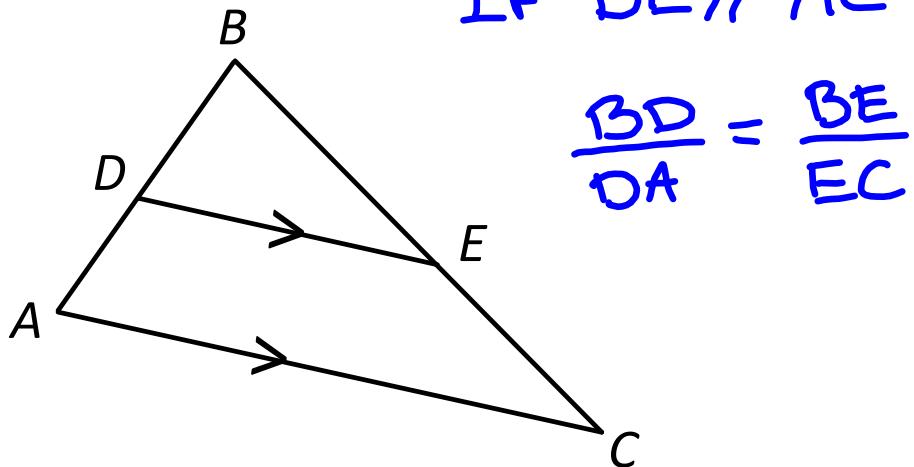


Triangle Proportionality Theorem

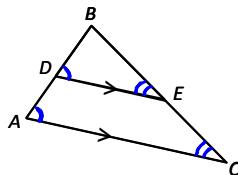
If a line is parallel to one side of a triangle and intersects the other two sides, then it divides those two sides proportionally

IF $\overline{DE} \parallel \overline{AC}$, then



$$\frac{BD}{DA} = \frac{BE}{EC}$$

Given: $\overline{DE} \parallel \overline{AC}$ Prove: $\frac{BD}{DA} = \frac{BE}{EC}$



