7.4 Similar Figures

Pg. 366   4/19/18

Apr 11-10:52 AM

Learn to use proportions to find missing measures in similar figures.

Matching sides of two or more polygons are called **corresponding sides,** and matching angles are called **corresponding angles**.

Corresponding sides

A 3 cm D
2 cm 90°
B C

W 9 cm Z
6 cm
X 90° Y

Corresponding angles

$$\frac{\ell}{B} \overset{18}{=} \frac{2}{6} \overset{3}{\times} \frac{3}{9}, \quad R$$

Apr 11-10:52 AM

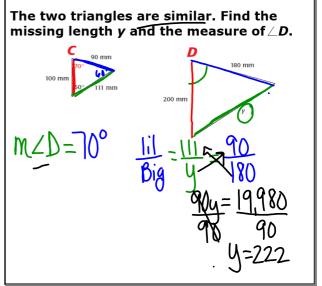**Similar** figures have the same shape but not necessarily the same size.

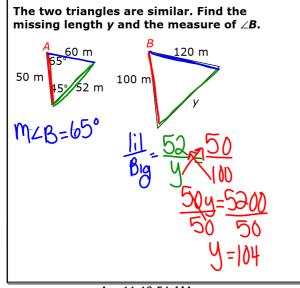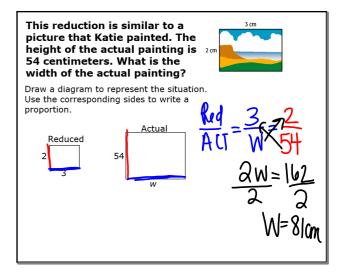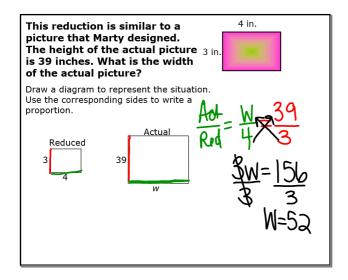| Similar Figures |
|---|
| Two figures are similar if
• the measures of the corresponding angles are equal
• the ratios of the lengths of the corresponding sides are proportional |

60 60
20 30
100 90

Apr 11-10:53 AM

The two triangles are <u>similar</u>. Find the missing length *y* and the measure of ∠*D*.

C 90 mm
70° 60°
100 mm
50° 111 mm

D 180 mm
200 mm
y

$$m\angle D = 70°$$

$$\frac{lil}{Big} = \frac{111}{y} \overset{\times}{=} \frac{90}{180}$$

$$\frac{90y}{90} = \frac{19,980}{90}$$

$$y = 222$$

Apr 11-10:53 AM

The two triangles are similar. Find the missing length *y* and the measure of ∠*B*.

A 60 m
65°
50 m
45° 52 m

B 120 m
100 m
y

$$m\angle B = 65°$$

$$\frac{lil}{Big} = \frac{52}{y} \overset{\times}{=} \frac{50}{100}$$

$$\frac{50y}{50} = \frac{5200}{50}$$

$$y = 104$$

Apr 11-10:54 AM

This reduction is similar to a picture that Katie painted. The height of the actual painting is 54 centimeters. What is the width of the actual painting?

3 cm
2 cm

Draw a diagram to represent the situation. Use the corresponding sides to write a proportion.

Reduced
2
3

Actual
54
w

$$\frac{Red}{Act} = \frac{3}{w} \overset{\times}{=} \frac{2}{54}$$

$$\frac{2w}{2} = \frac{162}{2}$$

$$w = 81cm$$

Apr 11-10:55 AM

This reduction is similar to a picture that Marty designed. The height of the actual picture is 39 inches. What is the width of the actual picture?

4 in.

3 in.

Draw a diagram to represent the situation. Use the corresponding sides to write a proportion.

Reduced
3
4

Actual
39
w

$$\frac{Act}{Red} = \frac{W}{4} = \frac{39}{3}$$

$$3W = 156$$
$$\frac{3W}{3} = \frac{156}{3}$$
$$W = 52$$

Apr 11-10:56 AM

Lesson Quiz

These two triangles are similar.

3 in.
K   L 53.1°
J   5 in.   36.9°   Q

24 in.

1. Find the missing length x. 1.1 5 3
$$\frac{3x}{3} = \frac{90}{3} \quad x = 30 \quad \text{Big} \; \frac{x}{18} \quad 30$$

O   18 in.   P

2. Find the measure of $\angle J$.
$$m\angle J = 36.9$$

3. Find the missing length y. $\frac{B}{L} = \frac{24}{y} = \frac{18}{3}$
$$\frac{18y}{18} = \frac{72}{18} \quad y = 4$$

J
5   y
53.1°   L   3   K

4. Find the measure of $\angle P$.
$$m\angle P = 90°$$
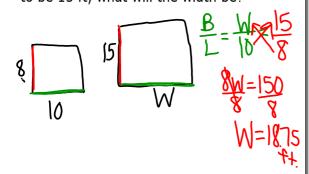
Apr 11-10:57 AM

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5. Susan is making a wood deck from plans for an 8 ft by 10 ft deck. However, she is going to increase its size proportionally. If the length is to be 15 ft, what will the width be?

8
10

15
W

$$\frac{B}{L} = \frac{W}{10} = \frac{15}{8}$$

$$\frac{8W}{8} = \frac{150}{8}$$

$$W = 18.75 \; ft.$$

Apr 11-10:59 AM

HW: WORKSHEET!

Apr 25-8:44 AM

2