

# Practice Test

Name \_\_\_\_\_

## Multiple Choice

Identify the choice that best completes the statement or answers the question.

C 1. An 8 kg bag of potatoes costs \$9.15. What is the unit rate?

- a. \$9.15/8 kg
- b. \$0.87/kg
- c. \$1.14/kg
- d. \$0.99/kg

$$\frac{9.15}{8} = 1.14$$

A 2. Maureen ran 15 km in 1.25 h. What is her running speed?

- a. 12 km/h
- b. 15 km/h
- c. 120 m/min
- d. 200 m/s

$$\frac{15}{1.25} = 12$$

C 3. The dosage of an antibiotic medicine for a person with a mass of 90 kg is 12 mL. Which equation determines the amount of medicine, A, in millilitres, needed for a person with a mass of 65 kg?

- a.  $P = (90 \text{ kg}) \left( \frac{12 \text{ mL}}{65 \text{ kg}} \right)$
- b.  $P = (12 \text{ mL}) \left( \frac{90 \text{ kg}}{65 \text{ kg}} \right)$
- c.  $P = (65 \text{ kg}) \left( \frac{12 \text{ mL}}{90 \text{ kg}} \right)$
- d.  $P = (65 \text{ kg}) \left( \frac{90 \text{ kg}}{12 \text{ mL}} \right)$

$$\frac{12}{90} = \frac{?}{65}$$

B 4. Which scale factor(s) will produce an image that is smaller than the original?

- I. 37% ✓
- II.  $\frac{4}{12}$  ✓
- III. 9.6 ✗

- a. I only
- b. I and II only
- c. II and III only
- d. I, II, and III

B 5. A photograph is 6 cm by 11 cm. A copy is made using a scale factor of 140%. What are the dimensions of the copy?

- a. 4.3 cm by 7.9 cm
- b. 8.4 cm by 15.4 cm
- c. 24 cm by 44 cm
- d. 43 mm by 79 cm

$$6 \times 1.4 = 8.4 \text{ cm}$$
$$11 \times 1.4 = 15.4 \text{ cm}$$

C 6. The distance between two towns on a map is 5.4 cm. The map was made using a scale of 1 cm to 300 km. What is the actual distance between the two towns?

- a. 1600 km
- b. 1550 km
- c. 1620 km
- d. 1520 km

$$\frac{?}{5.4} = \frac{300 \text{ km}}{1}$$

C 7. Which one of the following cylinders is similar to a cylinder that is 8 cm long and 2.5 cm in diameter? Choose the best answer.

- a. a cylinder 4 cm long and 1.5 cm in diameter
- b. a cylinder 12 cm long and 3.5 cm in diameter
- c. a cylinder 16 cm long and 5 cm in diameter
- d. all of the above

$$\times 2 \times 2$$

B 8. A 1:7 scale model of a shopping cart is 15 cm tall, 8.4 cm wide, and 13.4 cm long. What are the dimensions of the actual shopping cart?

- a. 95 cm by 40 cm by 45 cm
- b. 105 cm by 58.8 cm by 93.8 cm
- c. 150 cm by 160 cm by 195 cm
- d. 1 m by 0.6 m by 1 m

$$15 / (1/7) = 105$$

B 9. A stage director needs a large chess pawn for a scene. The pawn in her chess set is 35 mm tall and she estimates that the height of the enlarged pawn must be 700 mm. How many times greater will the surface area of the larger pawn be?

- a. 800
- b. 400
- c. 200
- d. 1600

$$\frac{700}{35} = 20$$

$$\text{Area } 20 \times 20 = 400$$

- A 10. Cylinder A has a radius of 5 mm and a height of 30 mm.  
Cylinder B has a radius of 20 mm and a height of 120 mm.  
These two cylinders are similar.  
By what factor is the volume of cylinder B greater than the volume of cylinder A?

- a. 64  
b. 8  
c. 16  
d. 32

$$4 \times 4 \times 4$$

- B 11. Rectangle A is 6 cm high, 9 cm long, and 15 cm wide.  
Rectangle B is 14 cm high, 21 cm long, and 35 cm wide.  
These two rectangles are similar.  
By what factor is the surface area of rectangle B greater than the surface area of rectangle A?

- a.  $\frac{49}{81}$   
b.  $\frac{49}{9}$   
c.  $\frac{3}{7}$   
d.  $4\frac{1}{3}$

$$\frac{14}{6} = \frac{7}{3}$$

$$\frac{7}{3} \times \frac{7}{3} = \frac{49}{9}$$

- D 12. A pool in the shape of a rectangular prism is filled with 15 m<sup>3</sup> of water.  
A similar pool has dimensions that are increased by a scale factor of  $\frac{4}{3}$ .  
What volume of water will fill the larger swimming pool?

