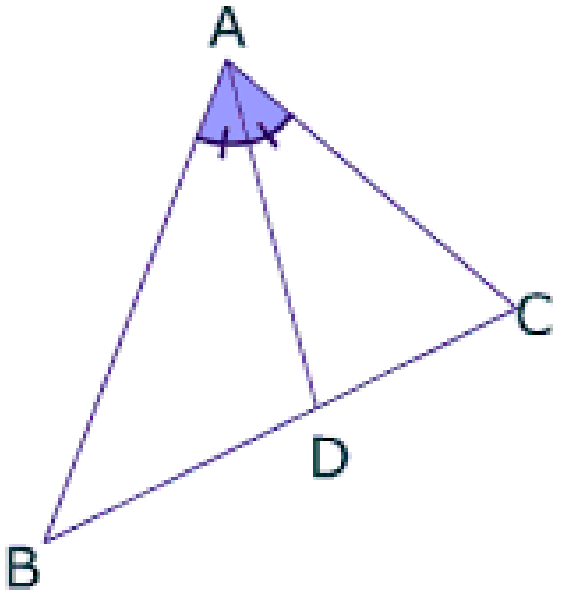
Warm-up



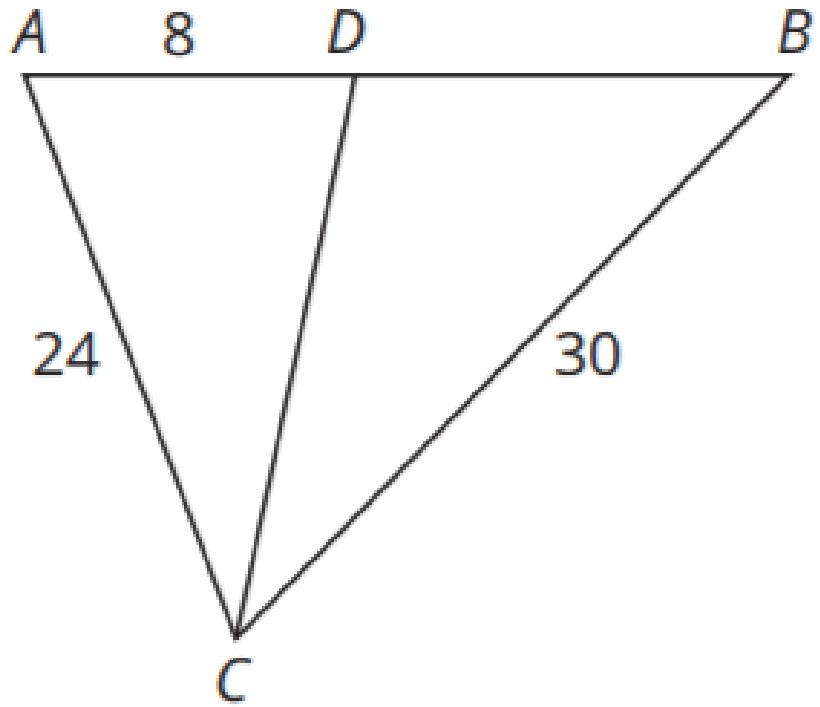
$\overline{CA} = 12$

$\overline{CD} = 6$

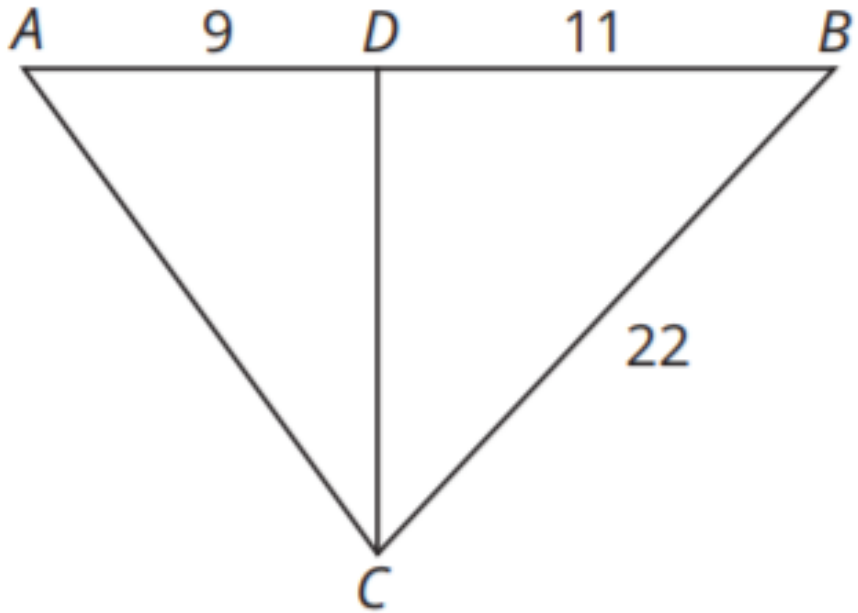
$\overline{BA} = 15$

