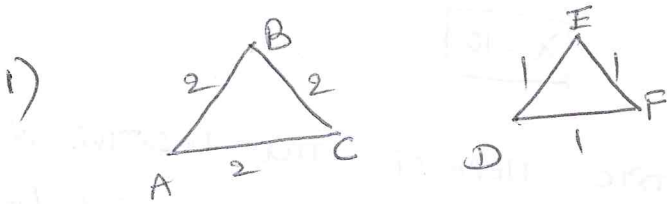


6.1 Ratios, Proportions and Geometric mean



THE RATIO OF THE SIDE LENGTH IN  $\triangle ABC$  TO A SIDE LENGTH IN  $\triangle DEF$  CAN BE WRITTEN  $\frac{2}{1}$  OR  $2:1$ .

2)

EX: ① SIMPLIFY:  $64M:6M$

$$\frac{64}{6} = \frac{32}{3} = 32:3$$

②  $\frac{5FT}{20IN} = \frac{60IN}{20IN} = \frac{3}{1}$  OR  $3:1$

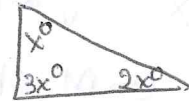
3) THE MEASURES OF ANGLES OF A TRIANGLE ARE IN THE RATIOS  $1:2:3$ . FIND THE MEASURE OF THE ANGLES:

$$x^\circ + 2x^\circ + 3x^\circ = 180^\circ$$

$$6x^\circ = 180^\circ$$

$$x^\circ = 30 \text{ OR } \boxed{x = 30^\circ}$$

SO, THE ANGLES ARE;  $30^\circ, 2(30^\circ), 3(30^\circ) = 30^\circ, 60^\circ, 90^\circ$



④ PROPORTIONS:  $\frac{a}{b} = \frac{c}{d}$

EXTREME  $\rightarrow a$        $\rightarrow c$  Mean  
 Mean  $\leftarrow b$        $d \rightarrow$  EXTREME

b, c are called the Means, AND, a, d are called

EXTREMES:-

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

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

$$12 = 12$$

⑤ CROSS PRODUCT PROPERTY:

IF  $\frac{a}{b} = \frac{c}{d}$   $b \neq 0; d \neq 0$ ; Then  $\boxed{ad = bc}$

EX:  $\frac{5}{10} \Rightarrow \frac{x}{16}$

$10x = 16 \cdot 5$

$\frac{10x}{10} = \frac{80}{10}$

$\boxed{x = 10}$

⑥ GEOMETRIC MEAN:- GEOMETRIC MEAN OF TWO POSITIVE NUMBERS  $a$  AND  $b$  IS THE POSITIVE NUMBER 'X' THAT SATISFIES

$\frac{a}{x} = \frac{x}{b}$  SO,  $x^2 = ab$ ; AND  $x = \sqrt{ab}$

EX: FIND THE GEOMETRIC MEAN OF 24 AND 48

Solution:-  $x = \sqrt{ab}$ ;  $x = \sqrt{24 \cdot 48}$

$x = \sqrt{24 \cdot 24 \cdot 2} = 24\sqrt{2}$

$\therefore$  THE G.M. OF 24 AND 48 IS  $24\sqrt{2}$

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6.2. ADDITIONAL PROPERTIES OF

PROPORTIONS:-

1) IF  $\frac{a}{b} = \frac{c}{d}$  then  $\frac{b}{a} = \frac{d}{c}$

2) IF  $\frac{a}{b} = \frac{c}{d}$  then  $\frac{a}{c} = \frac{b}{d}$

③ IF  $\frac{a}{b} = \frac{c}{d}$ ; then  $\frac{a+b}{b} = \frac{c+d}{d}$

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Name \_\_\_\_\_

Date \_\_\_\_\_

LESSON  
6.1

## Practice

For use with pages 356-363

Simplify the ratio.

1. \$12:\$16

2.  $\frac{32 \text{ in.}^2}{8 \text{ in.}^2}$

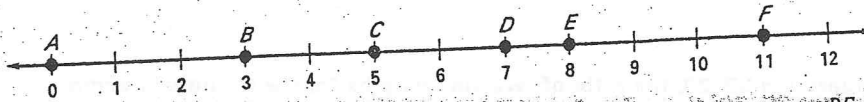
3.  $\frac{6 \text{ cm}}{14 \text{ cm}}$

4.  $\frac{10 \text{ in.}}{2 \text{ ft}}$

5. 3 gallons : 10 quarts

6. 28 oz : 2 lb

Use the number line to find the ratio of the distances.



10.  $\frac{AB}{CF}$

11.  $\frac{BF}{CD}$

12.  $\frac{DE}{AC}$

13.  $\frac{BE}{AD}$

14. **Perimeter** The perimeter of a rectangle is 56 inches. The ratio of the length to the width is 6 : 1. Find the length and the width.

