Know this proof. **ALL STEPS + JUSTIFICATIONS!**

**Given:** \( EF \parallel BC \).

**Prove:** \( \frac{AE}{EB} = \frac{AF}{FC} \)

\[ \angle A \cong \angle A \text{ Reflexive Prop.} \]

\[ \angle AEF \cong \angle ABC \text{ corresponding angles theorem} \]

\[ \triangle AEF \sim \triangle ABC \text{ by AA} \]

\[ \frac{AB}{AC} = \frac{AE}{AF} \quad \text{corresponding parts are proportional} \]

\[ \frac{AE + EB}{AC} = \frac{AF + FC}{AF} \]

\[ \frac{AE}{AC} + \frac{EB}{AC} = \frac{AF}{AF} + \frac{FC}{AF} \]

\[ 1 + \frac{EB}{AC} = 1 + \frac{FC}{AF} \]

\[ \frac{EB}{AC} = \frac{FC}{AF} \]

\[ \frac{AE}{EB} = \frac{AF}{FC} \]

What is the value of \( x \) in these pictures?

1. 

\[ \frac{10}{15} = \frac{12}{RS} \quad x = 18 \]

2. 

\[ \frac{1}{4} = \frac{1}{x} \quad x = 4 \]

Is each set of lines parallel? How do you know?

3. \( \overline{QP} \parallel \overline{MN} \)

4. \( \overline{WX} \parallel \overline{DE} \)

\[ \frac{9}{40} = \frac{12}{80} \checkmark \text{ by the converse of the } \Delta \text{ prop. then } \overline{QP} \parallel \overline{MN} \]

\[ \frac{15}{2.5} = \frac{21}{3.5} \checkmark \text{ by the converse of the } \Delta \text{ prop. then } \overline{WX} \parallel \overline{DE} \]

5. A person who is 6 feet tall casts a shadow of 3.2 feet. A building at the same time of day casts a shadow of 18.5 feet. How tall is the building? Draw a picture.

\[ \frac{6}{3.2} = \frac{x}{18.5} \]

\[ x \approx 347 \text{ ft} \]
Find the point, P, that divides each directed line segment in the ratio provided.

6. A (-1, 4) B (-9, 0); 1 to 3

7. A (7, -3) B (-7, 4); 3 to 4

8. A (-1, 5) B (7, -3); 7 to 1

Write a similarity statement comparing the three triangles in each diagram.

9. \[ \Delta JML \sim \Delta LMK \sim \Delta JLMK \]

10. \[ \Delta EOF \sim \Delta DFG \sim \Delta EOFD \]

11. \[ \Delta XYZ \sim \Delta WYZ \sim \Delta XYZY \]

Write in simplest radical form.

Find \( x \), \( y \), and \( z \). Round to the nearest tenth if necessary.

12. \[ x = \sqrt{35} \]
\[ y = 2\sqrt{15} \]
\[ z = 2\sqrt{21} \]

13. \[ x = 10 \]
\[ y = 10y \]
\[ z = 2y \]

14. \[ x = 2 \]
\[ y = \sqrt{15} \]
\[ z = \sqrt{10} \]