- a. 27 m<sup>3</sup>  
b. 19 m<sup>3</sup>  
c. 47 m<sup>3</sup>  
d. 36 m<sup>3</sup>

$$15 \times \left(\frac{4}{3}\right)^3 = 35.6$$

- B 13. A lacrosse ball has a diameter of 6.4 cm.  
A basketball has a diameter of about 23 cm.  
By what percent is the surface area of a basketball greater than the surface area of a lacrosse ball?

- a. 359%  
b. 1291%  
c. 1661%  
d. 4641%

$$\frac{23}{6.4} \times \frac{23}{6.4} = 12.915 \times 100 = 1291.5\%$$



## Written Response

1. You go in to Costco to buy some paper towel. They have three options. You don't care how absorbant it is or how big each piece is: you just want the best price per piece.

Brand A: 12 rolls with 200 pieces per roll for \$16.99

Brand B: 16 rolls with 120 pieces per roll for \$14.49

Brand C: 14 rolls with 180 pieces per roll for \$15.95

Find the unit price for each brand and circle the best deal: (2 marks)

Brand A: 0.07079 Brand B: 0.00754 Brand C: 0.006329

BEST DEAL

2. Jonathan earns \$540 for a five-day workweek of 8-hours per day. How much does he make per hour? (1 mark)

$$540 / 5 \times 8 = \$13.50/\text{hour}$$

3. Reduce each of the following ratios to lowest terms: (2 marks)

a)  $40 : 64 = \frac{5}{8}$

b)  $\frac{3}{4} : \frac{1}{3} = 9 : 4$

MATH  $\rightarrow$  frac

4. A school toilet is flushed an average of 10 times an hour during the 6 hours that school is open. Each flush requires six litres of water. Find how many kilolitres of water are flushed by one toilet in a school year. (there are 200 school days in the year, and 1000 litres in a kilolitre) (1 mark)

$$10 \times 6 \times 6 \times 200 = 72000L = 72 \text{ kL}$$

5. Everything in a store is discounted by the same percentage. If one item is marked down from \$59.99 to \$39.99, then what will the discounted price be for an item originally marked at \$159.99? (1 mark)

$$\frac{39.99}{59.99} = \frac{?}{159.99} \quad \$106.65$$

6. On a map, an actual length of 200 km is represented by 4 cm. (3 marks)

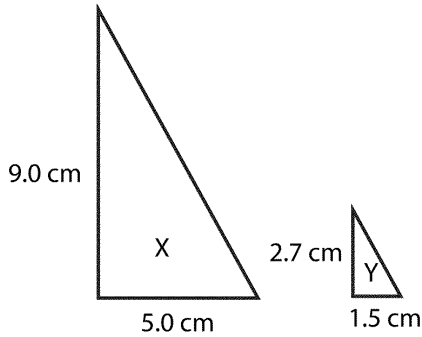
a) What is the scale of this map? 4cm : 200km = 1cm : 50km

b) What scale factor was used to create the map?  $\frac{1}{5000000}$

c) If two places are 10 cm apart on the map, how far apart are they in real life? 500km

$$\frac{4}{200} = \frac{10}{?}$$

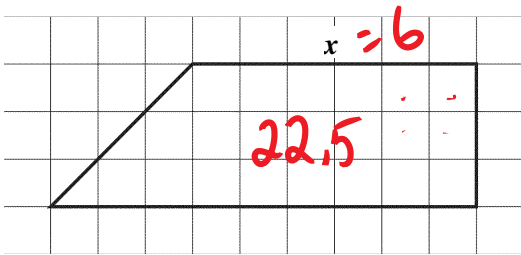
7. Determine the scale factor that was used to transform diagram X into diagram Y. Express your scale factor as a reduced fraction or as a decimal to three places or as a percent to one decimal place. (1 mark)



$$\frac{2.7}{9} = .3$$

Scale Factor =  $\frac{3}{10}$  or 0.3

8. Dexter enlarges this figure by a scale factor of 5. Determine the new length of side  $x$ , and the area of the enlarged figure in square units. (2 mark)

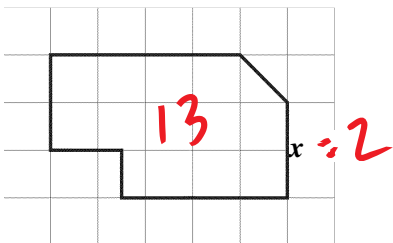


Length of new side  $x = \underline{30}$

Area of enlargement = 562.5

9. Anna reduces this figure by a scale factor of  $\frac{1}{4}$ .

Determine the new length of side  $x$ , and the area of the reduced figure, to the nearest tenth of a square unit. (1 mark)