$\triangle BDE \sim \triangle BAC$ by AA

$$\frac{BD}{BA} = \frac{BE}{BC} \quad \text{Proportional sides}$$

$$\frac{BD}{BD+DA} = \frac{BE}{BE+EC} \quad \text{Seg. add Post}$$

$$\frac{BD+DA}{BD} = \frac{BE+EC}{BE} \quad \text{Reciprocal of both sides}$$

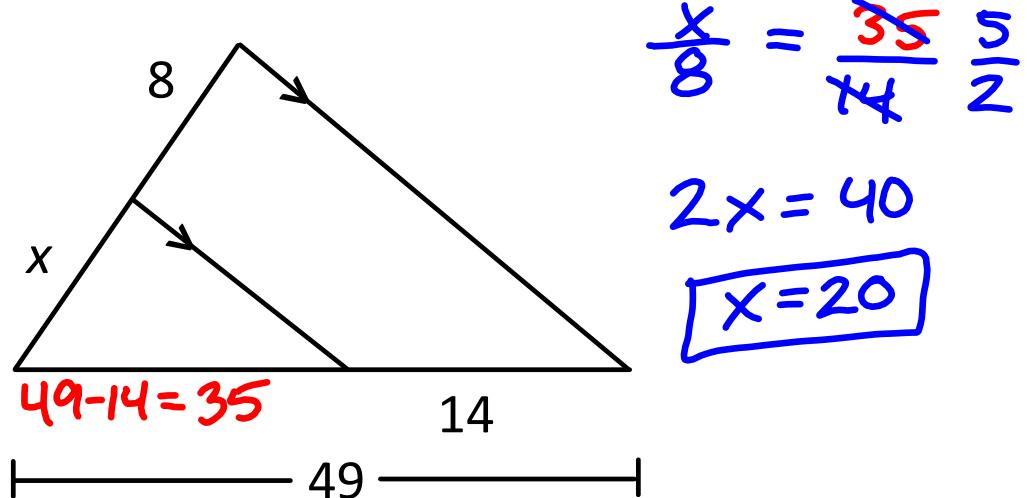
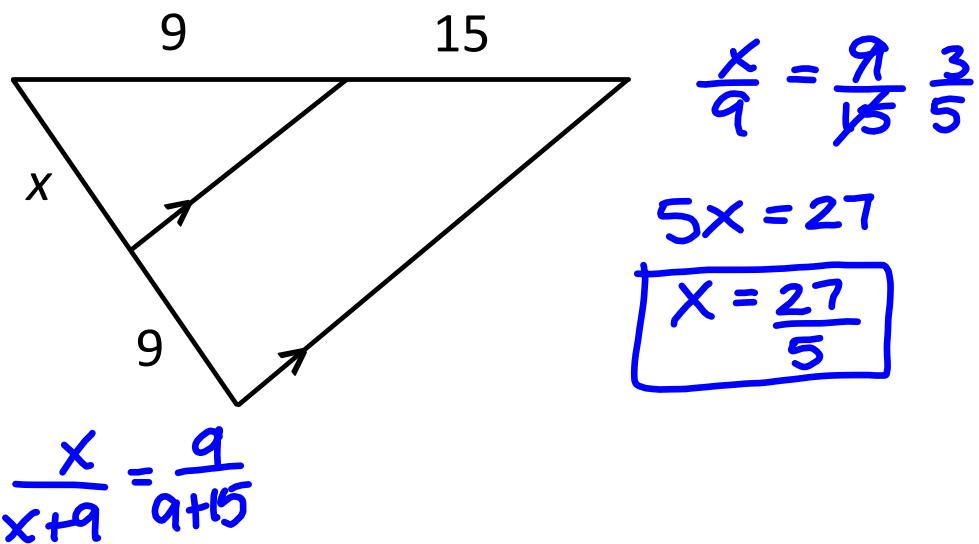
$$\frac{\frac{BD}{BD} + \frac{DA}{BD}}{1} = \frac{\frac{BE}{BE} + \frac{EC}{BE}}{1} \quad \text{Split fractions}$$

