# Math 9 Assignment 5: Proportional Reasoning (solutions)

1. How many cm in 3 meters?
   300 cm

2. How many mm in a 2 km?
   $2 \text{ km} = 2000 \text{ m} = 200000 \text{ cm} = 2,000,000 \text{ mm}$

3. How many inches in a 4 miles given 1 mile = 5280 feet?
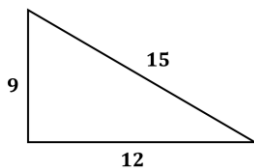   $5280 \times 4 = 21,120 \text{ feet} = 253,440 \text{ inches}$

4. If a 6 cm long toy car is at a scale of 1:30 how long is the car in real life in meters?
   $6 \text{ cm} \times 30 = 180 \text{ cm} = 1.8 \text{ m}$

5. A right triangle has side lengths of 3-4-5.
   This triangle is enlarged by a factor of 3.
   a. Sketch these triangles

   

   b. What is the perimeter of the larger triangle?
      $P = 9 + 12 + 15 = 36$

   c. How many times larger is the area of the larger triangle vs. the smaller triangle?
      $A_{\text{small}} = \frac{3 \times 4}{2} = 6$
      $A_{\text{large}} = \frac{9 \times 12}{2} = 54$
      $54 \div 6 = 9$ times larger

6. Suppose the picture of the bacterial cell below is 4 cm wide. If the bacteria is 2 micrometers long in real life, what is the scale of this picture? (ex. 200:1, 1:2000, etc.)

   

   4 cm : 2 micrometers
   40 mm : 2 micrometers
   40,000 micrometers : 2 micrometers
   20,000 : 1

7. The following toy bus is 8 cm wide:



   If the real bus is 4 m wide, what is the scale factor?
   8 cm : 4 m
   8 cm : 400 cm
   1 : 50
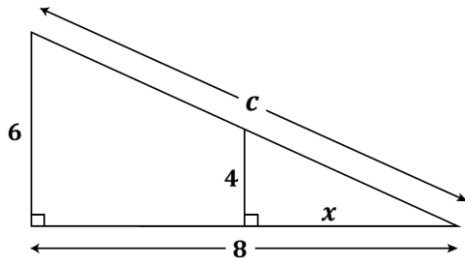
8. Your toy jet is 6 cm wide.  It is at a scale of 3 : 140.
   How large is the plane in real life?

   $6 \text{ cm} \times \frac{140}{3}$
   $2 \text{ cm} \times 140$
   $280 \text{ cm} = 2.8 \text{ m}$

9. See triangle below:



   a. Find $c$
      $3 - 4 - 5$
      $6 - 8 - 10$
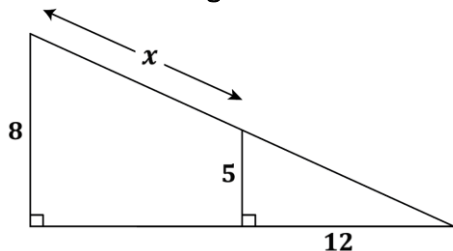      $c = 10$

   b. Find $x$
      $\frac{x}{4} = \frac{8}{6}$
      $\frac{x}{4} = \frac{4}{3}$
      $3x = 16$
      $x = \frac{16}{3}$

10. Find $x$ in the diagram below:



    Look at the small triangle on the right
    $5 - 12 - 13$

$$\frac{5}{13} = \frac{8}{x+13}$$
$$5(x + 13) = 104$$
$$5x + 65 = 104$$
$$5x = 39$$
$$x = \frac{39}{5}$$

11. Suppose the Jeddah tower is 1100 m tall. The ruler measurement of a picture of this building is 8 cm. The ruler measurement of the picture of the monster is 3 cm.
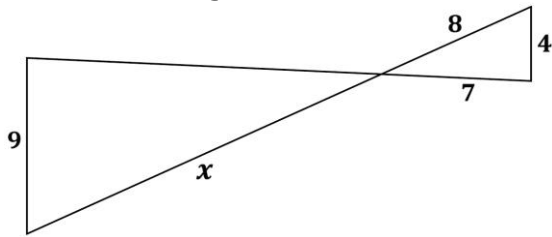
    a. How tall is the monster in real life?



$$\frac{3}{8} = \frac{x}{1100}$$
$$8x = 3300$$
$$x = \frac{3300}{8} = \frac{1650}{4} = \frac{825}{2} \text{ or } 412.5 \text{ m}$$
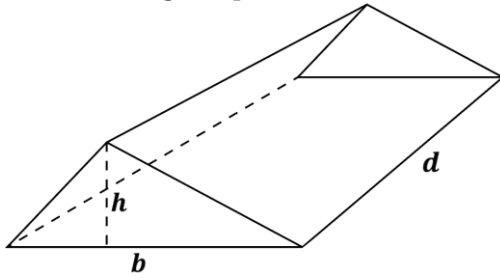
12. Find $x$ in the diagram below:



$$\frac{x}{9} = \frac{8}{4}$$
$$4x = 72$$
$$x = 18$$

13. See the triangular prism below:



If all dimensions are tripled, how many times larger is the volume of the larger prism?

8

$$V_1 = \frac{bh}{2} \times d$$

$$V_2 = \frac{(2b)(2h)}{2} \times 2d = 8V_1$$