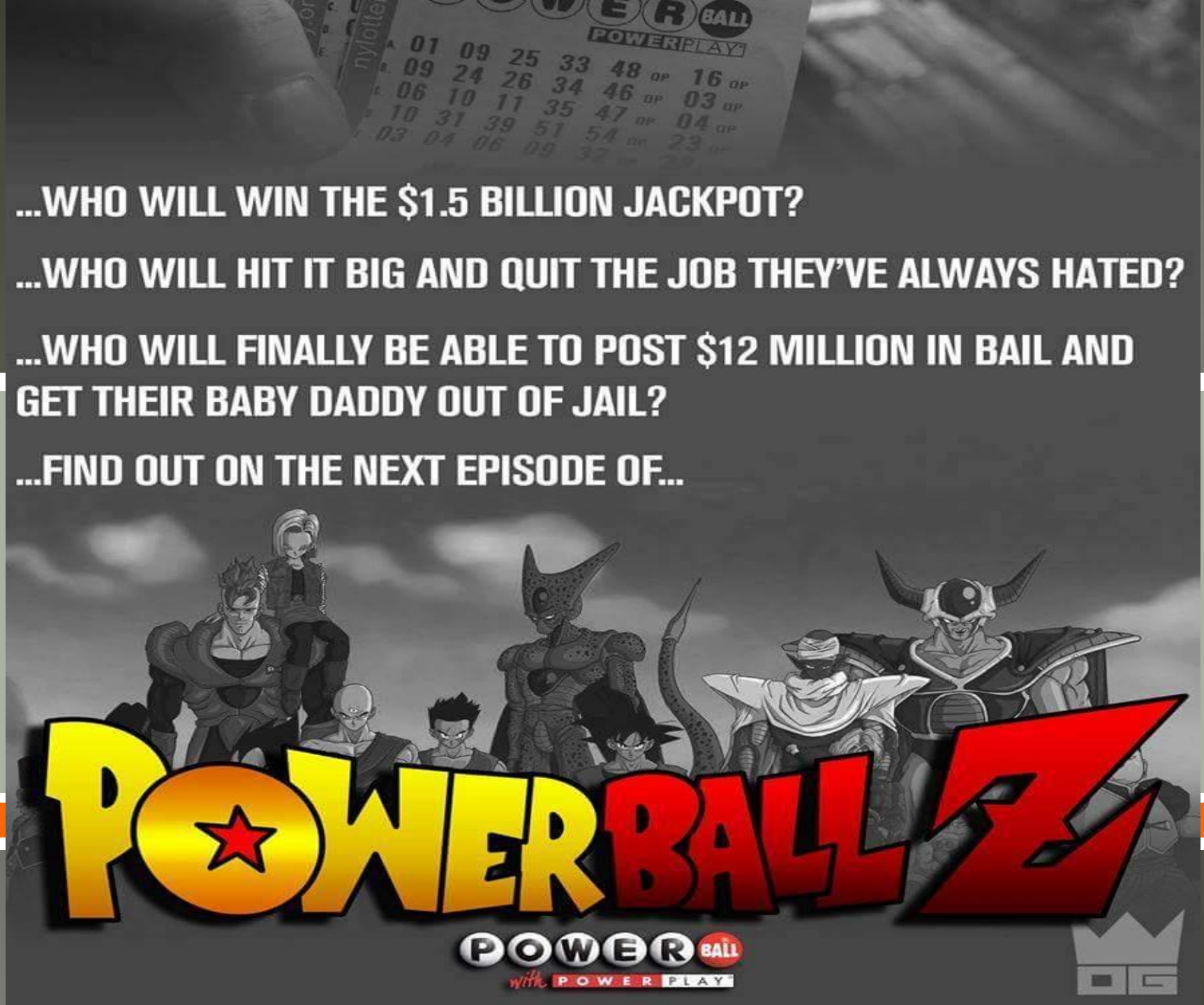
Geometry Unit 7

7-6: Proportional Lengths


...WHO WILL WIN THE $1.5 BILLION JACKPOT?
...WHO WILL HIT IT BIG AND QUIT THE JOB THEY'VE ALWAYS HATED?
...WHO WILL FINALLY BE ABLE TO POST $12 MILLION IN BAIL AND GET THEIR BABY DADDY OUT OF JAIL?
...FIND OUT ON THE NEXT EPISODE OF...
POWERBALL Z
POWERBALL with POWERPLAY

Warm-ups

- Fill in the blanks.