$$1 + \frac{DA}{BD} = 1 + \frac{EC}{BE} \quad \text{Simplify}$$

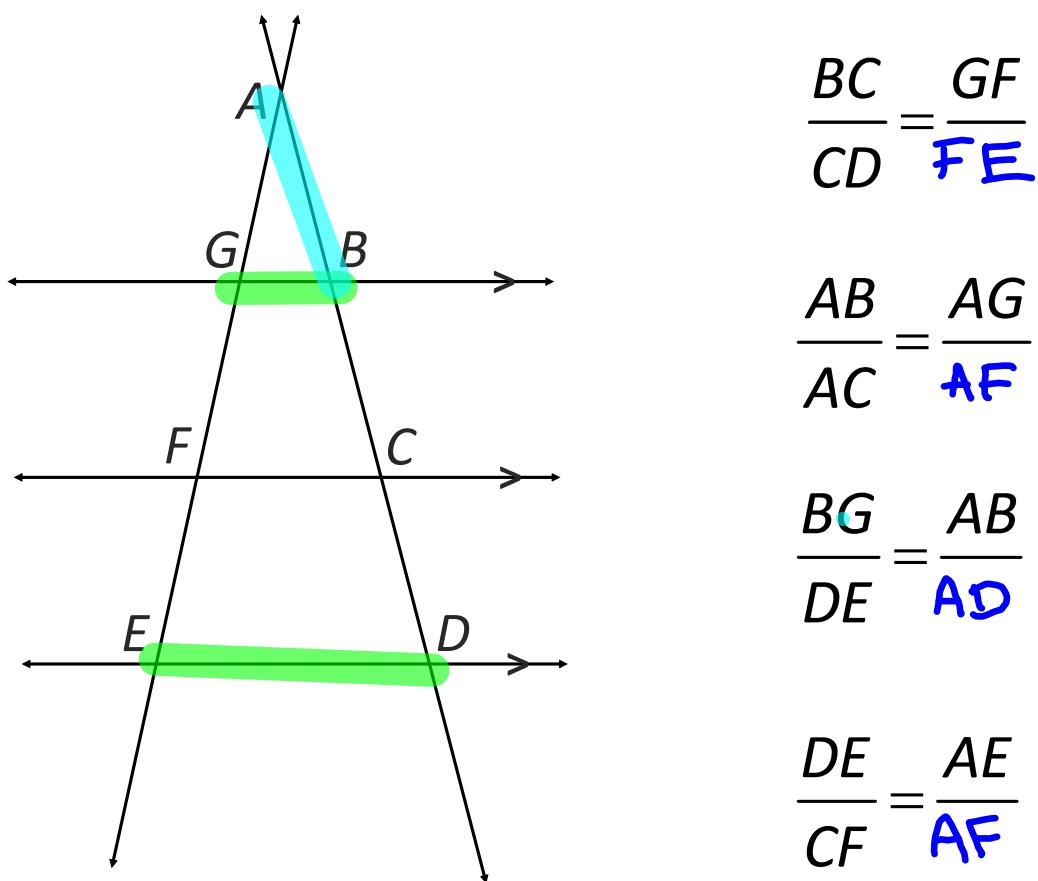
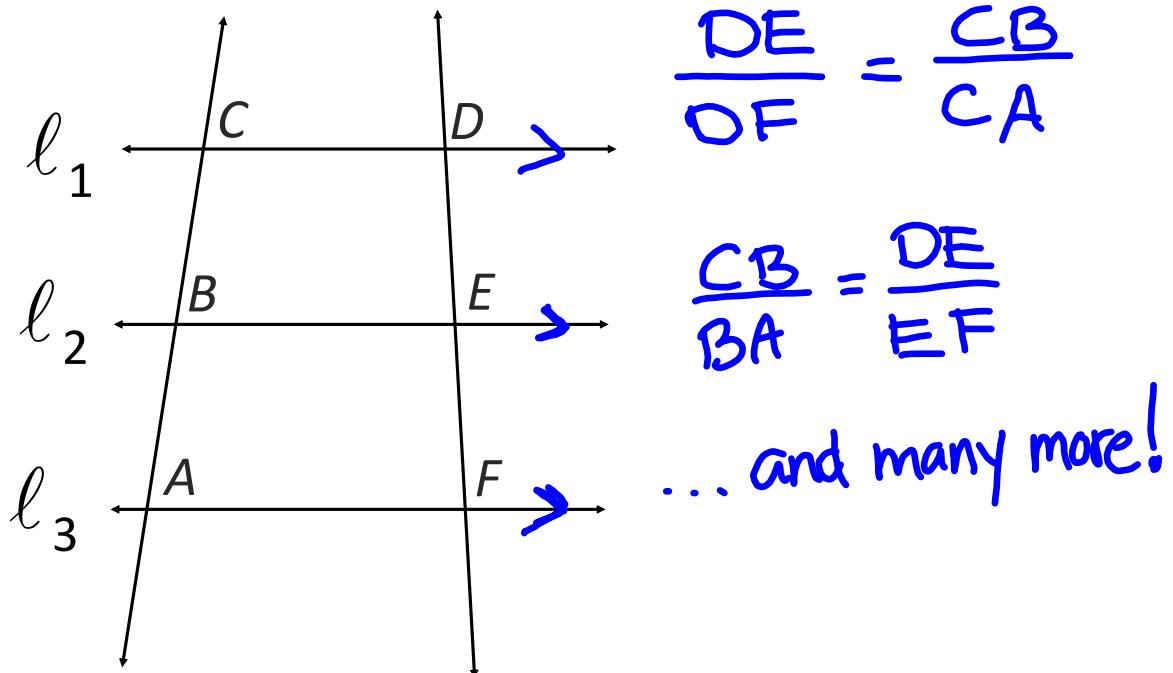
$$-1 \qquad -1 \quad \text{Subtraction Prop. of } =$$

