# Similarity and Proportions

Honey I shrunk and/or enlarged the whatever!....

Huh? Maybe I'm older than I thought... Oh well... Similarity is almost the same thing as congruence except similar figures are the same shape but not necessarily the same size. Here's what I mean... Have you ever been into a store and seen a model? (No gentlemen, not that kind of model.) Like a model car, or a model airplane or even one of those "look at the new buildings we are going to build" kind of models you see in public buildings sometimes. That is similar! So the model corvette and real corvette are the same shape but different sizes. Here is another example...
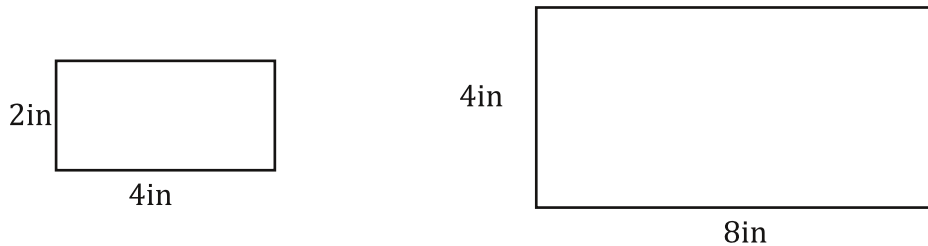
Notice that these two rectangles are the same shape, but one is bigger than the other. How much bigger? Well, notice that if you multiply the sides of the first one by 2 you get the sides of the second one. This leads us to the Ratio of Similarity. All this is, is the ratio of the sides of the smaller shape to the sides of the larger shape. These two have a ratio of 2/4 or 1/2. So the smaller one is half the size of the larger... Let's practice finding the ratio of similarity.

Each pair of figures is similar. Find the ratio of similarity.

Ex. 1.

$$\frac{2}{3}$$

Ex. 2.

$$\frac{9}{12} = \frac{3}{4}$$
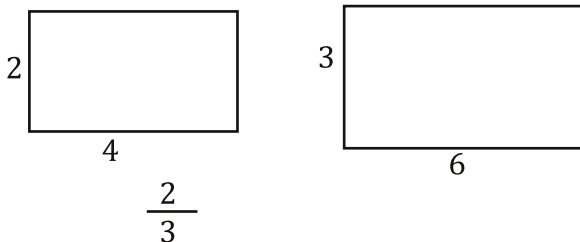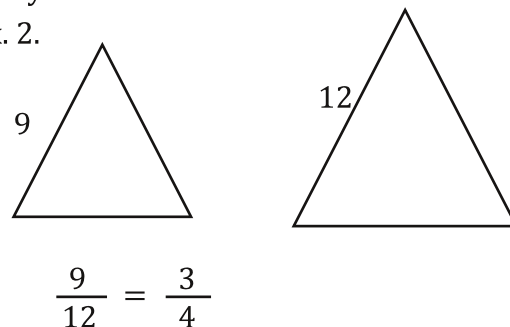
Okay, so what is this good for anyway? Well, let's say that you have a model car and the ratio between the model and the real thing is 1/8. Say your model is 2ft long. How long is the real car? Well... all you have to do is set up and solve a proportion like this...

$$\frac{1}{8} = \frac{2}{x} = \quad \begin{matrix} 1(x)=2(8) \\ x=16 \end{matrix}$$ So the real car is 16 feet long!
(Maybe it's a Mini.)

Now when you set up the proportion, you must make sure that if you have the smaller number on top for your ratio, the other fraction must always have the smaller number on top, too. I like to always put the small number on top so I don't make the mistake of flipping one of the ratios. Let's look at two more examples...

Ex. 3. These figures are similar. The ratio of similarity is 2/5. Find x.
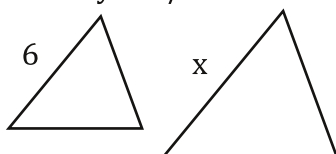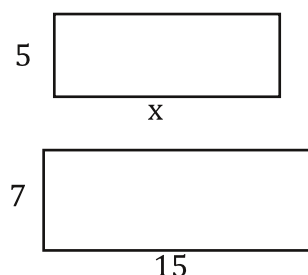
$$\frac{2}{5} = \frac{6}{x} =$$
$$2(x)=5(6)$$
$$\frac{2x=30}{2 \quad 2}$$
$$x=15$$

Ex. 4. These figures are similar. Find x.
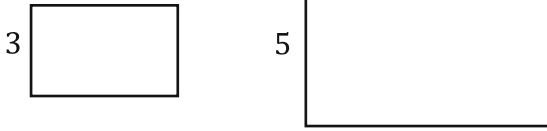
$$\frac{5}{7} = \frac{x}{15} =$$
$$7(x)=5(15)$$
$$\frac{7x=75}{7 \quad 7}$$
$$x=10.71$$