15. **Area** The area of a rectangle is 525 square centimeters. The ratio of the length to the width is 7 : 3. Find the length and the width.

The measures of the angles of a triangle are in the extended ratio given.  
Find the measures of the angles of the triangle.

16. 1:7:10

17. 5:6:7

Solve the proportion.

19.  $\frac{4}{5} = \frac{x}{15}$

20.  $\frac{5}{8} = \frac{20}{y}$

21.  $\frac{z+2}{4} = \frac{27}{12}$

22.  $\frac{3}{x} = \frac{1}{x-6}$

23.  $\frac{3}{m+5} = \frac{2}{m+1}$

Name \_\_\_\_\_

Date \_\_\_\_\_

LESSON  
6.1**Practice** *continued*  
For use with pages 358–363

Find the geometric mean of the two numbers.

25. 2 and 8

26. 3 and 9

Solve the proportion.

34.  $\frac{12}{x} = \frac{x}{4}$

35.  $\frac{y-2}{2} = \frac{2y-3}{5}$

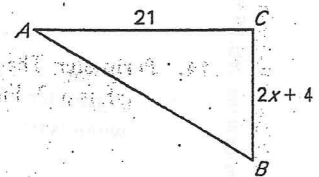
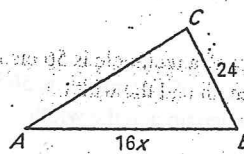
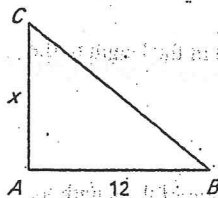
36.  $\frac{8}{z-2} = \frac{z+2}{4}$

In Exercises 37–39, the ratio of two side lengths for the triangle is given. Solve for the variable.

37.  $AC:AB$  is 3:4.

38.  $AB:CB$  is 2:1.

39.  $AC:BC$  is 7:4.



40. Area The perimeter of the rectangular front lawn of the library is 192 feet. The ratio of the length to the width is 5:3. Find the area of the lawn.



Name \_\_\_\_\_

Date \_\_\_\_\_

**LESSON**  
**6.2**

**Practice**

For use with pages 364–370

Copy and complete the statement.

1. If  $\frac{6}{x} = \frac{5}{y}$ , then  $\frac{6}{5} = \frac{?}{?}$ .

2. If  $\frac{x}{12} = \frac{y}{26}$ , then  $\frac{x}{y} = \frac{?}{?}$ .

3. If  $\frac{x}{4} = \frac{7}{y}$ , then  $\frac{x+4}{4} = \frac{?}{?}$ .

4. If  $\frac{9}{2} = \frac{x}{y}$ , then  $\frac{11}{2} = \frac{?}{?}$ .

Decide whether the statement is true or false.

5. If  $\frac{x}{y} = \frac{8}{3}$ , then  $\frac{y}{x} = \frac{3}{8}$ .

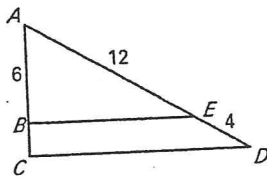
6. If  $\frac{x}{y} = \frac{8}{3}$ , then  $\frac{3}{x} = \frac{y}{8}$ .

7. If  $\frac{x}{y} = \frac{8}{3}$ , then  $\frac{x}{8} = \frac{3}{y}$ .

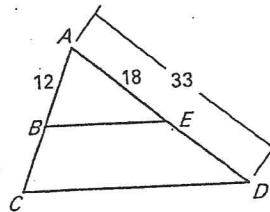
8. If  $\frac{x}{y} = \frac{8}{3}$ , then  $\frac{x}{8} = \frac{y}{3}$ .

Use the diagram and the given information to find the unknown length.

11. Given  $\frac{AB}{BC} = \frac{AE}{ED}$ , find  $BC$ .



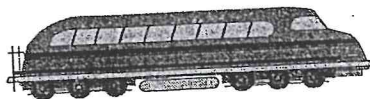
12. Given  $\frac{AB}{BC} = \frac{AE}{ED}$ , find  $BC$ .



19. **Sales Tax** You plan on purchasing a new \$25,000 vehicle. Recently, a friend bought a \$22,500 vehicle and paid an additional \$1575 in sales tax. Assuming the same sales tax rate applies, how much should you expect to pay in sales tax?

In Exercises 20 and 21, use the following information.

**Scale Model** You purchase a scale model of a train. The model states that the scale is 1 inch : 5.4 feet.



20. If the model is 10 inches long, how long is the actual train?
21. The actual height of the train is 13.5 feet, how tall is the model?
23. While on vacation, you paid 205 pesos for a sombrero at a gift shop. If the exchange rate were 9.24 Mexican pesos to 1 U.S. dollar, what would have the cost been in U.S. dollars?

