# Chapter 1 Answers

## BLM 1-1 Prerequisite Skills

**1. a)** $x = 36$ **b)** $x = 6$ **c)** $x = 2.8$
**d)** $x = 5.1$ **e)** $x = 2.5$ **f)** $x = 1.5$

**2. a)** $z = 2x - \frac{1}{3}y$ **b)** $a = \sqrt{\frac{b - 2c^2}{3c}}$

**c)** $f = \sqrt{\frac{4\left(g - 2e^2\right)}{3e^3}}$

**3. a)** C **b)** D **c)** B **d)** A

**4. a)** 63.5 cm **b)** 20.7784 yd **c)** 0.65 $m^2$
**d)** 157.48 in. **e)** 329.184 m **f)** 24.756 39 $ft^2$

**5. a)** 4.8768 m **b)** 192 in. **c)** 5.333 yd

**6. a)** 600 m by 200 m
**b) i)** 0.12 $km^2$ **ii)** 120 000 $m^2$
**c)** The area in square metres is 1 000 000 times greater than the area in square kilometres. 1 km = 1000 m, so 1 $km^2$ = 1000 m × 1000 m or 1 000 000 $m^2$.

**7. a)** 5.5 L **b)** 0.043 L **c)** 0.6 L **d)** 2.36 L

**8. a)** 450 000 $cm^3$ **b)** 0.45 $m^3$

**9. a)** 3.2 L **b)** 5.632 pt

**10.** 18.8 cm

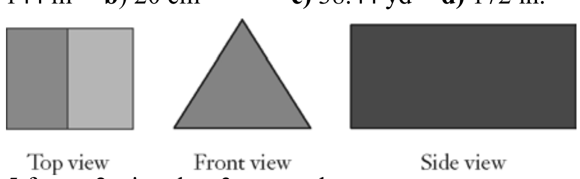
**11.** 8.5 cm

**12.** 10.3 mm

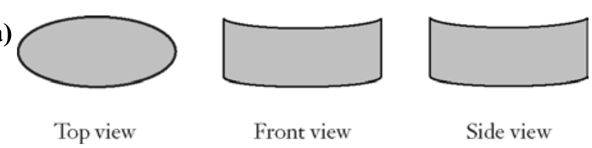
**13.** A, C

**14. a)** 50 m **b)** 22.434 cm **c)** 24.8 yd **d)** 46.5 in.

**15. a)** 144 $m^2$ **b)** 20 $cm^2$ **c)** 38.44 $yd^2$ **d)** 172 $in.^2$

**16. a)**



**b)** 5 faces; 2 triangles, 3 rectangles
**c)** the two triangles and the three rectangles

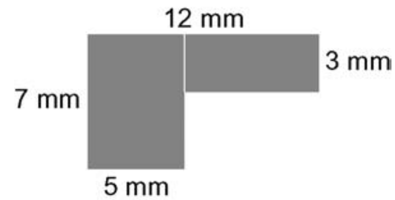
**17. a)**


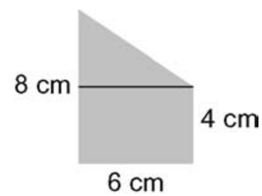

**b)** 3 faces; 2 circles, 1 curved rectangle
**c)** the two circles

**18. a)** 6
**b)** bases: squares; faces: rectangles
**c)** cube

**19. a)** pentagonal prism
**b)** 7 faces: 2 pentagons, 5 rectangles
**c)** the two pentagons and the five rectangles

## BLM 1-4 Section 1.1 Area

**1. a) i)** 2 rectangles



**ii)** 1 rectangle, 1 right triangle



**b) i)** 56 $mm^2$ **ii)** 36 $cm^2$

**2. i)** 56 $mm^2$ **ii)** 36 $cm^2$

**3.** For question 1, calculated the areas of the two shapes and added the areas. For question 2, found the area of the 8 cm by 6 cm rectangle and subtracted the area of the right triangle.

**4.** 55 $in.^2$

**5.** 62.06 $yd^2$

**6. a), b)** 50.625 $ft^2$
**c)** Answers may vary. Components. This method required fewer steps.

**7. a)** Rectangle has parallel sides, so unmarked side is also 3.7 m. The semi-circle's diameter is 3.7 m (7.4 – 3.7).
**b)** 32.8 $m^2$

**8. a)** approximately 17 705 $m^2$
**b)** 18 pails

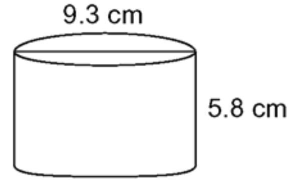
**9. a)** 8314 $cm^2$ **b)** \$307.61

**10. a)** 37.74 $m^2$ **b)** 3 cans; \$77.97

## BLM 1-8 Section 1.2 Volume

**1. a)** hexagon **b)** 420 $cm^3$

**2. a)** Cubic metres. It is less work to convert the one imperial measure to metric than the two metric measures to imperial. There are two large measures (yards and metres) so it makes more sense to convert centimetres to metres.
**b)** 1.12 $m^2$

