

Geometry - Geometric Modeling Applications - Test Answer Key

Common Core G-MG.A.1, G-MG.A.2, G-MG.A.3 · maths-pdf.fr/en/

Use this answer key and scoring guide for the geometric modeling test. Each solution shows the full work, and the scoring note tells how the points are split between method and final answer. Partial credit is listed so that grading stays consistent from one paper to the next.

Geometry · Common Core State Standards: **G-MG.A.1, G-MG.A.2, G-MG.A.3**

Question 1 - Modeling a can [2 pts]

$$V = \pi \cdot 16 \cdot 10 = 160\pi = 502.7 \text{ cm}^3.$$

$$502.7 \div 1,000 = 0.50 \text{ L.}$$

502.7 cm³; 0.50 L

Scoring: 1 point for the volume, 1 point for the conversion.

Question 2 - Density [2 pts]

Volume $5^3 = 125 \text{ cm}^3$. Density $\frac{100}{125} = 0.8 \text{ g per cm}^3$.

It is less than 1, so the cube floats.

Scoring: 1 point for the density, 1 point for the conclusion.

Question 3 - Population density [3 pts]

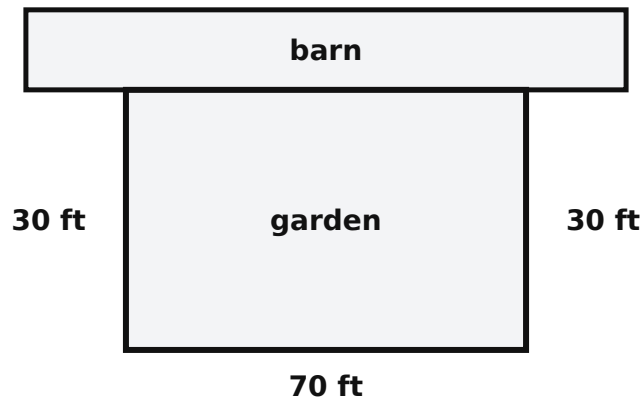
a. $\frac{84,000}{120} = 700$

b. $650 \cdot 210 = 136,500$

c. The first county: 700 people per square mile is greater than 650.

Scoring: 1 point per part.

Question 4 - Fence design [3 pts]



30 ft by 70 ft: area 2,100.

Constraint: $l = 130 - 2w$.

$w = 30$: $l = 70$, area 2,100. $w = 35$: $l = 60$, area 2,100. $w = 40$: $l = 50$, area 2,000.

The largest area, 2,100 sq ft, is reached by $w = 30$ and by $w = 35$.

Scoring: 1 point for the constraint, 1 point for the areas, 1 point for the conclusion.

Question 5 - Painting [2 pts]

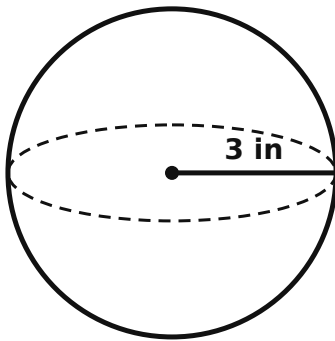
$$2\pi \cdot 6 \cdot 20 = 240\pi = 754 \text{ sq ft.}$$

$$754 \cdot \$0.40 = \$301.60$$

754 sq ft; about \$301.60

Scoring: 1 point for the area, 1 point for the cost.

Question 6 - Sphere [2 pts]



$$V = 36\pi, S = 36\pi.$$

$$V = \frac{4}{3}\pi \cdot 3^3 = 36\pi.$$

$$S = 4\pi \cdot 3^2 = 36\pi.$$

V = 36π cu in; S = 36π sq in

Scoring: 1 point each.

Question 7 - Concrete [2 pts]

Thickness 0.5 ft. Volume $30 \cdot 10 \cdot 0.5 = 150$ cu ft.

$$\frac{150}{27} = 5.56$$

5.56 cubic yards

Scoring: 1 point for the volume in cubic feet, 1 point for the conversion.

Question 8 - Minimum height [2 pts]

$$\pi \cdot 15^2 \cdot h \geq 20,000$$

$$h \geq \frac{20,000}{225\pi} = 28.3$$

At least 28.3 feet

Scoring: 1 point for the inequality, 1 point for the height.

Question 9 - Hexagon cell [2 pts]
--

$$\frac{3\sqrt{3}}{2} \cdot 16 = 24\sqrt{3} = 41.6$$

41.6 square millimeters

Scoring: 1 point for the substitution, 1 point for the answer.

Total
20 points