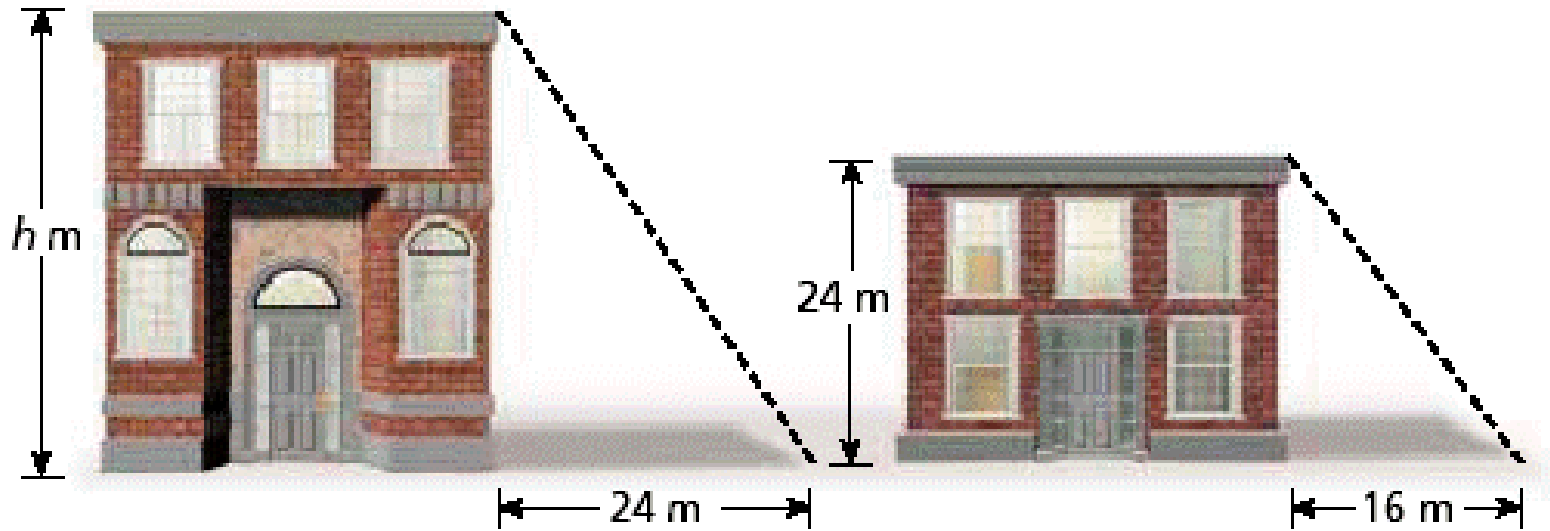# Ratio and proportion(2/3)

CLASS VI

CHAPTER 12

These two buildings are similar. We can find the height of the large building if we understand proportion. So lets understand proportion.

Proportion

- If two ratios are equal ,we say that they are in proportion and use the symbol :: or = to equate the two ratios.

- Eg:Anand bought 3 pens for 15 rupees and Aman bought 10 pens for 50 rupees. Whose pens are more expensive?

  Ratio of pens purchased by Anand and Aman is 3:10

  Ratio of their cost is 15: 50= 3:10.

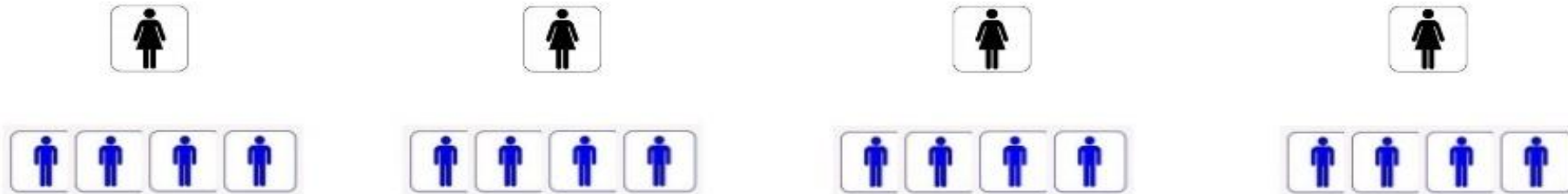**Since the ratios are equal the pens were purchased at the same price.**

PROPORTIONS

Proportions are two ratios of equal value.

$$\frac{1 \text{ girl}}{4 \text{ boys}} \qquad \frac{4 \text{ girls}}{16 \text{ boys}}$$

Are these ratios saying the same thing?

