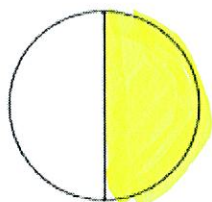


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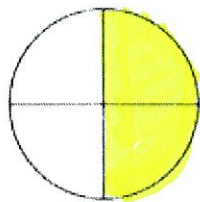
Solving Proportions

A **proportion** is an equality stating that two ratios are equal.
We can write ratios as fractions.

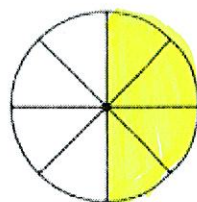
Revisiting Fractions: Shade half of each circle. Then write the fraction represented by each picture,



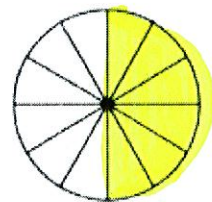
$$\frac{1}{2}$$



$$\frac{2}{4}$$



$$\frac{4}{8}$$



$$\frac{6}{12}$$

Now reduce each fraction. What do you notice?

We call two or more fractions proportional if they all simplify to the same fraction.

Determine if the following fractions are proportional.

1. $\frac{2}{3}$ and $\frac{8}{12}$ $2 \cdot 12 = 3 \cdot 8$
 $24 = 24 \checkmark$ **yes**

3. $\frac{12}{24}$ and $\frac{3}{4}$ $\frac{1}{2} \neq \frac{3}{4}$ **no**

2. $\frac{3}{2}$ and $\frac{18}{8}$ $\frac{3}{2} \neq \frac{9}{4}$ **no**

4. $\frac{4}{3}$, $\frac{16}{12}$, and $\frac{8}{6}$ $\frac{4}{3} = \frac{4}{3} = \frac{4}{3}$ **yes**

Solving Proportions

If part of the proportion is unknown, we can cross - multiply to solve for the missing piece.

1. $\frac{10}{x} = \frac{8}{4}$

$$8 \cdot x = 10 \cdot 4$$

$$\frac{8x}{8} = \frac{40}{8}$$

$$x = 5$$

2. $\frac{4}{9} = \frac{2}{x}$

$$4 \cdot x = 18$$

$$4x = 18$$

$$x = 4.5$$

3. $\frac{6}{x+3} = \frac{3}{8}$

$$3 \cdot (x+3) = 6 \cdot 8$$

$$3x + 9 = 48$$

$$3x = 39$$

$$x = 13$$

4. $\frac{x+4}{2} = \frac{x+2}{4}$

$$4 \cdot (x+4) = 2 \cdot (x+2)$$

$$4x + 16 = 2x + 4$$

$$2x = -12$$

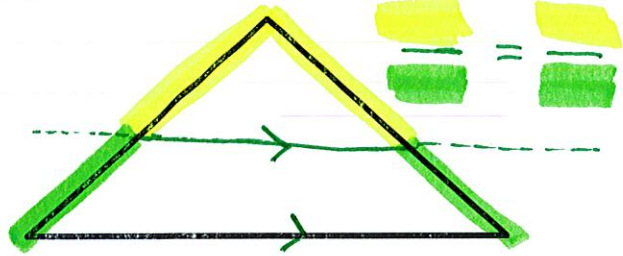
$$x = -6$$

Name: _____ Date: _____

Triangle Proportionality

SIDE SPLITTER THEOREM

If a line parallel to one side of a triangle intersects the other two sides of the triangle, then the line divides these two sides proportionally.



Solve for x:

1. $45 \cdot 16 = 36 \cdot x$
 $\frac{720}{36} = \frac{36x}{36}$
 $x = 20$

$\frac{45}{x} = \frac{36}{16}$

2. $\frac{x}{104} = \frac{30}{65}$
 $65 \cdot x = 104 \cdot 30$
 $65x = 3,120$
 $x = 48$

3. $\frac{x}{48} = \frac{40}{30}$
 $30 \cdot x = 40 \cdot 48$
 $30x = 1,920$
 $x = 64$

4. $\frac{x}{28} = \frac{55}{20}$
 $20 \cdot x = 28 \cdot 55$
 $20x = 1,540$
 $x = 77$

5. $\frac{x+6}{24} = \frac{8}{12}$
 $12x = 120$
 $x = 10$
 $12 \cdot (x+6) = 24 \cdot 8$
 $12x + 72 = 192$
 $12x = 120$
 $x = 10$

6. $\frac{9+2x}{117} = \frac{24}{72}$
 $648 + 144x = 2808$
 $144x = 2160$
 $x = 15$

7. $\frac{36}{9x-27} = \frac{16}{48}$
 $1728 = 144x - 432$
 $x = 15$

8. $\frac{130}{34x+4} = \frac{70}{112}$
 $14560 = 2380x + 280$
 $x = 6$