$\overline{DB} = ?$

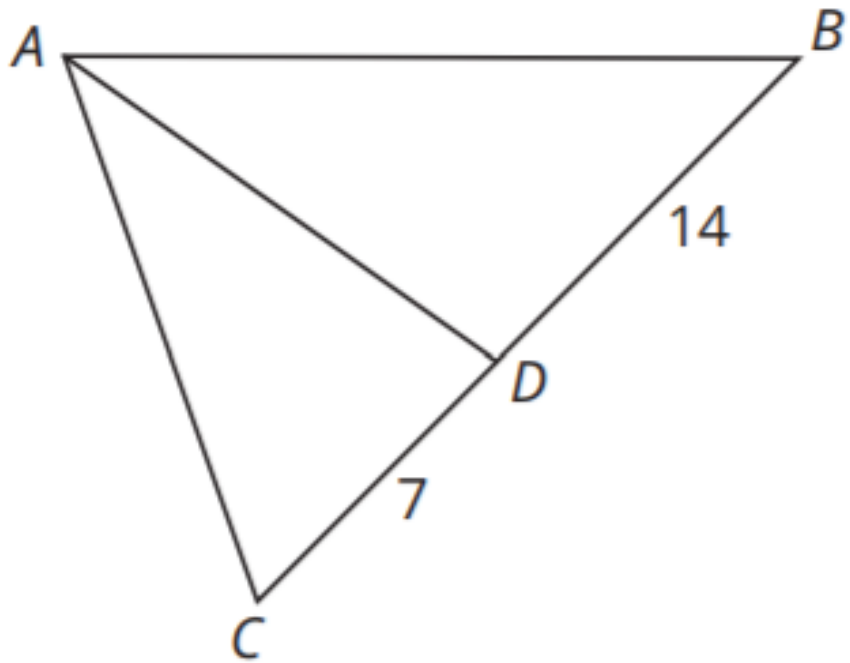
2. $\overline{CD}$ bisects $\angle C$. Solve for DB.



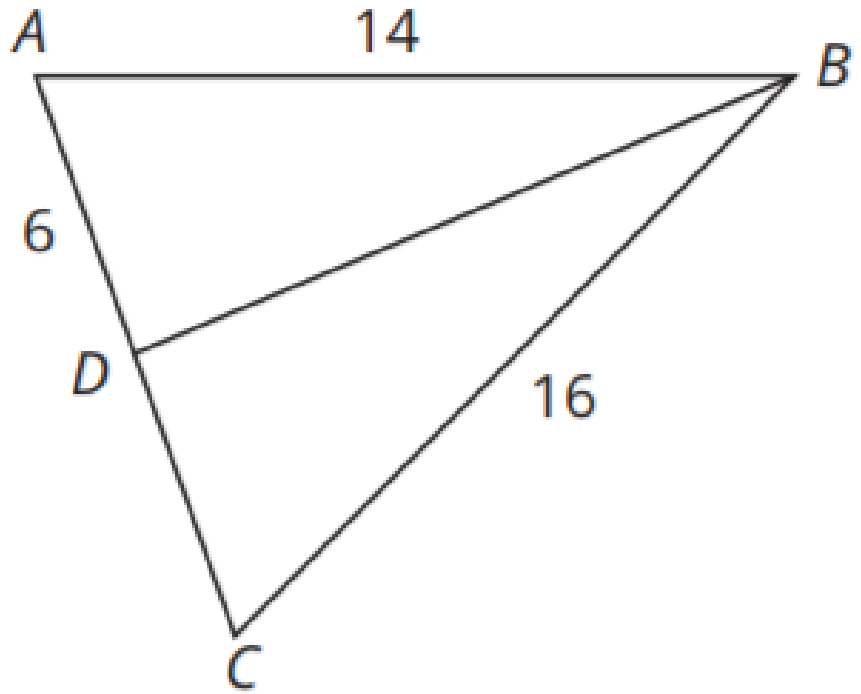
3. $\overline{CD}$ bisects $\angle C$. Solve for CA.



