

Geometry · Cross Sections, Solids of Rotation and Geometric Modeling · Test Answer Key

Common Core G-GMD.B.4, G-MG.A.1, G-MG.A.2, G-MG.A.3 · mathovore.fr

Each solution shows the key shape, formula or equation and the result, with a scoring guide. Give partial credit only as the guide describes, and check that every answer has correct units.

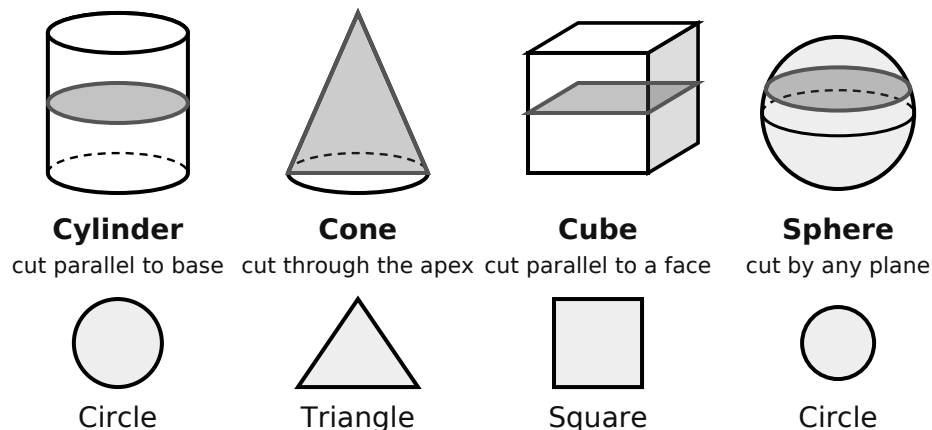
GeometryCommon Core: G-GMD.B.4 · G-MG.A.1 · G-MG.A.2 · G-MG.A.3

Question 1: Name the cross sections (3 points)

(a) A circle. (b) A triangle (isosceles). (c) A circle.

Answers: **circle; triangle; circle.**

Scoring: 1 point for each correct shape.



Four solids, the plane that cuts each one, and the cross section it makes.

Question 2: Cut through a cylinder (2 points)

(a) A rectangle 12 cm wide (the diameter) and 15 cm tall.

(b) $\text{Area} = 12 \times 15 = 180 \text{ cm}^2$.

Answers: **rectangle 12 cm by 15 cm; 180 cm².**

Scoring: 1 point for the shape with both dimensions; 1 point for the area.

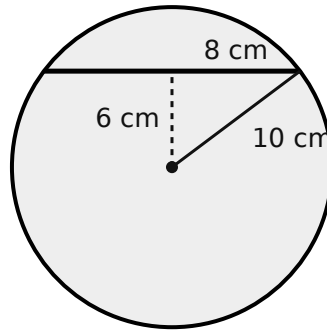
Question 3: Slicing a sphere (2 points)

(a) $x^2 + 6^2 = 10^2$, so $x^2 = 64$ and $x = 8$ cm.

(b) $\text{Area} = \pi(8)^2 = 64\pi \text{ cm}^2$.

Answers: 8 cm; $64\pi \text{ cm}^2$.

Scoring: 1 point for the radius (right triangle with hypotenuse 10); 1 point for the area.



The 6-8-10 right triangle.

Question 4: Rotating a triangle (3 points)

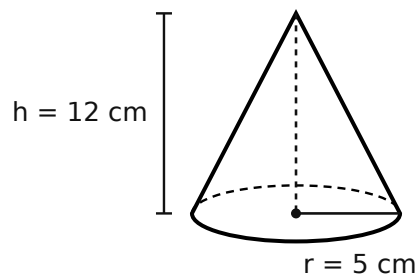
(a) A cone.

(b) The leg on the axis is the height, 12 cm, and the other leg is the radius, 5 cm.

(c) $V = \frac{1}{3}\pi(5)^2(12) = 100\pi \text{ cm}^3$.

Answers: **cone**; $r = 5$ cm, $h = 12$ cm; $100\pi \text{ cm}^3$.

Scoring: 1 point for each part.



The cone, $V = 100\pi \text{ cm}^3$.

Question 5: Comparing counties (2 points)

(a) A: $31,200 \div 40 = 780$. B: $24,640 \div 28 = 880$ people per square mile.

(b) County B is denser by $880 - 780 = 100$ people per square mile.

Answers: **780 and 880; County B by 100.**

Scoring: 1 point for both densities; 1 point for the comparison with the difference.

Question 6: Heating a gym (2 points)

(a) Volume = $50 \times 30 \times 12 = 18,000 \text{ ft}^3$. BTUs = $18,000 \times 4 = 72,000$.

(b) $72,000 \div 18,000 = 4$ hours.

Answers: **72,000 BTUs; 4 hours.**

Scoring: 1 point for each part.

Question 7: Cheaper box (3 points)

(a) $10 \times 6 \times 6 = 360$ and $9 \times 8 \times 5 = 360$.

(b) Box 1: $2(60 + 60 + 36) = 312 \text{ in}^2$. Box 2: $2(72 + 45 + 40) = 314 \text{ in}^2$.

(c) Box 1: $312 \times 0.03 = \$9.36$. Box 2: $314 \times 0.03 = \$9.42$. Box 1 costs less.

Answers: **both** 360 in^3 ; 312 in^2 **and** 314 in^2 ; **Box 1 at \\$9.36.**

Scoring: 1 point for each part.

Question 8: Grain silo (3 points)

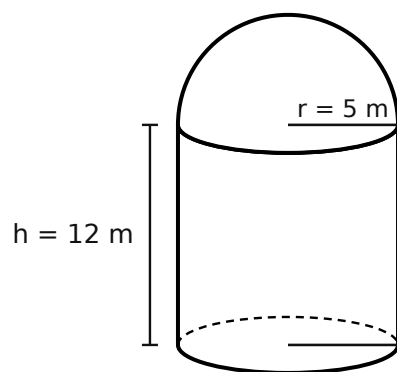
(a) $V = \pi(5)^2(12) = 300\pi \text{ m}^3$.

(b) $V = \frac{1}{2} \cdot \frac{4}{3} \pi (5)^3 = \frac{250\pi}{3} \text{ m}^3$.

(c) Total = $300\pi + \frac{250\pi}{3} = \frac{1150\pi}{3} \approx 1,204.3 \text{ m}^3$.

Answers: 300π ; $\frac{250\pi}{3}$; **about** $1,204.3 \text{ m}^3$.

Scoring: 1 point for each part.



A silo: cylinder plus hemisphere.

Total
20 points