1.) In similar figures, we say that the corresponding angles are

Congruent

2.) In similar figures, we say that the corresponding sides are

Proportional

3.) A line that intersects two or more lines in different points is known as a **Transversal**

Proportional Lengths

- Content Objectives: Students will be able to find missing side lengths by using proportions in triangles and parallel lines.

- Language Objectives: Students will be able to write and solve various proportions from given triangles and parallel lines.

Proportional Lengths

- Points L and M lie on $\overline{AB}$ and $\overline{CD}$, respectively.

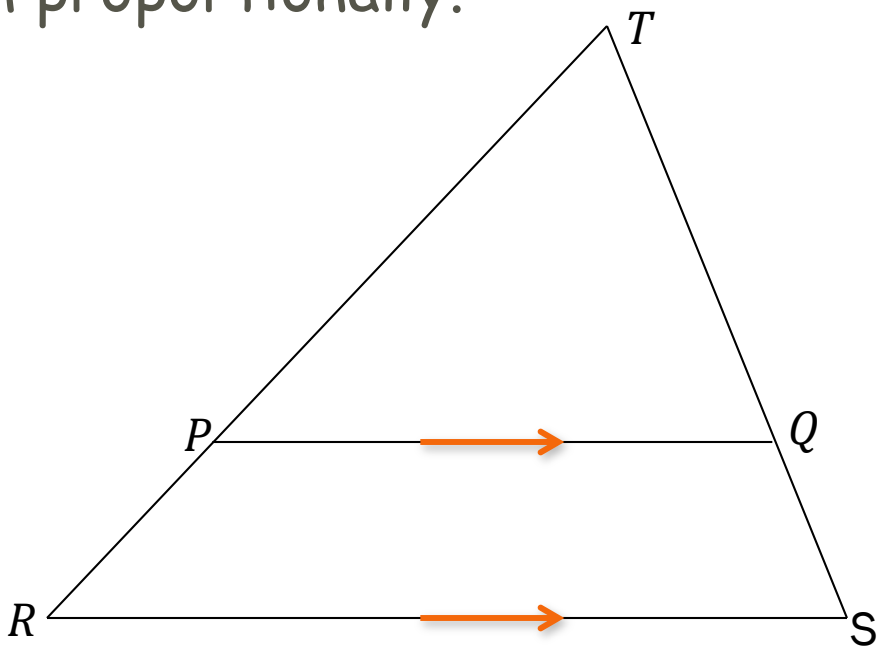
- If $\frac{AL}{LB} = \frac{CM}{MD}$, then we say that $\overline{AB}$ and $\overline{CD}$ are **divided proportionally.**

Proportional Lengths

- **Theorem 7-3 Triangle Proportionality Theorem**: If a line parallel to one side of a triangle intersects the other two sides, then it divides them proportionally.

Given: ΔRST; $\overleftrightarrow{PQ} \,//\, \overleftrightarrow{RS}$

Prove: $\frac{RP}{PT} = \frac{SQ}{QT}$



Proportional Lengths

- Use the triangle proportionality theorem to find proportions that are equivalent to $\frac{RP}{PT} = \frac{SQ}{QT}$