DETERMINING TRUE PROPORTIONS:

To determine a proportion true, cross multiply.

If the cross products are equal, then it is a true proportion.

$$\frac{4}{5} \quad\not\!\!\times\quad \frac{20}{25}$$

$$20 \times 5 \;=\; 4 \times 25$$

$$100 \;=\; 100 \;\checkmark$$

The cross products were equal, therefore $\frac{4}{5}$ And $\frac{20}{25}$ makes a true proportion.

SOLVING THE PROPORTION:

When solving proportions, follow these rules:

1. **Cross multiply.**

2. **Divide BOTH sides by the number connected to the variable.**

3. **Check the answer to see if it makes a true proportion.**

Problem:

$$\frac{52}{4} \bowtie \frac{n}{7}$$

Which number is connected to the variable?

Since the 4 is connected to the variable, DIVIDE both sides by the 4.

$$4 \times n = 52 \times 7$$

$$\frac{4n}{4} = \frac{364}{4}$$

$$n = 91 \text{ miles}$$

$4 \div 4 = 1$; therefore you are left with "n" on one side.

$364 \div 4 = 91$

Guided Practice:

Directions: Solve to see if each problem is a true proportion.

1. $\dfrac{3}{5} = \dfrac{15}{25}$

2. $\dfrac{6}{8} = \dfrac{57}{76}$

3. $\dfrac{7}{12} = \dfrac{37}{60}$

15 x 5 = 3 x 25

75 = 75

true

57 x 8 = 6 x 76

456 = 456

true

7 x 60 = 37 x 12

420 ≠ 444

false

Note-

▶ Four quantities are said to be in proportion, if the ratio of the first and the second quantities is equal to the ratio of the third and the fourth quantities.

▶ Thus, 6, 120, 30, 600 are in proportion,

since $\dfrac{6}{120} = \dfrac{30}{600}$.

We indicate the proportion by 6 : 120 :: 30 :600, it is read as 6 is to 120 as 30 is to 600.

▶ In the above proportion, 6 and 600 are the extreme terms and 120 and 30 are the middle terms.

▶ The order of terms in the proportion is important. 3, 10, 15 and 50 are in proportion, but 3, 10, 50 and 15 are not.

Alternative method to solve proportion

Example : Do the ratios 15 cm to 2 m and 10 sec to 3 minutes form a proportion?

 Solution: **Step1.**(convert in same units)

 Ratio of 15 cm to 2 m = 15 : 2 × 100 (1 m = 100 cm) = 15 : 200

Also, **Ratio** of 10 sec to 3 min = 10 : 3 × 60 (1 min = 60 sec) = 10 : 180

Step2. Check 15,200,10, 180 are in proportion.

Product of middle terms = 200×10= 2000

Product of extreme terms= 180 × 15 =2700

Since product of middle terms ≠ extreme terms ,hence not in proportion.

Example:-

Q. Are 30, 40, 45 and 60 in proportion?

Solution : Ratio of 30 to 40 = 30:40 = 3:4.

Ratio of 45 to 60 = 45:60 = 3:4.

Since, 30:40 = 45:60.

Therefore, 30, 40, 45, 60 are in proportion.

$30 \times 60 = 40 \times 45$ (product of middle terms= product of extreme terms)

Guided Practice:

Directions: Solve to see if each problem is a true proportion.

1. $\dfrac{3}{5} = \dfrac{15}{25}$

2. $\dfrac{6}{8} = \dfrac{57}{76}$

3. $\dfrac{7}{12} = \dfrac{37}{60}$

Thank you!!!