4. $\overline{AD}$ **bisects** $\angle A$. $AC + AB = 36$. **Solve for** AC **and** AB.

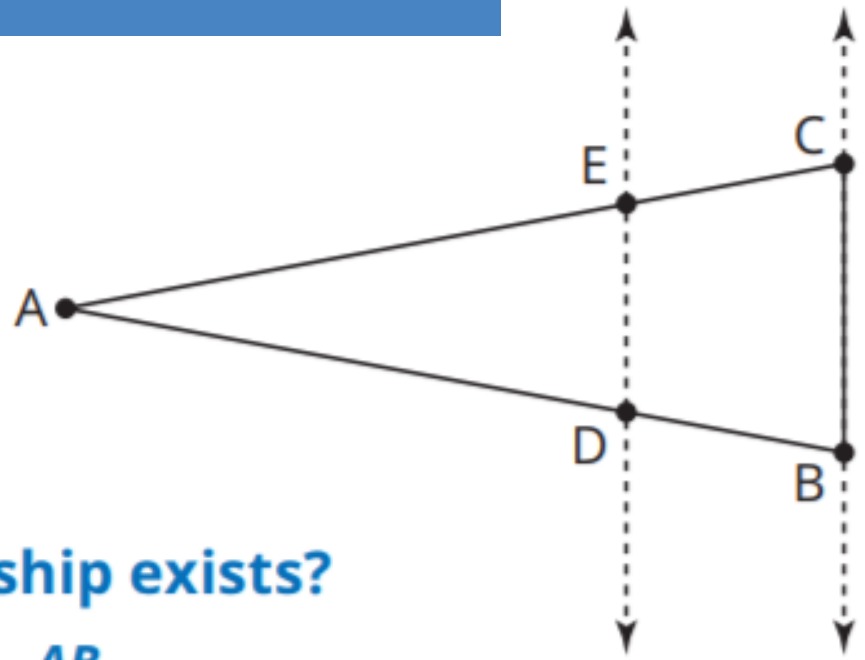


5. $\overline{BD}$ bisects $\angle B$. Solve for AC.



ACTIVITY
3.4
Triangle Proportionality Theorem

Consider the diagram. It shows a dilation of $\overline{DE}$ to $\overline{BC}$, using point A as the center of dilation.



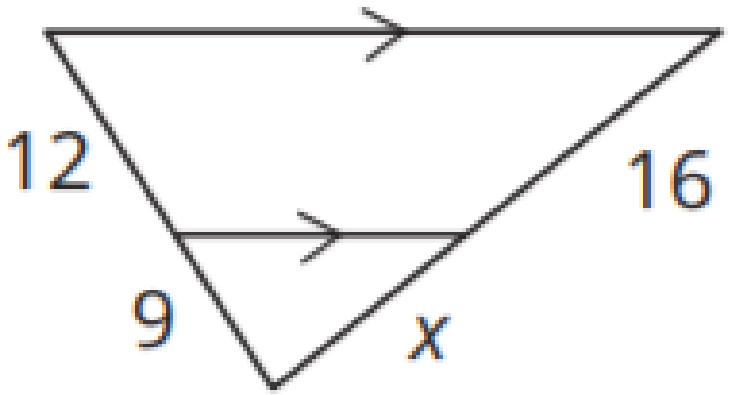
1. How do you know that each relationship exists?