For each pair of similar figures, find the ratio of similarity, reduce if possible.
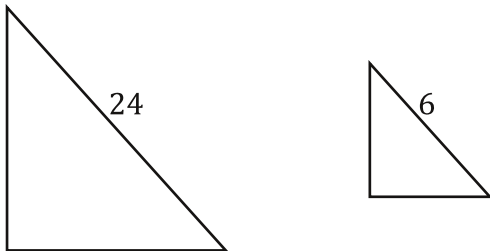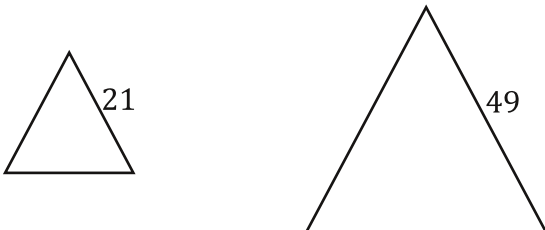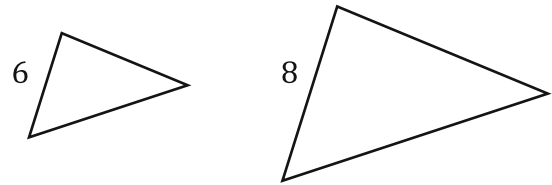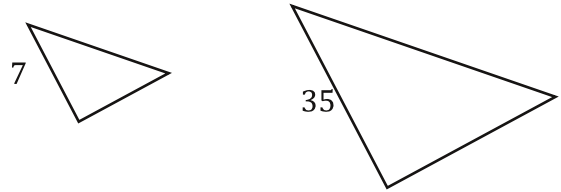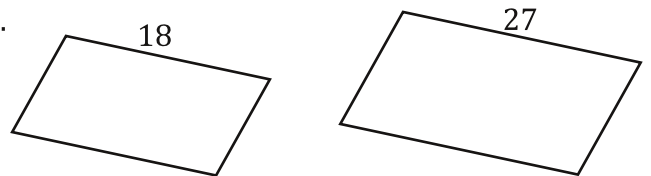
1.

2.

3.

4.

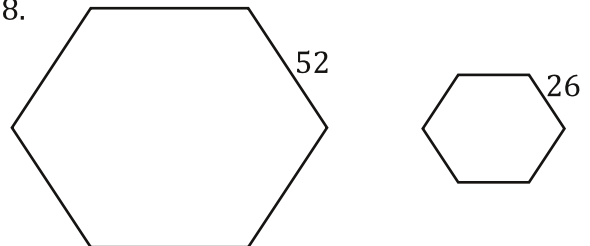5.

6.

7.

8.

Bubble all the correct answers from above. Don't bubble incorrect answers.
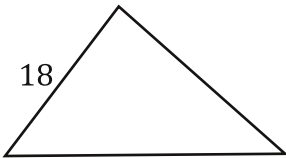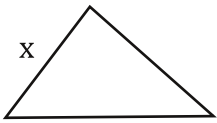
○4/5 ○2/3 ○1/2 ○3/4 ○3/7 ○2/5 ○1/4 ○3/5 ○4/7 ○1/5 ○4/5 ○1/9 ○5/9 ○7/9
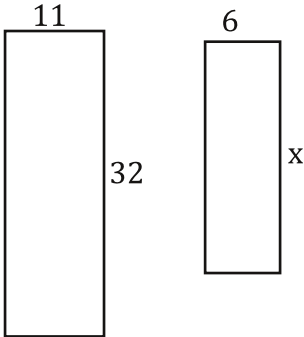
Each pair of figures is similar. Find the missing length.
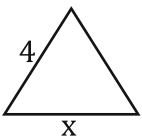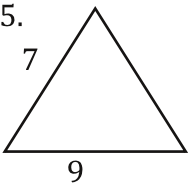
9. Ratio of similarity =2/3.

8

x

10. Ratio of similarity =4/5.

12

x
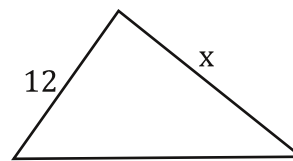
11. Ratio of similarity =2/7.

x

18

12. Ratio of similarity =5/13.

x

26

13.

11   6

32   x

14.

9   10

12   x

15.

7

9

4

x

16.

15   x

2   5

___
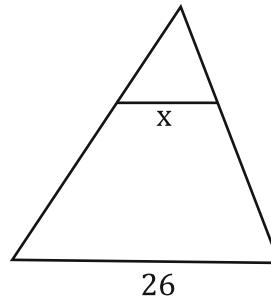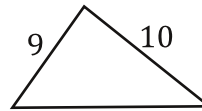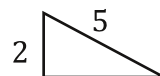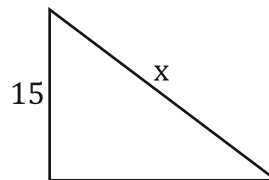
Bubble all the correct answers from above. Don't bubble incorrect answers.

