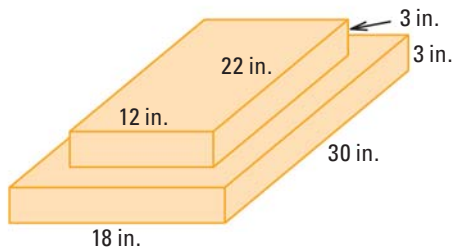


## SURFACE AREA AND VOLUME PROBLEMS ON TAKS

Below are examples of surface area and volume problems in multiple choice format. Try solving the problems before looking at the solutions. (Cover the solutions with a piece of paper.) Then check your solutions against the ones given.

1. The diagram shows two rectangular layers of a cake. Each layer is 3 inches high. The bottom of each layer is not frosted, and the entire top of the lower layer is frosted. One batch of frosting covers 400 square inches of cake. How many batches are needed to frost the cake?



- A 3
- B 4
- C 5
- D 6

2. What is the approximate volume of a soccer ball with a radius of 11 centimeters?
- F  $1521 \text{ cm}^3$
  - G  $3136 \text{ cm}^3$
  - H  $5436 \text{ cm}^3$
  - J  $5575 \text{ cm}^3$

### Solution

Find the surface area to frost on each layer.

$$\begin{aligned} \text{Top layer surface area} &= (2B + Ph) - B \\ &= B + Ph \\ &= 12(22) + [2(12) + 2(22)](3) \\ &= 468 \end{aligned}$$

$$\begin{aligned} \text{Bottom layer surface area} &= (2B + Ph) - B \\ &= B + Ph \\ &= 18(30) + [2(18) + 2(30)](3) \\ &= 828 \end{aligned}$$

Find the total surface area to be frosted.

$$\text{Total surface area} = 468 + 828 = 1296 \text{ in.}^2$$

Finally, find the number of batches of frosting.

$$1296 \text{ in.}^2 \cdot \frac{1 \text{ batch of frosting}}{400 \text{ in.}^2} = 3.24 \text{ batches}$$

So, 4 batches of frosting are needed.

The correct answer is B.

- (A)      (B)      (C)      (D)

### Solution

$$\begin{aligned} \text{Volume} &= \frac{4}{3}\pi r^3 \\ &= \frac{4}{3}\pi(11)^3 \\ &= \frac{4}{3}\pi(1331) \\ &\approx 5575 \text{ cm}^3 \end{aligned}$$

The correct answer is J.

- (F)      (G)      (H)      (J)