Name_____

Unit 10 Day 1

Proportions

cross product
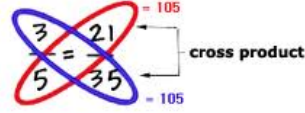
I can ~~Set up & solve~~
~~Proportion problems~~

Ratios

If a and b are two numbers and $b \neq 0$, then the ratio of a to b is $\dfrac{a}{b}$,
the ratio of a to b can also be written as a:b.

How many boys in class today?___11_____

How many girls in class today?___13_____

Ratio of boys to girls in our class   11 : 13 $\dfrac{11}{13}$

Ratio of girls to boys in our class

13 : 11   13/11

Odds
Ratio
don't use totals

<u>Proportion</u>: An equation that states that two ratios are equal.

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

In a proportion the cross products are equal.

If $\frac{a}{b} = \frac{c}{d}$ then, <u>ad</u> = <u>bc</u>.

$$\frac{2}{3} = \frac{4}{6}$$ $3 \cdot 4 = 12$

$2 \cdot 6 = 12$

Solve:

When x is isolated, you may use the cross multiply and divide method.

$$\frac{2}{x} = \frac{6}{9}$$ $\frac{6x}{6} = \frac{18}{6}$

$x = 3$

When x is not isolated, you must cross multiply to set up an equation. Then solve.

$$\frac{1}{x-3} = \frac{4}{3x}$$ $$\frac{y-3}{7} = \frac{y+1}{11}$$

$4(x-3) = 3x$ $7(y+1) = 11(y-3)$

$4x - 12 = 3x$ $7y + 7 = 11y - 33$
$-4x \qquad -4x$ $-7y + 33 \quad -7y - 33$

$-12 = -1x$ $\frac{40}{4} = \frac{4y}{4}$

$12 = x$ $10 = y$

<u>Properties of Proportions:</u>

*2 ratios are equal

If $\dfrac{a}{b} = \dfrac{c}{d}$ then $\dfrac{b}{a} = \dfrac{d}{c}$ *then reciprocals are equal

Switcher= OOO
opposite
flip

If $\dfrac{a}{b} = \dfrac{c}{d}$ then $\dfrac{a}{c} = \dfrac{b}{d}$

$\dfrac{1}{2} = \dfrac{4}{8}$ then $\dfrac{1}{4} = \dfrac{2}{8}$

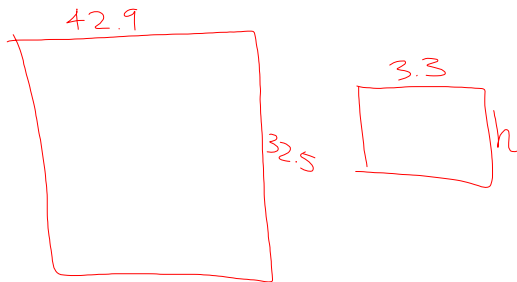*You can interchange the means (diagonal) then you form another true proportion

If $\dfrac{a}{b} = \dfrac{c}{d}$ then $\dfrac{a+b}{b} = \dfrac{c+d}{d}$

*If you add the value of each ratios denominator to its numerator, you form another true proportion.

Set up the proportion and solve.

Mary reduced the size of a painting to a width of 3.3 in. What is the new height if it was originally 32.5 in tall and 42.9 in wide?

42.9

32.5

3.3

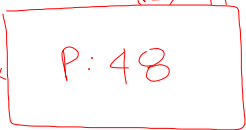h

$\dfrac{42.9}{32.5} = \dfrac{3.3}{h}$

$32.5(3.3) = 42.9h$

$107.25 = 42.9h$

$2.5 = h$

3

The perimeter of a room is 48 feet and the ratio of its length to width is 7:5.
$$\overset{7}{} \qquad \overset{5}{}$$

Find the length and width of the room.

$7(2)=14$

$5(2)$ $\boxed{\text{P: 48}}$ $5x$

10

$7x$

$7x+7x+5x+5x=48$

$$\frac{24x}{24}=\frac{48}{24}$$

$\boxed{x=2}$

The ratio of the measures of the angles in a $\triangle$ are 1:2:3.

Find the measures of the angles. $=180$

$$1x + 2x + 3x = 180$$

$$6x = 180$$

$$\boxed{x=30}$$

$1(30)=30$

$2(30)=60$

$3(30)=90$

$$\boxed{30:60:90}$$

The ratio of the measures of the sides of a triangle is $\boxed{3:5:7}$ and its perimeter is 450 cm. Find the measure of each side of the triangle.

$$3x + 5x + 7x = 450$$

$3(30)=90$ $15x = 450$

$5(30)=150$

$7(30)=210$ $x=30$

$\boxed{90:150:210}$

The ratio of the measures of the angles in a triangle is 4:5:6.

Find the measure of the angles in the triangle. $=180$

$$4x + 5x + 6x = 180$$

$$\frac{15x}{15} = \frac{180}{15}$$

$\boxed{x=12}$

$4(12)=48$

$5(12)=60$

$6(12)=72$

$$\boxed{48:60:72}$$