

Prisms: Surface Area, Volume and Composite Figures

Grade 7 math · Test Answer Key · Standards: 7.G.B.6

The answer key gives complete solutions and a scoring guide. Give credit for any valid decomposition of a composite figure, and deduct a point when square and cubic units are confused or when the base area of a triangle omits the one half.

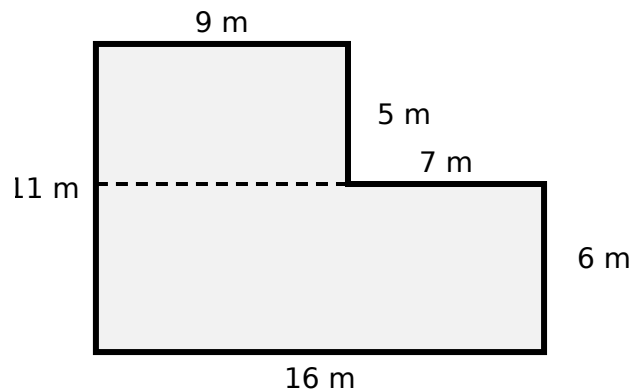
Standards: 7.G.B.6 · **Level:** Grade 7

Question 1 Area with a notch (2 points)

Whole rectangle: $16 \times 11 = 176 \text{ m}^2$. Notch: $7 \times 5 = 35 \text{ m}^2$. $176 - 35 = 141$.

141 m²

Scoring: 1 point for a valid decomposition or subtraction, 1 point for the area with units.



Another way: $9 \times 5 + 16 \times 6 = 45 + 96 = 141$.

Question 2 Trapezoid on a rectangle (3 points)

a. $A = \frac{1}{2}(9 + 15) \times 6 = 12 \times 6 = \mathbf{72 \text{ cm}^2}$

b. $15 \times 4 = \mathbf{60 \text{ cm}^2}$

c. $72 + 60 = \mathbf{132 \text{ cm}^2}$

Scoring: 1 point for each part.

Question 3 Box measurements (2 points)

a. $V = 14 \times 6 \times 5.5 = 84 \times 5.5 = \mathbf{462 \text{ in}^3}$

b. $SA = 2(14 \times 6 + 14 \times 5.5 + 6 \times 5.5) = 2(84 + 77 + 33) = 2(194) = \mathbf{388 \text{ in}^2}$

Scoring: 1 point for each part.

Question 4 Right triangular prism (3 points)

- a. $B = \frac{1}{2} \times 24 \times 7 = \mathbf{84 \text{ cm}^2}$
- b. $V = 84 \times 12 = \mathbf{1,008 \text{ cm}^3}$
- c. $P = 24 + 7 + 25 = 56$. $SA = 2(84) + 56 \times 12 = 168 + 672 = \mathbf{840 \text{ cm}^2}$

Scoring: 1 point for each part.

Question 5 L-shaped prism (3 points)

- a. $10 \times 8 - 4 \times 3 = 80 - 12 = \mathbf{68 \text{ cm}^2}$
- b. $V = 68 \times 5 = \mathbf{340 \text{ cm}^3}$

Scoring: part a, 1 point for the decomposition and 1 for the area; part b, 1 point.

Question 6 Find a missing length (2 points)

$B = \frac{1}{2} \times 9 \times 6 = 27 \text{ cm}^2$. $V = Bh$, so $270 = 27h$ and $h = 10$.

10 cm

Scoring: 1 point for the base area, 1 point for the length.

Question 7 Open fish tank (3 points)

- a. Bottom: $30 \times 12 = 360$. Long sides: $2 \times (30 \times 16) = 960$. Short sides: $2 \times (12 \times 16) = 384$. Total: $360 + 960 + 384 = \mathbf{1,704 \text{ in}^2}$
- b. $V = 30 \times 12 \times 12 = \mathbf{4,320 \text{ in}^3}$

Scoring: part a, 1 point for the faces and 1 for the sum; part b, 1 point.

Question 8 Stacked blocks (2 points)

Bottom: $10 \times 6 \times 2 = 120 \text{ cm}^3$. Top: $4 \times 6 \times 3 = 72 \text{ cm}^3$. Total: 192.

192 cm³

Scoring: 1 point for the two volumes, 1 point for the sum.