

Chapter 8 Proportional Reasoning & Scale Factor Test

(ver.01-12-MC-2)

Name: _____

Date: _____

Instructions:

For all questions, make sure to justify your answer.

Full marks may not be given for the answer only.

Note: 2.2 lbs = 1 kg

Learning Goal 24) I can compare and interpret rates. (8.1 & 8.2)

Self Assessment (circle one) : I feel that for this outcome I am:

not yet meeting
1 - 2

minimal meeting
3 - 4

meeting
5 - 6

fully meeting
7 - 8

expectations

/ 8

1. A 454 g block of butter costs \$4.37. What is the price per 100 g?

$$\frac{4.37}{454g} = \frac{x}{100g}$$

$$4.37 = \frac{454x}{100}$$

$$\$ 0.963 / 100g$$

2. Olga drove 346 km and used up 28.7 L of gas.

How would you communicate her car's fuel efficiency in Canada?

Justify your answer.

- a. 8.29 L/100 km
- b. 12 mL/km
- c. 12 km/L
- d. 0.083 L/km
- e. 0.083 L/100 km
- f. 12 L/100 km

$$\frac{346km}{28.7L} = \frac{x}{1L}$$

$$\frac{28.7x}{28.7} = \frac{346}{28.7}$$

$$x = 12$$

3. The graph shows how a cyclist travels over time. Over which interval is the cyclist travelling at 12 km/h?

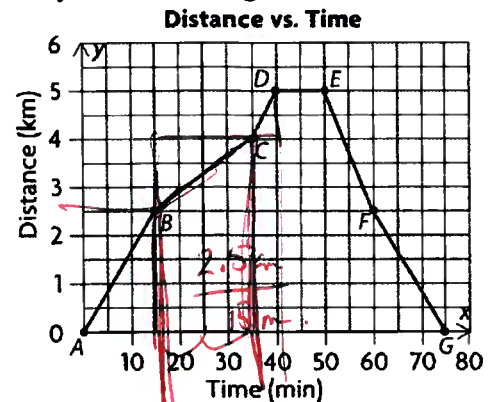
Justify your answer.

- a. AB
- b. BC
- c. CD
- d. DE
- e. EF
- f. FG

$$\frac{2.5km}{15min} \times \frac{60min}{1hr} = \frac{150km}{15hr} = \frac{10km}{hr}$$

$$\frac{1km}{5}$$

$$\frac{1.5km}{20min} \times \frac{60min}{1hr} = \frac{4.5km}{hr}$$



4. It takes 4 h 26 min to fill a 3600 L water tank. How long will it take to fill a 1700 L water tank?

4hr

$$\frac{4.43}{3600L} = \frac{x}{1700L}$$

$$\frac{9}{100} = \frac{x}{60}$$

$$x = 2.09$$

$$2hr + 5min$$

2 hours 5 minutes
(answer in hours and minutes)

Learning Goal 25) I can compare, interpret and draw 2-D scale diagrams. (8.3 & 8.4)

Self Assessment (circle one) : I feel that for this outcome I am:

/ 21

not yet meeting 1 - 2	minimal meeting 3 - 4	meeting 5 - 6	fully meeting 7 - 8	expectations
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5. Circle which scale factor(s) will produce an image that is smaller than the original? Explain why.

0.86

128%

$\frac{4}{3}$

1.7

0.1

6. Circle which scale factor(s) will produce an image that is larger than the original? Explain why.

72%

$\frac{8}{5}$

9.6

$\frac{2}{3}$

0.1

7. A photograph is 12 cm by 25 cm. A copy is made using a scale factor of 75%.

What are the dimensions of the copy?

orig(SF) = new

$9 \times 18\frac{3}{4}$

12

↑ reduction

8. A room in a floor plan is 7.2 cm by 9.6 cm. The floor plan was made using a scale factor of 0.024.

What is the longest dimension of the actual room?

orig(SF) = new

$\times (0.024) = 9.6$

by

4m
400cm

9. 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? Answer in the most appropriate units.