**3. a)**


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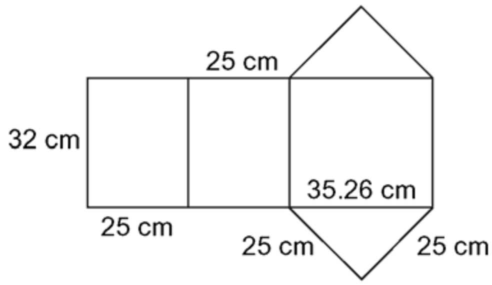
**b)** 394 cm$^3$
**c)** 0.39 L
**4.** 575 in.$^3$
**5.** 29.3 cm
**6.** 4.5 cm
**7.** 0.48 m$^3$
**8. a)** 10 619 cm$^3$ **b)** 8340 cm$^3$ **c)** 22.79 cm$^3$

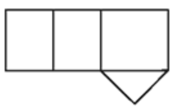
## BLM 1-11 Section 1.3 Surface Area

**1. a)**



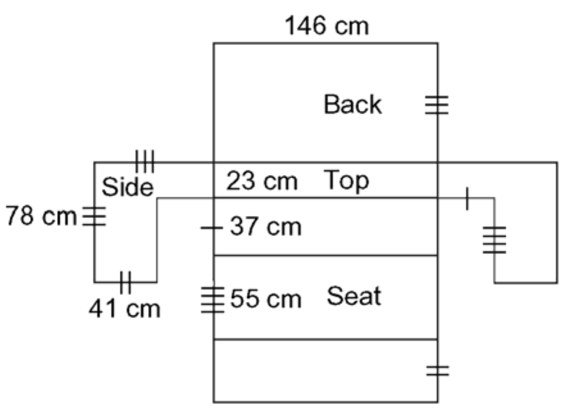

**b)** 3356.52 cm$^2$

**2. a)**



**b)** 3044.02 cm$^2$
**3.** 3600 cm$^2$
**4.** 56.55 in.$^2$
**5.** 534 cm$^2$
**6.** 2400 cm$^2$
**7.** 4.78 m$^2$
**8. a)** 243 in.$^2$ **b)** 202.5 in.$^2$ **c)** Box from part b).

**9. a)**




**b)** The main part of the sofa is a large rectangle.
Find the length: $78 + 23 + 37 + 55 + 41 = 234$.
Find the area: $234 \times 146 = 34\ 164$. For the sides of the sofa, use net area: $2 \times (78 \times 78 - 37 \times 55) = 8098$.
Add the two amounts to find the total surface area: 42 262 cm$^2$.
**c)** $42.21
**10. a)** 2.7146 m$^2$ **b)** $27.11
**11. a)** 424 in.$^2$ **b)** 8 mailboxes
**12.** Two more mailboxes could be painted.
**13. a)** 100 cm$^2$ **b)** 110 cm

## BLM 1-14 Section 1.4 Optimize Perimeter and Area

**1.** B, D, A, C
**2.** Yes. Diagrams may vary. For example, draw a rectangle with the same perimeter that is longer and narrower than rectangle C.
**3.** H, F, G, E
**4.** Yes. Diagrams may vary. For example, draw a rectangle with the same area that is longer and narrower than rectangle F.
**5.** The maximum dining area is a rectangle with two sides 10 m in length and the third side (opposite the barn) 20 m in length. Diagrams may vary.
**6. a)** 7 m by 8 m
**b)** The dimensions change to 7.5 m by 7.5 m; there is 0.25 m$^2$ of additional area.
**7.** 25 m by 50 m
**8.** 40 ft by 40 ft; 1600 ft$^2$
**9.** Side opposite river or wall is 80 ft, other two sides are 40 ft; maximum area is 3200 ft$^2$
**10.** 80 ft by 80 ft; 6400 ft$^2$
**11. a)** 80 ft by 80 ft; 80 ft by 40 ft; 40 ft by 40 ft
**b)** The design from question 9; it has the greatest area.
**12.** 80 cm by 80 cm
**13. a)** 6.7 m by 13.4 m **b)** 26.8 m
**14. a)** A **b)** 36 ft **c)** Answer may vary.