$\frac{b}{a} = \frac{d}{c}$

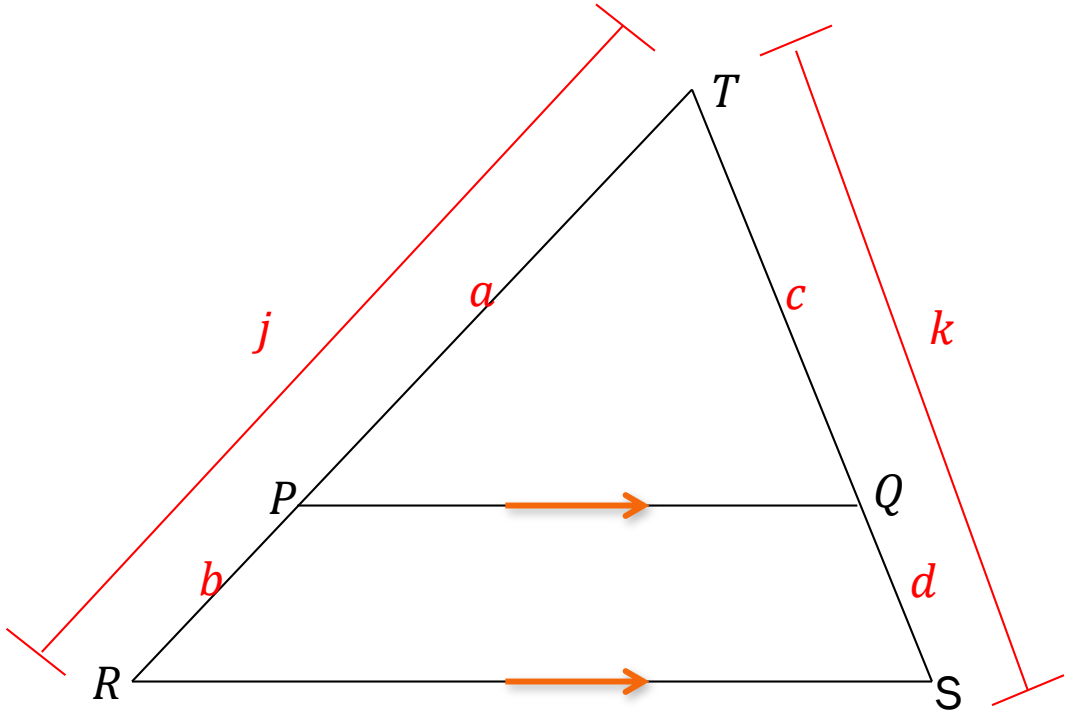
$\frac{a}{b} = \frac{c}{d}$

$\frac{a}{c} = \frac{b}{d}$

$\frac{a}{j} = \frac{c}{k}$

$\frac{b}{j} = \frac{d}{k}$

$\frac{b}{d} = \frac{j}{k}$

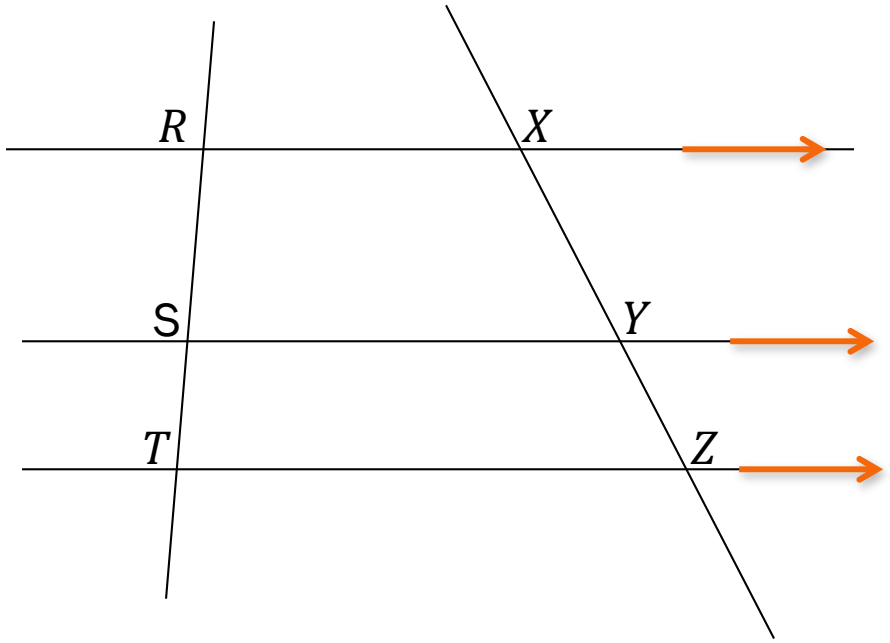


Proportional Lengths

- **Corollary**: If three parallel lines intersect two transversals, then they divide the transversals proportionally.

Given: $\overleftrightarrow{RX} \parallel \overleftrightarrow{SY} \parallel \overleftrightarrow{TZ}$

Prove: $\frac{RS}{ST} = \frac{XY}{YZ}$

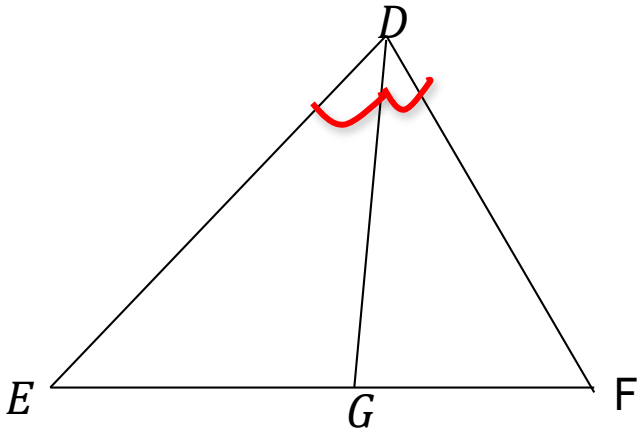


Proportional Lengths

- **Theorem 7-4 Triangle Angle-Bisector Theorem**: If a ray bisects an angle of a triangle, then it divides the opposite side into segments proportional to the other two sides.