$\frac{1 \text{ cm}}{300 \text{ km}} = \frac{5.4 \text{ cm}}{x}$

$x = 1620 \text{ km}$

1620 km

10. Which of the following right cones are similar to a right cone that is 15 cm high and has a diameter of 9 cm?

Note: there could be more than one cone that is similar to the original

Justify your selection(s).

(5 marks)

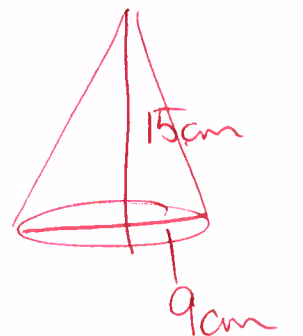
a right cone 30 cm high and 18 cm in diameter ✓

a right cone 10 cm high and 5 cm in diameter

a right cone 20 cm high and 11 cm in diameter

a right cone 35 cm high and 21 cm in diameter ✓

a right cone 1.5m high and 0.9 m in diameter ✓



11. Jean wants to defrost a frozen turkey that weighs 9 kg by putting it in cold water. His cookbook says to allow 1.5 h of thawing time for every 3 lb of turkey.
How many hours will it take to thaw the turkey?

$$9 \text{ kg} = \frac{9}{2.2} \text{ lbs} \approx 4.09 \text{ lbs}$$

$$x \text{ hr} = \frac{4.09 \text{ lbs}}{3 \text{ lbs}} \times 1.5 \text{ hr} \approx 2.04 \text{ hr}$$

10.4 hr

$$3 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} = 1.36 \text{ kg}$$

(answer to the nearest hour)

12. The butcher shop sells a 3 lb package of chicken legs for \$9.57. The supermarket sells chicken legs for \$7.68/kg.
(a) Determine the price per kilogram that each store charges.

Butcher Shop	Supermarket
$\frac{\$9.57}{3 \text{ lbs}} \times \frac{2.2 \text{ lbs}}{1 \text{ kg}} = \frac{21.054}{3} = 7.018$	$\$7.68/\text{kg}$
	$7.02 \times 4.55 = 31.90$

If you bought 10 lbs for a bbq, how much would you save at the cheaper store?

$$\frac{9.57}{3 \text{ lbs}} = \frac{x}{10 \text{ lbs}} \Rightarrow x = \$31.90$$

$$10 \text{ lbs} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} = 4.55 \text{ kg}$$

$$4.55 \text{ kg} \times \$7.68/\text{kg} = \$34.74$$

\$3.00 saved

Learning Goal 26) I can compare and interpret 3-D scale diagrams. (8.5 & 8.6)

Self Assessment (circle one): I feel that for this outcome I am: / 12

not yet meeting 1 - 2	minimal meeting 3 - 4	meeting 5 - 6	fully meeting 7 - 8	expectations
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13. Data for rectangle ABCD is shown on the first line of the table.

Rectangle ABCD is reduced to an area of 13 cm².

Circle which rectangle is the reduction of rectangle ABCD?

Justify your answer.