## BLM 1-15 Section 1.6 Analyse Optimum Volume and Surface Area

**1.** D, B, A, C; A cube has the minimum surface area, so the box that most resembles a cube will have the least surface area, and boxes that are not cube shaped will have a greater surface area.
**2.** G, H, F, E; Volume is maximized in a cylinder when the height and the diameter are the same, so cylinders that are taller than they are wide have a lesser volume and cylinders that are as tall as they are wide have a greater volume.
**3.** A cube with a side length of 9.283 m.
**4.** The shed would become shorter and the square base will be larger: base 11.7 m by 11.7 m, height 5.84 m.
**5. a)** 480 000 cm$^3$ or 0.48 m$^3$
**b), c)** A cube with a side length of 78.3 cm.
**6. a)** approximately 1728 cm$^3$
**b)** Yes. If the diameter and the height of the can were the same (13 cm), Coca will use less packaging.
**c)** 6%
**7.** radius: 4.07 cm, height 8.15 cm
**8. a)** side: 12.60 cm; length: 7.274 cm
**b)** Answers may vary. For example, set up the volume and surface area formulas in a spreadsheet and use systematic trial to find the minimum surface area for the given volume.
**9. a)** base: 7.913 cm by 7.913 cm; 939.2 cm$^3$
**b)** side: 11.96; 928.69 cm$^3$
**c)** radius: 4.82; 1094.2 cm$^3$



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**10. a)** Square-based prism: cube with side length 10 cm; 1000 $cm^3$. Equilateral triangle-based prism: side: 15.197 cm, height: 8.77 cm; 877.38 $cm^3$. Cylinder: radius: 5.64 cm, height: 11.28 cm; 1128.38 $cm^3$.
**b)** The square-based prism and the equilateral triangle-based prism are shorter. The cylinder is wider and shorter; the diameter and the height are now the same.
**11.** Cylinder. Rectangular gifts will not fit easily in cylindrical boxes. Cylinders are more difficult to assemble and store than square-based prism boxes.

## BLM 1-18 Chapter 1 Review

**1.** 64 $ft^2$
**2.** 2450 $cm^2$
**3. a)** 4 cans **b)** 1 can
**4.** 4.6 cm
**5.** 0.7 $m^3$
**6.** 7.5 ft
**7.** 4.8 $m^2$
**8.** 48 $ft^2$
**9.** 1403 $cm^2$
**10. a)** Make a square with sides 6 m in length.
**b)** Make a rectangle with sides 12 m and 6 m in length against 12 m of the existing fence.
**11.** 31 yd
**12.** The minimum perimeter would be 21.9 yd. The garden would be 10.9 yd by 5.5 yd, built against a 10.9 yd section of the school.
**13.** A, C, B, D; A cube has a minimum surface area for a given volume. So the box that is most like a cube will have the minimum surface area. Order the boxes from the one that looks most like a cube to the one that looks least like a cube.
**14.** D, B, A, C; A cylinder will have a maximum volume for a given surface area when the diameter is equal to the height. Order the containers from the one that looks as wide as it is tall to the one that is much wider than it is tall.
**15. a)** radius: 6.83 cm; height: 13.66 cm. Assume the radius and height can be any value that gives the fixed volume.
**b)** The container will be awkward to hold and pour since it is so wide. It will take up more shelf space than a taller, narrower container so fewer containers can be displayed in stores.
**16. a)** approximately 12.25 cm by 12.25 cm by 12.25 cm
**b)** a cube
**c)** 1837 $cm^3$
**17. a)** 10.1 $m^3$
**b) i)** 4.2 $m^3$
**ii)** 8.9 $m^3$

## BLM 1-19 Chapter 1 Practice Test

**1.** B
**2.** D
**3.** B
**4.** A
**5.** B
**6.** 415 $cm^2$
**7. a)** All sides approximately 11.2 cm.
**b)** Box should be a cube with side lengths 11.2 cm.
**c)** 751 $cm^2$
**8.** 1910.1 $cm^2$
**9. a)** 6031.9 $cm^3$ **b)** radius: 9.86 cm; height: 19.75 cm
**10.** 86 $cm^3$. Assume the medallion is solid except for the visible cut-out part.
**11. a)** approximately 7.6 $m^2$
**b)** He can double the area. The garden would be 2.75 m wide and 5.5 m long, along a 5.5-m section of his house.
**12.** 143.3 $m^2$
**13. a)** 3244 $ft^2$
**b)** 301 $m^2$
**c)** 488 $ft^2$
**d)** 46 cans
**14. a)** 2.6 $cm^3$; assume the hole approximates a cylinder
**b)** 194 $cm^2$
**c)** 41 bottles; assume the bottle spouts are not included

## BLM 1-20 Chapter 1 Test

**1.** C
**2.** A
**3.** D
**4.** A
**5.** C
**6.** 2.2 $m^2$
**7. a)** radius: 4.92 cm; height: 9.85 cm
**b)** Cylinder should have same height and diameter.
**c)** 456.97 $cm^2$
**8.** 70.7 $yd^2$
**9. a)** 37.2 $yd^3$ **b)** all sides approximately 3.34 yd
**10.** 9778.2 $cm^3$. Assume the pipe is hollow and does not have any holes.
**11. a)** 56.25 $m^2$
**b)** She would have four times the area, 225 m. The garden would be 15 m wide and 15 m long.
**12.** 91 $m^2$
**13. a)** 5025 $cm^3$
**b)** 49 sets; assume there is no wastage
**c) i)** 44 sets **ii)** 33 sets
**14. a) to e)** Answers may vary.



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