a. $\overline{ED} \parallel \overline{CB}$

b. $\frac{AC}{AE} = \frac{AB}{AD}$

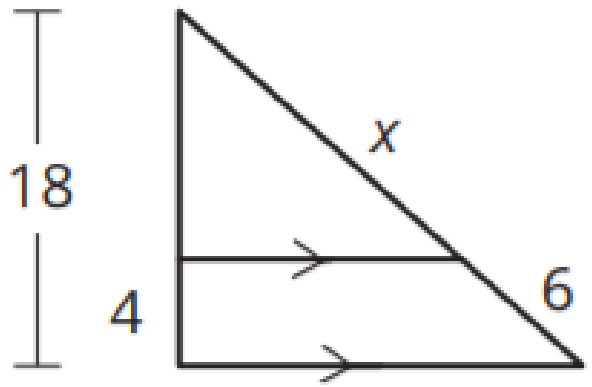
Because the conjecture has been proved to be true, you can now refer to it as a theorem. The **Triangle Proportionality Theorem** states: "If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally."

$$\frac{9}{12} = \frac{x}{16}$$
$$12x = 144$$
$$x = 12$$

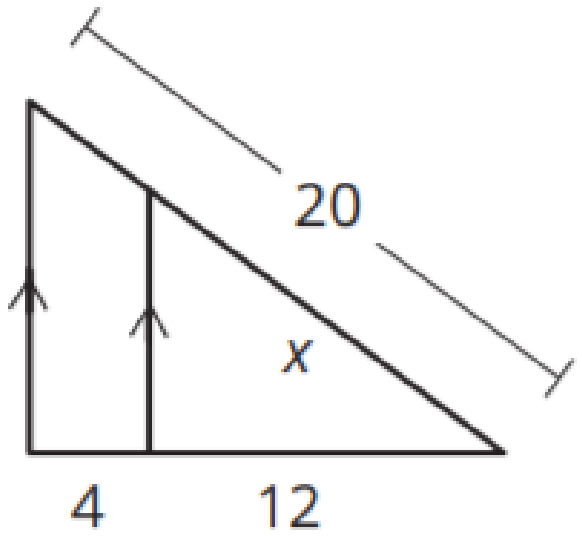


5. Determine each unknown value. Show your work.

a.

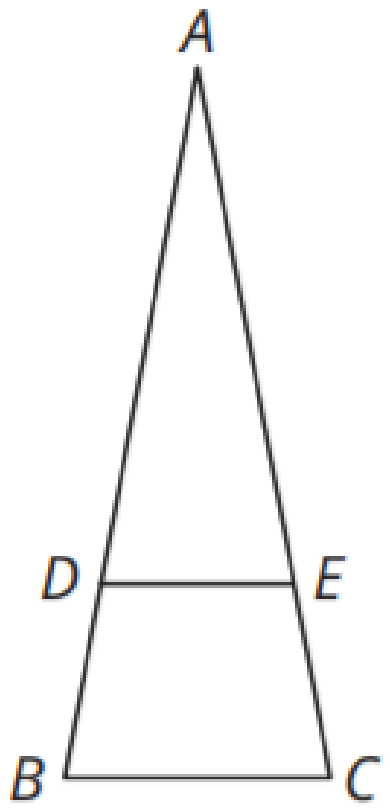


b.



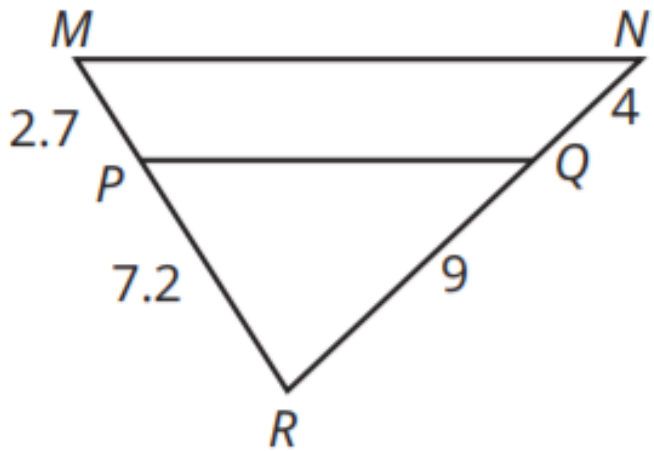
The **Converse of the Triangle Proportionality Theorem** states: "If a line divides two sides of a triangle proportionally, then it is parallel to the third side."

If $\frac{BD}{DA} = \frac{CE}{EA}$, then $\overline{BC} \parallel \overline{DE}$



6. Determine whether $\overline{MN}$ is parallel to $\overline{PQ}$ in each figure. Explain your reasoning.

a.



b.