Given: ΔDEF; $\overrightarrow{DG}$ bisects $< FDE$

Prove: $\frac{GF}{GE} = \frac{DF}{DE}$



Proportional Lengths Examples

- Make a proportion and solve for the value of x

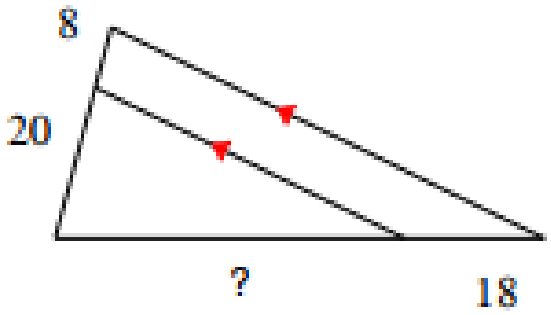
Solution:

$$\frac{?}{18} = \frac{20}{8}$$

$$\frac{?}{18} = \frac{5}{2}$$

$$2? = 90$$

$$? = 45$$



Proportional Lengths Examples

- Make a proportion and solve for the value of x

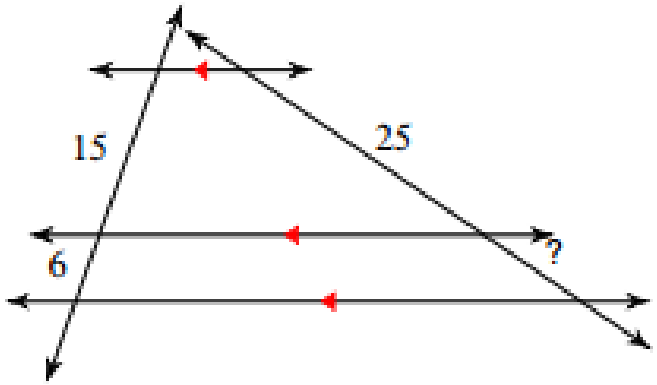
Solution:

$$\frac{?}{25} = \frac{6}{15}$$

$$\frac{?}{25} = \frac{2}{5}$$

$$5? = 50$$

$$? = 10$$



Proportional Lengths Examples

- Make a proportion and solve for the value of x

Solution:

