SAMPLE CHAPTER TEST SOLUTIONS

1. $SA = 2\pi r^2 + 2\pi rh$
$SA = 2\pi(5) + 2\pi(5)(12)$
$SA \approx 534.07 \text{ cm}^2$
The answer is c).

2. $V = \ell \times w \times h$
$V = 42 \times 93 \times 52$
$V = 203\ 112 \text{ cm}^3$
$203\ 112 \div (100)^3 \approx 0.2 \text{ m}^3$
The answer is b).

3. A box that has 8 times the volume will have side lengths that have been doubled. This is because 2 times 2 times 2 equals 8.
The answer is a).

4. Since the box is in the shape of a cube, each of the side lengths are equal. This means that students can cube root the volume to determine the side length.
$\sqrt[3]{15\ 625} = 25$
The answer is a).

5. A sphere has $\frac{2}{3}$ of the volume of its circumscribing cylinder.
The answer is c).

6. $V = \pi r^2 h$
$V = \pi(15)^2 (30)$
$V \approx 21\ 205.75 \text{ ft}^3$
The tank will hold $21\ 205.75 \text{ ft}^3$.

7. Two of the walls will have an area of 25 ft times 10 ft, or 250 ft^2 each.
Two of the walls will have an area of 32 ft times 10 ft, or 320 ft^2 each.
The total area of the four walls would be 1140 ft^2.

8. A cubic box would require the least material. To fit 64 boxes, the boxes could be placed 4 times 4 times 4 in the box, which would make the dimensions of the larger box 20 in. by 20 in. by 20 in.

9. a) Surface area of prism = $8 \times 4 \times 4 + 2 \times 4 \times 4$
Surface area of prism = 160 cm^2

Surface area of cylinder $= 2\pi(2)^2 + 2\pi(2)(8)$
Surface area of cylinder ≈ 125.7 cm^2
The cylinder will require less material to create.
b) 10 prisms $= 1600$ cm^2
10 cylinders $= 1256.6$ cm^2
The cylinders would use 343.4 cm^2 less material than using the prisms.

10. a) Surface area of prism $= 2(12 \times 3) + 2(3 \times 4) + 2(12 \times 4)$
Surface area of prism $= 192$ m^2
Surface area of sphere $= 4\pi(3)^2$
Surface area of sphere ≈ 113.10 m^2
The sphere will require less material to create.
b) Volume of prism:
$12 \times 3 \times 4 = 144$ m^3
Volume of sphere:
$\frac{4}{3}\pi(3)^3 \approx 113.10$ m^3
The sphere will require less material to fill.

11. $V = \pi r^2 x$
$879.44 = \pi(3.6)^2 x$
$879.44 \div [\pi(3.6)^2] = x$
$21.6 \approx x$
The length of the pipe is 21.6 m.

12. Volume of rectangular brick:
$V = \ell \times w \times h$
$V = 7.9 \times 4.2 \times 6.8$
$V = 225.624$ cm^3
Volume of a sphere:
$V = \frac{4}{3}\pi r^3$
$2225.624 \div \frac{4}{3}\pi = r^3$
$53.86 \approx r^3$
$\sqrt[3]{53.86} \approx r$
$3.78 \approx r$
The radius of the largest candle Darrin can make is approximately 3.78 cm.

13. a) V $= 85 \times 700 \times 200$
V $= 11\,900\,000$ ft^3
b) 1 foot $= \frac{1}{3}$ yard
$(1 \text{ foot})^3 = (\frac{1}{3} \text{ yard})^3$
1 ft$^3 = \frac{1}{27}$ yd^3
$11\,900\,000$ ft$^3 = 440\,740.7407$ yd^3
The city will need to haul away approximately $440\,741$ yd^3 of dirt.