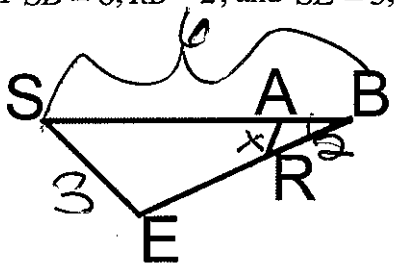
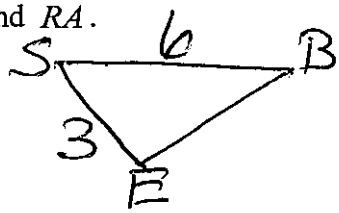
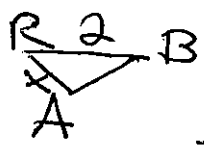
Overlapping Similar Triangles

1) Separate the triangles and draw them with the same orientation
2) Match up the corresponding letters (use reflexive property)
3) Create a proportion and solve

1. In triangle SEB, A is on $\overline{SB}$, and E is on $\overline{EB}$ so that $\angle E \cong \angle BAR$.
If $\overline{SB} = 6, \overline{RB} = 2$, and $\overline{SE} = 3$, find $\overline{RA}$.





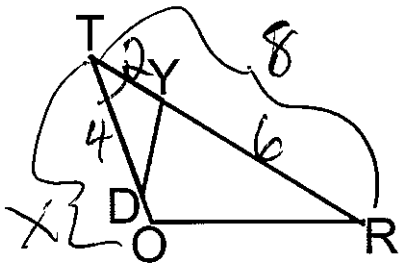


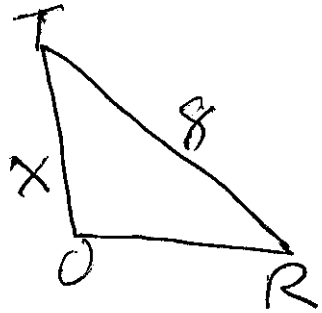
$\frac{6}{2} = \frac{3}{x}$

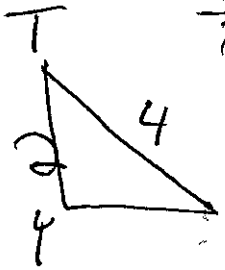
$\frac{6}{6}x = \frac{6}{6}$

$x = 1$

2. In triangle TOR, Y is on $\overline{TR}$, and D is on $\overline{TO}$ so that $\angle TYD \cong \angle ROT$.
If $\overline{TY} = 2, \overline{YR} = 6$, and $\overline{TD} = 4$, find $\overline{TO}$.





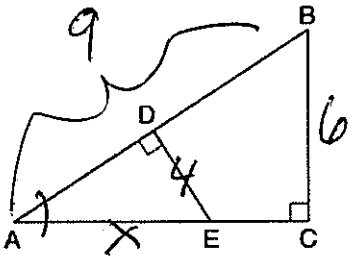


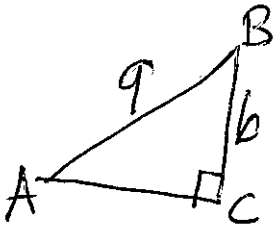
$\frac{x}{2} = \frac{8}{4}$

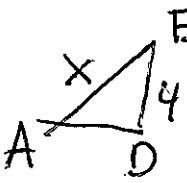
$\frac{4}{4}x = \frac{16}{4}$

$x = 4$

3. In $\triangle ABC$ shown below, $\angle ACB$ is a right angle, E is a point on $\overline{AC}$, and $\overline{ED}$ is drawn perpendicular to hypotenuse $\overline{AB}$. If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?





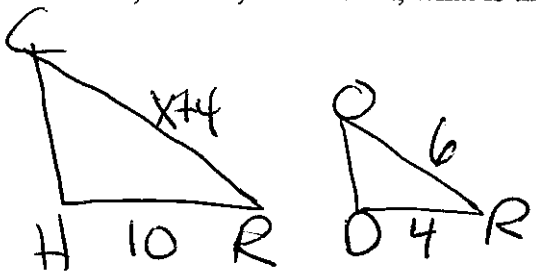


$\frac{9}{x} = \frac{6}{4}$

$\frac{6}{6}x = \frac{36}{6}$

$x = 6$

4. In triangle CHR, O is on $\overline{HR}$, and D is on $\overline{CR}$ so that $\angle H \cong RDO$. If $RD = 4$, $RO = 6$, and $OH = 4$, what is the length of $\overline{CD}$?