○4.15 ○17.45 ○14.45 ○13.33 ○ 20   ○15   ○10   ○ 12   ○9.6   ○5.14 ○37.5 ○5.14 ○13   ○8.6

17.

5

4

3

x
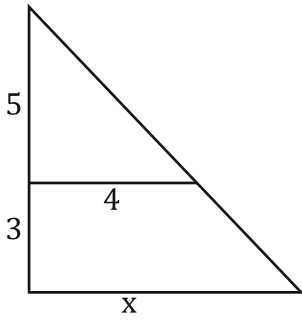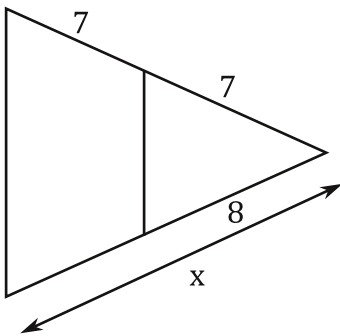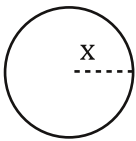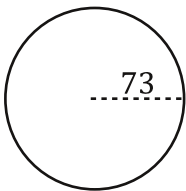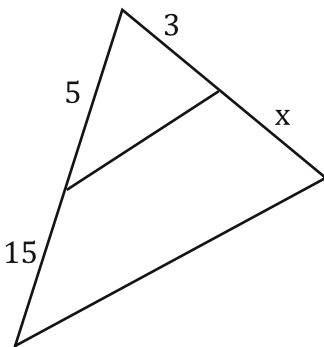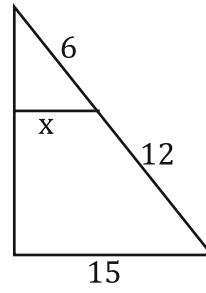
18.

6

x

12

15

19.

7

7

8

x

20.

21

29

13

x

21. Ratio of similarity =2/5.

73

x

22.

6

4

9

x

23.

3

5

x

15
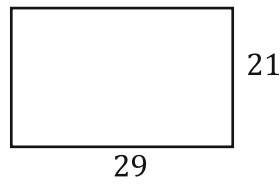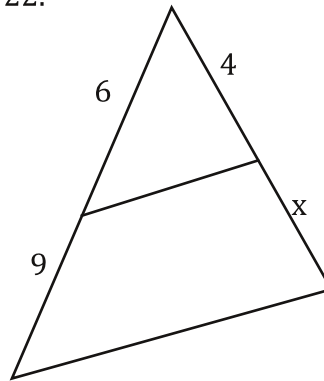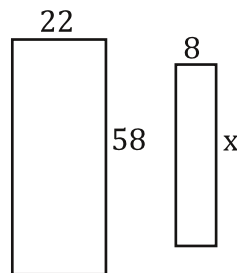
24.

22

58

8

x
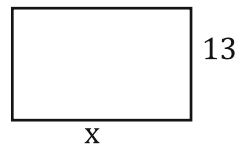
Bubble all the correct answers from above. Don't bubble incorrect answers.

○6.4 ○5 ○6 ○7.5 ○16 ○3.65 ○2.48 ○29.01 ○9 ○6 ○21.09 ○23.08 ○17.95 ○29.2

Answer each question.

25. Two triangles have a ratio of similarity of 3/4. If one side of the small triangle is 9in long, how long is the same side of the larger triangle?

26. Two rectangles have a ratio of similarity of 4/7. If one side of the small rectangle is 12m long, how long is the same side of the larger rectangle?

27. Two squares have a ratio of similarity of 2/3. The perimeter the small square is 136cm. What is the perimeter of the larger square?

28. Two triangles have a ratio of similarity of 3/8. The perimeter of the small triangle is 54in. What is the perimeter of the larger triangle?

29. Two right triangles are similar. The shortest leg of the small triangle is 4in. The shortest leg of the large triangle is 8in. If the hypotenuse of the small triangle is 12in, what is the length of the hypotenuse of the larger triangle?

30. Two right triangles are similar. The shortest leg of the small triangle is 6in. The shortest leg of the large triangle is 30in. If the hypotenuse of the larger triangle is 46in, what is the length of the hypotenuse of the small triangle?

31. Two rectangles are similar. The shortest side of the small rectangle is 5in. The shortest side of the large rectangle is 7in. If the longer side of the small rectangle is 10in, what is the length of the longer side of the larger rectangle?

32. Two triangles are similar. The shortest side of the small triangle is 6in. the shortest side of the large triangle is 9in. If the perimeter of the small triangle is 27in, what is the perimeter of the larger triangle?

Bubble all the correct answers from above. Don't bubble incorrect answers.

○13 ○14 ○24 ○40.5 ○54.63 ○26 ○144 ○214 ○12 ○8 ○21 ○9.2 ○6.8 ○204