

Grade 7/8 Math Geometry - Scale Drawing Worksheet

Cross Multiplication – Word Problems

Name: _____ **Answers** _____ Class: _____ Date: _____

1. The scale of the picture is 1 in. : 3 cm. Find the actual length of the Thermos. (4 inches tall)



$$\begin{aligned} 1 \text{ in} &: 3 \text{ cm} \\ 4 \text{ in} &: x \end{aligned} \quad \text{cross multiply } \rightarrow x = 4 \text{ in} \times 3 \text{ cm} / 1 \text{ in}$$

$$= 12 \text{ in} \cdot \text{cm} / \text{in}$$

$$= 12 \text{ cm (in cancels out)}$$

$\therefore$ The Thermos is 12 cm tall.

2. A model of a car was made using a scale of 1 in : 15 in. If the size of car in the model is 8 in, then find the actual length of the car.

$$\begin{aligned} 1 \text{ in} &: 15 \text{ in} \\ 8 \text{ in} &: x \end{aligned} \quad x = 8 \text{ in} \times 15 \text{ in} / 1 \text{ in}$$

$$= 120 \text{ in}^2 / \text{in}$$

$$= 120 \text{ in} \quad \therefore \text{The car is 120 inches or 10 feet long.}$$

3. The scale of the picture shown is 1 cm : 3 in. Find the actual height of the cup. (cup is 2cm)



$$\begin{aligned} 1 \text{ cm} &: 3 \text{ in} \\ 2 \text{ cm} &: x \end{aligned} \quad x = 2 \text{ cm} \times 3 \text{ in} / 1 \text{ cm}$$

$$= 6 \text{ cm} \cdot \text{in} / \text{cm}$$

$$= 6 \text{ in} \quad \therefore \text{The cup height is 6 inches.}$$

4. The scale of the picture shown is 1 inch : 10 cm. What would be the actual height of the penguin? (the picture is 3 inches tall)



$$\begin{aligned} 1 \text{ in} &: 10 \text{ cm} \\ 3 \text{ in} &: x \end{aligned} \quad x = 3 \text{ in} \times 10 \text{ cm} / 1 \text{ in}$$

$$= 30 \text{ in} \cdot \text{cm} / \text{in}$$

$$= 30 \text{ cm} \quad \therefore \text{The penguin is 30 cm tall.}$$

5. A botany student drew a sketch of a birch tree using a scale of 1 inch : 2 meters. Find the actual height of the tree, if it measures 3 inches in the sketch.

$$\begin{aligned} 1 \text{ in} &: 2 \text{ m} \\ 3 \text{ in} &: x \end{aligned} \quad x = 3 \text{ in} \times 2 \text{ m} / 1 \text{ in}$$

$$= 6 \text{ in} \cdot \text{m} / \text{in}$$

$$= 6 \text{ m} \quad \therefore \text{The actual height of the birch tree is 6 metres.}$$

6. A map is drawn using a scale of 1 inch : 4 meters. If the length of a paved path on the map is 16 inches, then find the actual length of the paved path.

$$\begin{aligned} 1 \text{ in} &: 4 \text{ m} \\ 16 \text{ in} &: x \end{aligned} \quad x = 16 \text{ in} \times 4 \text{ m} / 1 \text{ in}$$

$$= 64 \text{ in} \cdot \text{m} / \text{in}$$

$$= 64 \text{ m} \quad \therefore \text{The actual paved path would be 64 metres.}$$

7. A model of a dinosaur skeleton was made using a scale of 1 ft : 10 ft in a museum. If the size of the dinosaur's tail in the model is 4 ft, then find its actual length.

$$\begin{array}{lcl}
 1 \text{ ft} : 10 \text{ ft} & & \\
 4 \text{ ft} : x & x = 4 \text{ ft} \times 10 \text{ ft} / 1 \text{ ft} & \\
 & = 40 \text{ ft}^2 / \text{ft} & \\
 & = 40 \text{ ft} & \therefore \text{The dinosaur's tail is actually 40 ft long.}
 \end{array}$$

8. A map company used a scale of 1 inch : 380 meters to depict the heights of different mountains. What is the height of a mountain on map, which is actually 3420 meters high?

$$\begin{array}{lcl}
 1 \text{ in} : 380 \text{ m} & & \\
 x : 3420 \text{ m} & x = 3420 \text{ m} \times 1 \text{ in} / 380 \text{ m} & \\
 & = 3420 \text{ m} \cdot \text{in} / 380 \text{ m} & \\
 & = 9 \text{ in} & \therefore \text{The mountain would be 9 inches on the map.}
 \end{array}$$

9. A model chair has been designed using a scale 1 inch: 5 inches. The height of the model chair is 4 inches in length. What would be actual height of the chair?

$$\begin{array}{lcl}
 1 \text{ in} : 5 \text{ in} & & \\
 4 \text{ in} : x & x = 4 \text{ in} \times 5 \text{ in} / 1 \text{ in} & \\
 & = 20 \text{ in}^2 / \text{in} & \\
 & = 20 \text{ in} & \therefore \text{The actual height of the chair would be 20 inches.}
 \end{array}$$

10. The width of a window is 4 inches in an architect's blueprint. If the scale used to draw the blueprint is 1 inch : 1.5 feet, then what would be the actual width of the window?

$$\begin{array}{lcl}
 1 \text{ in} : 1.5 \text{ ft} & & \\
 4 \text{ in} : x & x = 4 \text{ in} \times 1.5 \text{ ft} / 1 \text{ in} & \\
 & = 6 \text{ in} \cdot \text{ft} / \text{in} & \\
 & = 6 \text{ ft} & \therefore \text{The actual width of the window is 6 feet.}
 \end{array}$$

11. A model of a cell uses a scale of 1 cm : 10 micrometers. If the nucleus is 1.3 cm wide on the model, what is the actual measurement of the nucleus?

$$\begin{array}{lcl}
 1 \text{ cm} : 10 \mu\text{m} & & \\
 1.3 \text{ cm} : x & x = 1.3 \text{ cm} \times 10 \mu\text{m} / 1 \text{ cm} & \\
 & = 13 \text{ cm} \cdot \mu\text{m} / \text{cm} & \\
 & = 13 \mu\text{m} & \text{The nucleus is actually 13 micrometers wide.}
 \end{array}$$

12. Model trains come in various scales as seen in the picture. If an actual train engine was 23 metres long, how long would it be in HO scale? Give you answer to the nearest centimetre (round correctly).

$$\begin{array}{lcl}
 1 : 87 & & \\
 x : 23 \text{ m} & x = 23 \text{ m} \times 1 / 87 & \\
 & = 23 \text{ m} / 87 & \\
 & = 0.2644 \text{ m} \text{ (Multiply by 100 to get cm since there are 100 cm in a metre.)} & \\
 & = 26.44 \text{ cm} & \\
 & = 26 \text{ cm (rounded to nearest cm)} &
 \end{array}$$

$\therefore$ The train engine would be 23 cm long.



Name	G Scale	O Scale	HO Scale	N Scale	Z Scale
Scale	1:22.5	1:48	1:87	1:160	1:220
Gauge	1.75"/45mm	1.25"/31mm	.625"/16mm	.375"/9mm	.25"/6mm