$\frac{X+4}{6} = \frac{10}{4}$

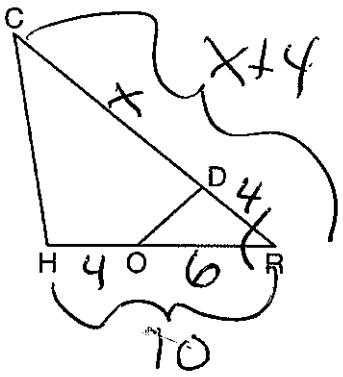
$4(X+4) = 60$

$4X + 16 = 60$

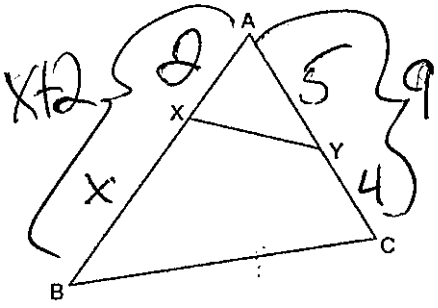
$-16 \quad -16$

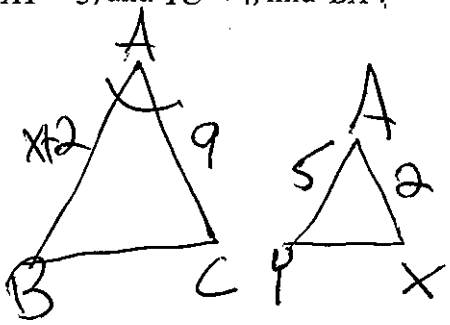
$\frac{4X}{4} = \frac{44}{4}$

$X = 11$



5. In the diagram below of $\triangle ABC$, X and Y are points on $\overline{AB}$ and $\overline{AC}$, respectively, such that $m\angle AYX = m\angle B$. If $\overline{AX} = 2$, $\overline{AY} = 5$, and $\overline{YC} = 4$, find $\overline{BX}$.





$\frac{X+2}{5} = \frac{9}{2}$

$2(X+2) = 45$

$2X + 4 = 45$

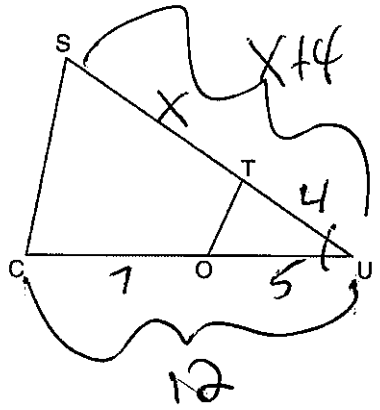
$-4 \quad -4$

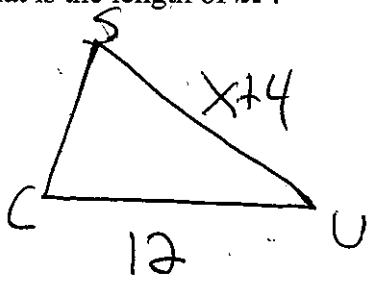
$\frac{2X}{2} = \frac{41}{2}$

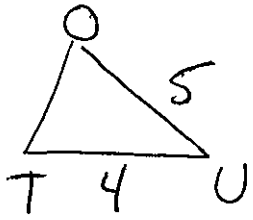
$X = 20.5$

6. In $\triangle SCU$ shown below, points T and O are on $\overline{SU}$ and $\overline{CU}$, respectively. Segment OT is drawn so that $\angle C \cong \angle OTU$.

If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?







$\frac{X+4}{5} = \frac{12}{4}$

$4(X+4) = 60$

$4X + 16 = 60$

$-16 \quad -16$

$\frac{4X}{4} = \frac{44}{4}$

$X = 11$