$$\frac{DA}{BD} = \frac{EC}{BE} \quad \text{Reciprocal of both sides.}$$

$$\frac{BD}{DA} = \frac{BE}{EC}$$

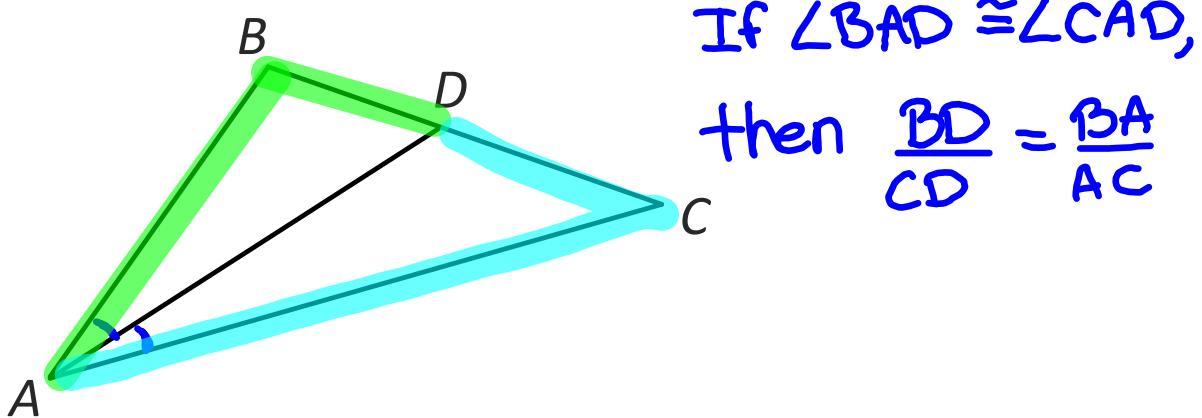


If three or more parallel lines are intersected by two transversals, then they divide the transversals proportionally.



Triangle Angle Bisector Theorem

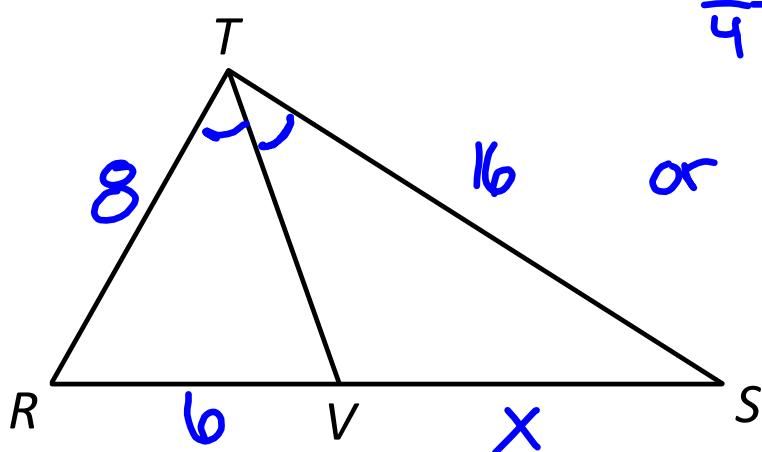
If a ray bisects an angle of a triangle, then it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.



Given: \overline{TV} bisects $\angle RTS$

$$RT = 8, TS = 16, RV = 6$$

Find: VS



$$\frac{3}{4} = \frac{x}{16}$$

$$\frac{4x}{48} = \boxed{x=12}$$

$$\text{or } \frac{6}{x} = \frac{8}{16} \cdot \frac{1}{2}$$

$$\boxed{x=12}$$