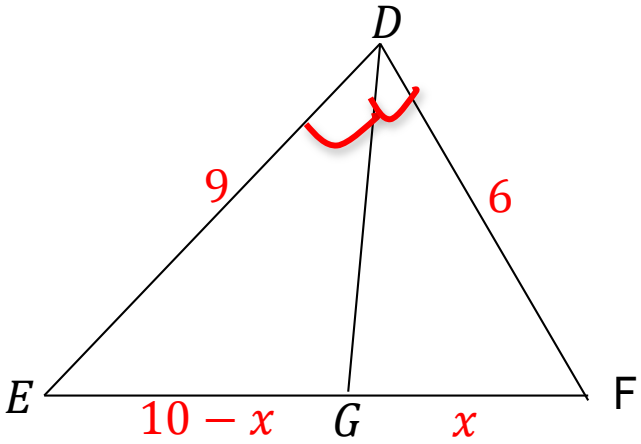
$$\frac{x}{10-x} = \frac{6}{9}$$

$$\frac{x}{10-x} = \frac{2}{3}$$

$$3x = 20 - 2x$$

$$5x = 20$$

$$x = 4$$



Proportional Lengths Examples

- Make a proportion and solve for the value of x

Solution:

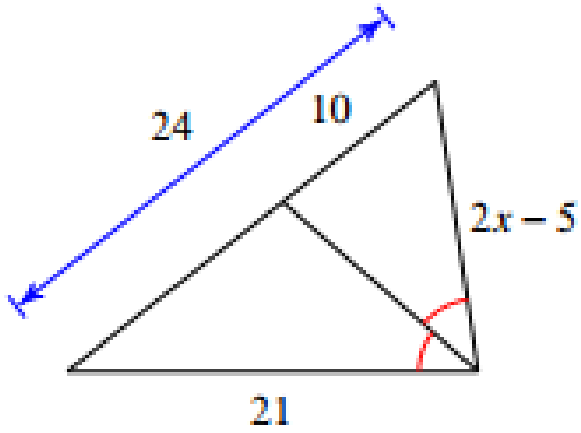
$$\frac{2x-5}{21}=\frac{10}{14}$$

$$\frac{2x-5}{21}=\frac{5}{7}$$

$$14x-35=105$$

$$14x=140$$

$$x=10$$



Proportional Lengths Examples

- Make a proportion and solve for the value of x

Solution:

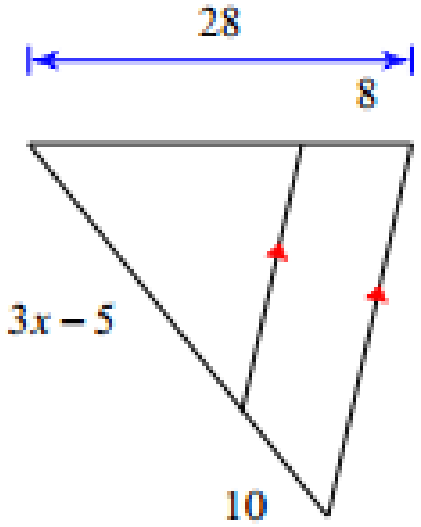
$$\frac{3x-5}{10}=\frac{20}{8}$$

$$\frac{3x-5}{10}=\frac{5}{2}$$

$$6x-10=50$$

$$6x=60$$

$$x=10$$



Proportional Lengths Examples

- Make a proportion and solve for the value of x

$$\frac{7+14x}{22}=\frac{35}{10}$$

$$\frac{7+14x}{22}=\frac{7}{2}$$

$$14+28x=154$$

$$28x=140$$

$$x=5$$