$$A \text{ SF} = \frac{1}{9}$$

$$117 \text{ cm}^2 \rightarrow 13 \text{ cm}^2$$

$$\frac{N}{O} = \frac{13}{117} = 0.11$$

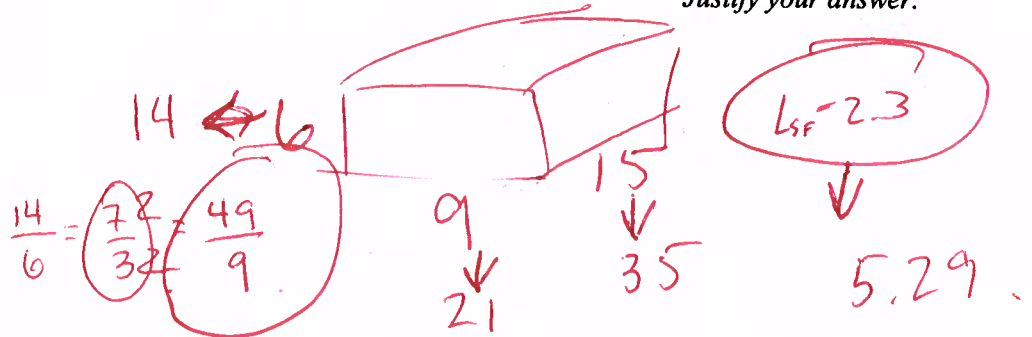
Rectangle Name	Length (cm)	Width (cm)	Scale Factor	Area (cm ²)	Area of Scaled Rectangle / Area of Original Rectangle
ABCD	9	13	1	117	1
EFGH	3	4	1/9	13	1/81
JKLM	4	3 1/3	1/3	13	1/9
NOPQ	1	1 1/3	1/9	13	1/3
RSTU	3	4 1/3	1/3	13	1/9

1/9
1/3

14. Rectangular prism A is 6 cm high, 9 cm long, and 15 cm wide.
 Rectangular prism B is 14 cm high, 21 cm long, and 35 cm wide.
 These two prisms are similar.

By what factor is the surface area of rectangular prism B greater than the surface area of rectangular prism A?
 Justify your answer.

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



15. A cylindrical oil tank is filled with 500 m^3 of oil. A similar oil tank has dimensions that are reduced by a scale factor of $\frac{2}{3}$. What volume of oil will fill the smaller tank?
 Justify your answer.

- a. 1687.5 m^3
 b. 148 m^3
 c. 333 m^3
 d. 222 m^3

Handwritten work for Q15:
 $V = 500 \text{ m}^3$
 $500 \left(\frac{2}{3}\right)^3 = 148.15 \text{ m}^3$
 $L_{SF} = \left(\frac{2}{3}\right)^3 \rightarrow V_{SF} = \frac{8}{27}$

16. A cylindrical oil tank has a surface area of 1800 m^2 . A similar oil tank has dimensions that are reduced by a scale factor of $\frac{2}{3}$. What is the surface area of the smaller tank?
 Justify your answer.

- a. 800 m^2
 b. 630 m^2
 c. 1200 m^2
 d. 533 m^2

Handwritten work for Q16:
 $SA = 1800 \text{ m}^2$

Handwritten work for Q16:
 $L_{SF} = \frac{2}{3} \rightarrow A_{SF} = \frac{4}{9}$

Handwritten work for Q16:
 $Orig(SF) = New$
 $1800 \left(\frac{4}{9}\right) = 800$

17. dimensions The base and height of a trapezoid with an area of 35 cm^2 will be enlarged by a scale factor of 4.
 Determine the area of the enlarged trapezoid.

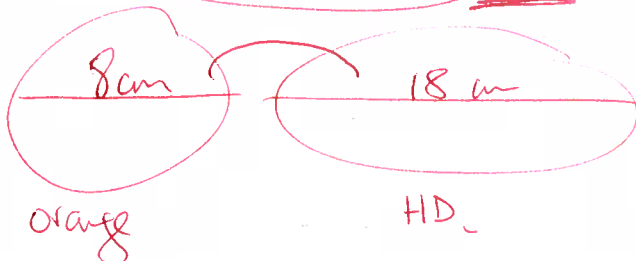
Handwritten work for Q17:
 $L_{SF} = 4$

Handwritten work for Q17:
 $A_{SF} = 16$

Handwritten work for Q17:
 $35 \text{ cm} (16) = 560$

Handwritten work for Q17:
 560 cm^2

18. An orange has a diameter of 8 cm. A honeydew melon has a diameter of 18 cm.
 Estimate how many times greater the volume of a melon is, compared with the volume of an orange.



Handwritten work for Q18:
 $L_{SF} = \frac{18}{8} = \frac{9}{4}$

Handwritten work for Q18:
 $V_{SF} = \frac{729}{64}$

Handwritten work for Q18:
 $11.4 \times \text{bigger}$