

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

$$\text{Population density} = \frac{\text{Population}}{\text{area}}$$

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Geometry

Density

1. Farmer John has a farm with a chicken pen in it. The chicken pen is rectangular measuring 5 yards by 7 yards. If there are 48 chickens in the pen, what is the population density to the nearest tenth of a chicken?

$$Pd = \frac{P}{a}$$

$$Pd = \frac{48 \text{ chickens}}{35 \text{ yd}^2}$$

$$\begin{aligned} A &= lw \\ A &= 5(7) \\ A &= 35 \text{ yd}^2 \end{aligned}$$

2. Jennifer is having her Sweet 16 party on a giant circular patio that has a radius of 7.2 meters. If there are 83 people at the party, to the nearest tenth, what is the population density?

$$Pd = \frac{P}{a}$$

$$Pd = \frac{83 \text{ ppl}}{162 \dots \text{yd}^2}$$

$$Pd = .5 \text{ ppl/yd}^2$$

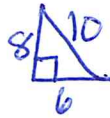
$$\begin{aligned} A &= \pi r^2 \\ A &= \pi (7.2)^2 \\ A &= 162 \dots \text{m}^2 \end{aligned}$$

3. For a music festival, a stage was built in the shape of a right triangle whose sides measure 6 yards, 8 yards, and 10 yards. At the end of the concert, all of the performers came out and performed together. There were a total of 62 performers on the stage. To the nearest tenth of a person, what was the population density on the stage?

$$Pd = \frac{P}{a}$$

$$Pd = \frac{62 \text{ ppl}}{24 \text{ yd}^2}$$

$$Pd = 2.6 \text{ ppl/yd}^2$$



$$\begin{aligned} A &= \frac{1}{2}bh \\ A &= \frac{1}{2}(6)(8) \\ A &= 24 \text{ yd}^2 \end{aligned}$$

4. Town A has an area of 12 square miles. Town B has an area of 10 square miles. If town A has a population of 8,198 people and town B has a population of 7,384 people, which town has a greater population density? Justify your answer.

$$\begin{array}{l} \text{Town A} \\ Pd = \frac{P}{a} \end{array}$$

$$Pd = \frac{8198 \text{ ppl}}{12 \text{ mi}^2}$$

$$Pd = 683 \dots \text{ ppl/mi}^2$$

$$\begin{array}{l} \text{Town B} \\ Pd = \frac{P}{a} \end{array}$$

$$Pd = \frac{7384 \text{ ppl}}{10 \text{ mi}^2}$$

$$Pd = 738.4 \text{ ppl/mi}^2$$

Town B has a greater population density

5. A brick that weighs 1824 grams has dimensions that measure 4 cm by 3 cm by 8 cm. To the nearest tenth, what is the density of the brick?

$$d = \frac{m}{V}$$

$$d = \frac{1824g}{96 \text{ cm}^3}$$

$$d = 19 \text{ g/cm}^3$$

$$V = lwh$$

$$V = 4(3)(8)$$

$$V = 96 \text{ cm}^3$$

6. A cylindrical candleholder has a diameter of 4.5 cm and a height of 20 cm. If the candleholder has a mass of 2900 g, rounded to the nearest whole number, what is its density?

$$d = \frac{m}{V}$$

$$d = \frac{2900g}{318 \dots \text{cm}^3}$$

$$d = 9 \text{ g/cm}^3$$

$$V = \pi r^2 h$$

$$V = \pi (2.25)^2 (20)$$

$$V = 318 \dots \text{cm}^3$$

7. What is the density of a solid sphere of clay that has a diameter of 3.2 inches and has a mass of 552 grams? Round your answer to the nearest tenth.

$$d = \frac{m}{V}$$

$$d = \frac{552 \text{ grams}}{17 \dots \text{in}^3}$$

$$d = 32.2 \text{ g/in}^3$$

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \pi (1.6)^3$$

$$V = 17 \dots \text{in}^3$$

8. A wooden cube has an edge length of 6 centimeters and a mass of 137.8 grams.

Determine the density of the cube, to the nearest thousandth. State which type of wood the cube is made of, using the density table below.

Type of Wood	Density (g/cm ³)
Pine	0.373
Hemlock	0.431
Elm	0.554
Birch	0.601
Ash	0.638
Maple	0.676
Oak	0.711

$$d = \frac{m}{V}$$

$$d = \frac{137.8g}{216 \text{ cm}^3}$$

$$d = .638 \text{ g/cm}^3$$

Ash

$$V = lwh$$

$$V = 6(6)(6)$$

$$V = 216 \text{ cm}^3$$

with all equal