6.2 Use Proportions to Solve Geometry Problems

KEY CONCEPT *For Your Notebook*

Additional Properties of Proportions

2. **Reciprocal Property** If two ratios are equal, then their reciprocals are also equal.

   If $\frac{a}{b} = \frac{c}{d}$, then $\frac{b}{a} = \frac{d}{c}$.

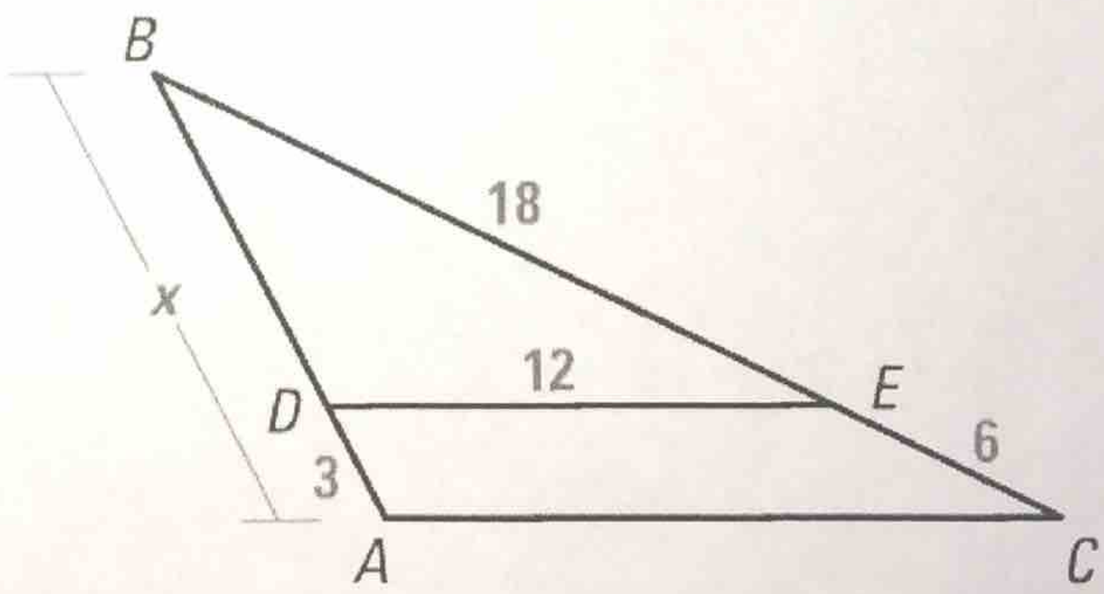
3. If you interchange the means of a proportion, then you form another true proportion.

   If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a}{c} = \frac{b}{d}$.

4. In a proportion, if you add the value of each ratio's denominator to its numerator, then you form another true proportion.

   If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{b} = \frac{c+d}{d}$.

Ex 1: In the diagram, $\frac{BD}{DA} = \frac{BE}{EC}$. Find BA and BD.



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

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

$\frac{x}{3} = \frac{18+6}{6}$

$\frac{x}{3} = \frac{24}{6}$

$6x = 72$

$x = 12$

$BA = 12$

$BD = x - 3$

$= 12 - 3$

$BD = 9$

scale drawing - a drawing that is the same shape as the drawing it represents, with corresponding sides proportional to each other

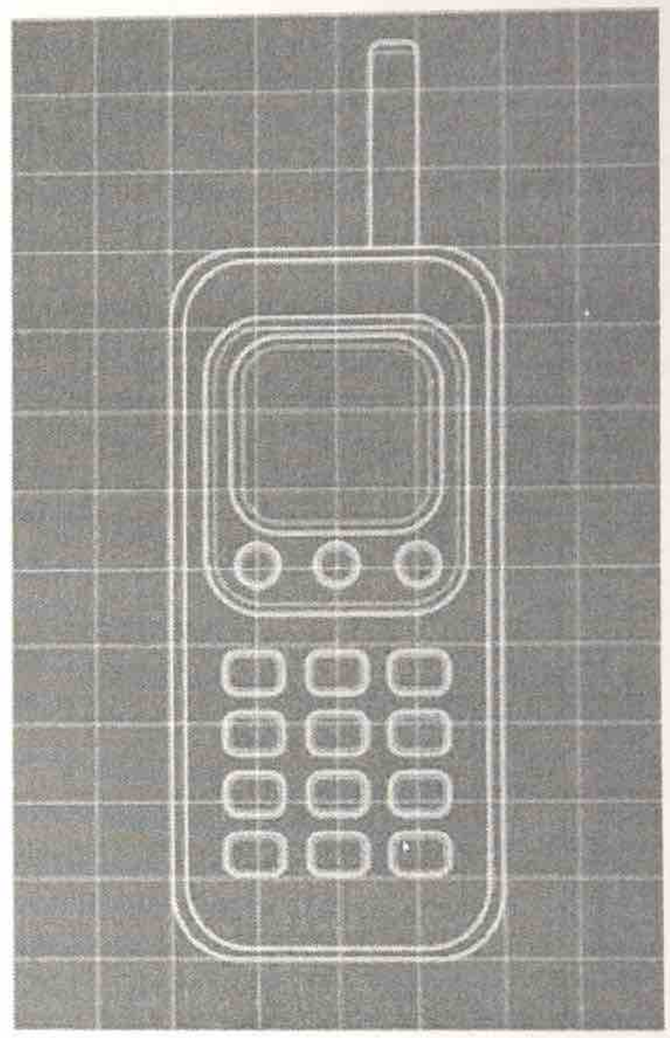
scale - a ratio that describes how the dimensions in the drawing are related to the actual dimensions of the object

Ex 2: The blueprint shows a scale drawing of a cell phone. The length of the antenna on the blueprint is 5 centimeters. The actual length of the antenna is 2 centimeters. What is the scale of the blueprint?

$$\frac{\text{length on blueprint}}{\text{length of antenna}} = \frac{5\text{ cm}}{2\text{ cm}}$$

$$= \frac{5 \div 2}{2 \div 2}$$

$$= \frac{2.5}{1}$$



Scale: 2.5 cm : 1 cm