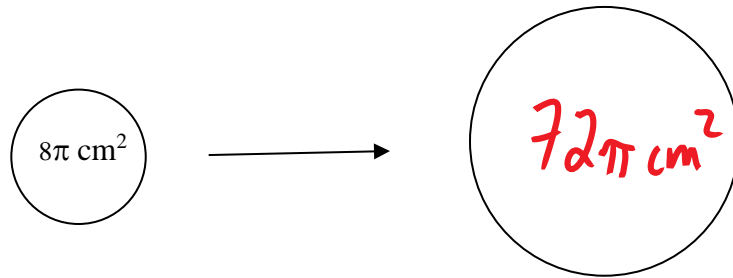
$$2 \times \left(\frac{1}{4}\right)$$

Length of new side  $x = \underline{0.5}$

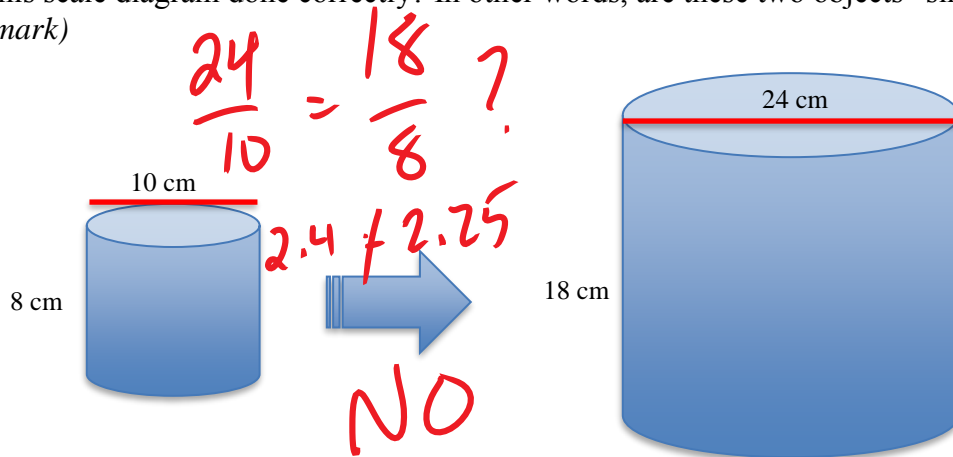
Area of reduction = 0.8125

$$13 \times \left(\frac{1}{4}\right)^2$$

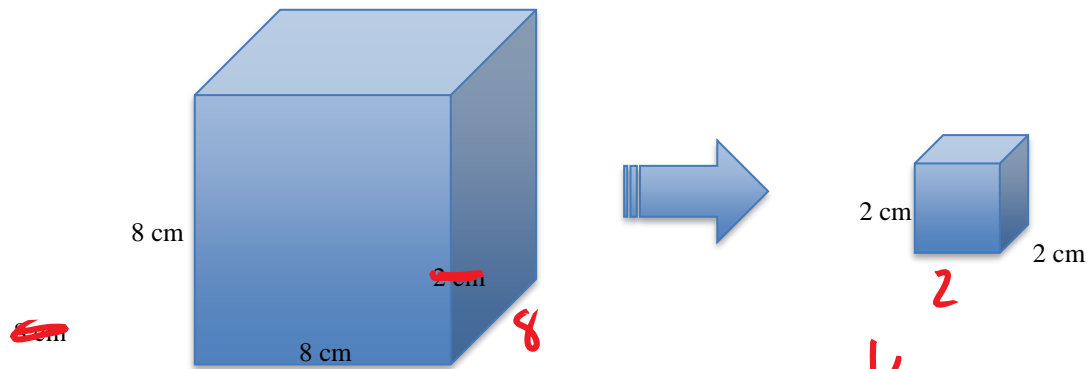
10. The area of a circle is  $8\pi \text{ cm}^2$ . It is going to be enlarged by a scale factor of 3. Determine the area of the enlarged circle. (1 mark)



11. Was this scale diagram done correctly? In other words, are these two objects “similar”? Show your work. (1 mark)



12. Look at the scaled object and answer the questions below (3 marks)



a) What scale factor was used to scale this 3D object?

$\frac{1}{4}$

b) By what factor did the surface area change?

$(\frac{1}{4}) \times (\frac{1}{4}) = \frac{1}{16}$

c) By what factor did the volume change?

$(\frac{1}{4})^3 = \frac{1}{64}$

13. A potter creates a vase with a volume of  $7250 \text{ cm}^3$ . Then the potter creates a smaller, similar vase, in which the dimensions are reduced by a scale factor of  $\frac{4}{5}$ . Determine the volume of the smaller vase (to one decimal place). (1 mark)



$$7250 \left(\frac{4}{5}\right)^3 = 3712 \text{ cm}^3$$

14. A can of Red Bull currently holds a volume of 250 mL ( $1 \text{ mL} = 1 \text{ cm}^3$ ). Red Bull wants to change their can to make it just slightly smaller while keeping the price the same. If they reduce both the radius and the height by 5% (a scale factor of .95), what will be the new volume of the tin can? (to the nearest mL) (1 mark)



$$250 (.95)^3 = 214.7 \text{ mL}$$

BONUS: If the original can is 10 cm tall, then what will be the surface area of the reduced can?