \overline{CB}

$$B: (4,4) \quad C: (5,1)$$

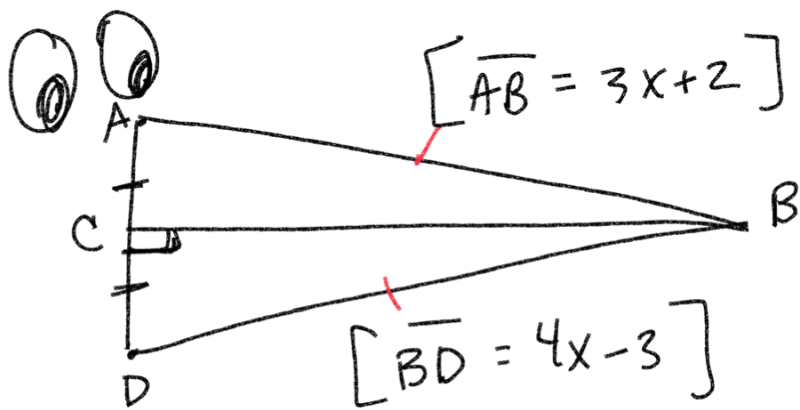
$$\frac{\sqrt{(5-4)^2 + (1-4)^2}}{\sqrt{1^2 + (-3)^2}} = \frac{\sqrt{1+9}}{\sqrt{1+9}} = \sqrt{10}$$

$$\sqrt{(1-4)^2 + (3-4)^2}$$

$$\sqrt{(-3)^2 + (-1)^2}$$

$$\sqrt{9+1} = \sqrt{10}$$

since $\sqrt{10} = \sqrt{10}$, B is on the perpendicular bisector



$$\overline{AB} \cong \overline{BD}$$

$$\downarrow \quad \downarrow$$

$$3x + 2 = 4x - 3$$

$$-2 \quad -2$$

$$3x = 4x - 5$$

$$-4x \quad -4x$$

$$-x = -5$$

$$\frac{-x}{-1} = \frac{-5}{-1}$$

$$x = 5$$