Chapter 12 Review

Calculate the listed values, then find the values for the Lateral Area, Total Area, and Volume. Show your work and state all equations used.

1. \[ p = 26 \quad h = 6 \quad B = 30 \]

   \[ \text{L.A.} = ph = 26 \times 6 = 156 \]
   \[ \text{T.A.} = L.A. + B = 156 + 30 = 186 \]
   \[ V = Bh = 26 \times 30 = 780 \]

2. \[ p = 64 \quad l = 17 \quad h = 15 \]

   \[ \text{L.A.} = \frac{1}{2}pl = \frac{1}{2} \times 64 \times 17 = 544 \]
   \[ \text{T.A.} = L.A. + B = 544 + 256 = 800 \]
   \[ V = \frac{1}{3} Bh = \frac{1}{3} \times 17 \times 15 \times 64 = 1280 \]

3. \[ r = 2 \quad d = \frac{4}{5} \quad h = \frac{5}{r} \quad B = 4\pi \]

   \[ \text{L.A.} = 2\pi rh = 2\pi \left(2 \times \frac{5}{2}\right) = 20\pi \]
   \[ \text{T.A.} = L.A. + B = 20\pi + 4\pi = 24\pi \]
   \[ V = \pi r^2 h = \pi \left(2^2 \times \frac{5}{2}\right) = 20\pi \]

4. \[ r = 5 \quad h = 12 \quad \ell = \frac{13}{r} \quad B = 25\pi \]

   \[ \text{L.A.} = \pi (s)(l) = \pi (5)(13) = 65\pi \]
   \[ \text{T.A.} = L.A. + B = 65\pi + 25\pi = 90\pi \]
   \[ V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi (5)^2 (12) = 100\pi \]

Organize your work. Solve for the missing length or value. Diagrams are not required.

5. The total area of a cube is 216. Find the Lateral Area.

   \[ T.A. = 6s^2 = 216 \]
   \[ s^2 = 36 \]
   \[ s = 6 \]
   \[ L.A. = 4s^2 = 4(6)^2 = 144 \]

6. A cylinder of height 3 holds 48\pi gallons of water. If it is transferred perfectly to a tank that is four times as tall, find the diameter of the new tank.

   \[ C_1: \quad V = \pi r^2 h = 48\pi = \pi r^2 (3) \quad r^2 = 16 \quad r = 4 \]
   \[ C_2: \quad r = 4 \times 4 = 16 \quad \ell = 16 \times 2 = \boxed{32} \]
Draw and label diagrams to represent the given word problem. Solve, showing all work and any formulas used.

7. You are trying to paint all walls, ceiling and floor of a rectangular room that is 12 ft. by 8 ft. all the same color and with one coat. The distance from the floor to the ceiling is 9 ft. You have 3 1-gallon buckets of paint that each covers 331 ft². Do you have enough paint to cover the entire room once?

\[
\text{T.A.} = ph + 2B
= (40)(9) + 2(96)
= 360 + 192
= 552 ft^2
\]

3 buckets = 3 \times 331 ft² = 1053 ft²

Yes, you have enough paint.

8. You want to pour a can of soda into a glass cup and the only one you have available is approximately 4 inches in diameter and 3 inches tall. If a can of soda is approximately 5 inches high and 2 inches in diameter, will all of your soda fit in the new cup (assuming you don’t use ice)?

\[
V(\text{can}) = \pi r^2 h = \pi (1)^2 \times 5 = 5\pi
\]

\[
V(\text{glass}) = \pi r^2 h = \pi (2)^2 \times 3 = 12\pi
\]

Yes, the soda will fit in the cup.

9. If the original scale factor of a solid is \( a:b \), then name the ratios of:
   a. Lengths = \( a:b \)
   b. Areas = \( a^2:b^2 \)
   c. Volumes = \( a^3:b^3 \)

10. Given the ratio of radii is 3:4, then,
    Scale factor = \( \frac{3}{4} \)
    a. Ratio of volumes = \( \frac{27}{64} \)
    b. Ratio of lateral area = \( \frac{9}{16} \)
    c. Ratio of circumference = \( \frac{3}{4} \)
    d. Ratio of total area = \( \frac{9}{16} \)

11. Given base areas are \( 8\pi \) and \( 18\pi \), then,
    Scale factor = \( \frac{2}{3} \)
    a. Ratio of base edge = \( \frac{2}{3} \)
    b. Ratio of volume = \( \frac{8}{27} \)
    c. Ratio of lateral area = \( \frac{4}{9} \)
    d. Ratio of height = \( \frac{2}{3} \)

The following solids are similar. Use the given information to solve for the missing value. (3 pts. ea)

12. The scale factor of solid A : solid B is 1:5.
If solid A has a slant height of 8, calculate the slant height of solid B.
\[
\frac{\text{Sh}(A)}{\text{Sh}(B)} = \frac{A}{B} = \frac{8}{X} = \frac{1}{5}
\]
\[
X = 40
\]

If solid E has a base area of 27, calculate the base area of solid F.
\[
\frac{B(E)}{B(F)} = \frac{E^2}{F^2} = \frac{27}{X} = \frac{9}{16}
\]
\[
X = 48
\]

13. The scale factor of solid C : solid D is 5:2.
If solid C has a volume of 250, calculate the volume of solid D.
\[
\frac{V(C)}{V(B)} = \frac{C^3}{B^3} = \frac{250}{X} = \frac{125}{8}
\]
\[
X = 16
\]

15. The scale factor of solid G : solid H is 2:1.
If solid G has a circumference of \( 16\pi \), calculate the circumference of solid H.
\[
\frac{\text{circ}(G)}{\text{circ}(H)} = \frac{G}{H} = \frac{16\pi}{X} = \frac{2}{1}
\]
\[
X = 8\pi
\]