7.1-7.2

Monday, October 19, 2020   6:17 PM

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Date: Nov 3 2020

1. Convert the following units:

a) $8km = ?m$	b) $13km = ?cm$	c) $90m = ?cm$
8000metres	1,300,000 cm	9000 cm

d) $180m = ?mm$	e) $16.5cm = ?mm$	f) $19km = ?mm$
180 000 mm	165mm	19,000,000 mm

g) $5838mm = ?m$	h) $9292cm = ?km$	i) $39,494,112mm = ?km$
5.838metres	0.092 km	39.494112 km

2. Find the scaled factors for the following:

a) Real car (5m) & toy car (18cm)	b) Height of hotel (150m) toy hotel (4cm)
$\frac{18}{500} = 0.036 = \frac{9}{250}$	$\frac{4}{15000} = 0.00026 = \frac{13}{50000}$

c) Real lady bug (1.2cm) Toy lady bug (80cm)	d) Size of city (45km) map of city (25cm)
$\frac{80}{1.2} = 66.\overline{6} = \frac{200}{3}$	$\frac{25}{4500\,000} = 0.000005$ $\frac{1}{180\,000}$

e) Size of Planet (180,000km) Toy Planet (55cm)	f) Real Death star (200km) Death star Replica (1.8m)
$\frac{55}{18\,000\,000\,000} = 0.00000000\frac{3}{0}\frac{}{5}$	$\frac{1.8}{200\,000} = \frac{9}{1000\,000}$

| g) Real Ant (9mm) Toy Ant (1.3m)	h) Real donut (9cm) Large Donut (18m)
$\frac{1300}{9} = 144.\overline{4}$	$\frac{1800}{9} = 200$

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3. Given each of the following equations, find the value of "x":

a) $\dfrac{3}{5} = \dfrac{x}{10}$	b) $\dfrac{2}{8} = \dfrac{x}{12}$	c) $\dfrac{7}{20} = \dfrac{x}{60}$	d) $\dfrac{12}{14} = \dfrac{x}{21}$
$30 = 5x$ $x = 6$	$24 = 8x$ $x = 3$	$420 = 20x$ $x = 21$	$252 = 14x$ $x = 18$
e) $\dfrac{4}{11} = \dfrac{2x}{33}$	f) $\dfrac{4}{15} = \dfrac{10}{x}$	g) $\dfrac{12}{x} = \dfrac{6}{10}$	h) $\dfrac{3}{5} = \dfrac{3x}{4}$
$132 = 22x$ $x = 6$	$4x = 150$ $x = 37.5$	$120 = 6x$ $x = 20$	$12 = 15x$ $x = \dfrac{5}{4}$

4. Given the following two shapes, use a ruler to determine the scale factor:

Original

3.3333

2-5   Image

0.9

SF : 0.36

Original

3cm

Image 0.7cm

SF : 0.23

Original

324m

15cm

Model

SF : $\dfrac{1}{2160}$
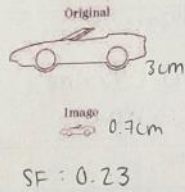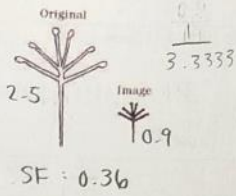
5. Given each of the following images on the left, draw a scaled diagram with a scaled factor of 2.5:

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9.5
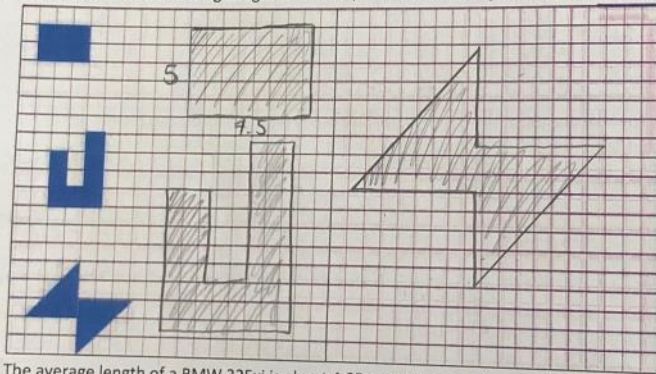
6. The average length of a BMW 325xi is about 4.85meters long. A toy model of this car is reduced at a scaled factor of 0.25. What is the length of the toy model?

$1 \div \dfrac{1}{4} = 4$

So the car is 4 times bigger.

$485cm \div 4 = 121.25 cm$

the toy car is 121.25cm

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What does a scale factor of 1 mean?

It means they're the same size

What does a scale factor of 10 mean?

It means the scaled item is 10 times bigger

9. What does a scale factor of 0.001 mean?

It means the scaled item is 0.1% the size of the real thing so its 1000 times smaller

10. Why is there no units with scaled factors?

because we don't know which measurement we're applying it to and they can change with measurements.

ex: 1/4 can mean $\frac{4cm}{16cm}$ or $\frac{1.8m}{7.2m}$

11. The distance between Vancouver and Seattle is 226.5km. The distance between the two cities on a map is about 2.3cm apart. What is the scaled factor of the map?

$\frac{2.3}{22\,650\,000} = 0.000000101$

12. The length of an apple is 12cm. A Toy apple has a scaled factor of 2.5. What is the length of the toy apple?

$12 \times 2.5 = 30$

the length is 30cm.

13. A bacteria is 0.0032mm long. If a model of the bacteria is 250.12, then how big is the bacteria in cm?

$SF = 250.12$.

0.0032 mm = original

$0.0032 \times 250.12 = model$

model would be 0.8mm

so. 0.08cm

14. The scaled factor of a map 1/200,000,000. If the distance between the two cities on a map is 5.5cm, how far are they apart in the real world?

$(5.5 \div 100 \div 1000) \times 200\,000\,000 = 11\,000$

so they are 11 000 km apart.

15. The Tumbler from Batman Returns has a length of 4.6 meters long. A toy model of this vehicle is 25cm long. What is the scaled factor?

$$\frac{25}{4600} = \frac{1}{184}$$

16. The length of an E. coli bacteria is about 0.005mm long. A toy E. coli bacteria has a length of 35cm long. What is the scaled factor of the toy?

$$\frac{350}{0.005} = 70\ 000$$

the toy IS 70 000 times bigger

17. An architect builds a model of a building at a scaled factor of 0.0003. If the model has a length of 85cm long and 75cm wide, what is the length and width of the actual building in meters? What is the area of the building?

$$1 \div 0.0003 = \frac{10\ 000}{3} \qquad A = 7083332.5m^2$$

$$L = 283333.3 = \boxed{28333m} \qquad W = 250\ 000cm = \boxed{2500m}$$

18. A little photograph measuring 10cm by 15cm is enlarged by a scaled factor of 10.5. What is the area of the enlarged picture in cm^2?

$A = 10.5$
$A^2 = 110.25$

Area of original : 150
Area of enlarged : 16537.5