# Fully-worked Solutions

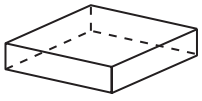
## Practice 6

### Formative Practice

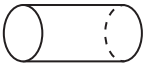
**1**


Cylinder
Answer: **D**

**2** (a)

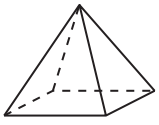


(b)



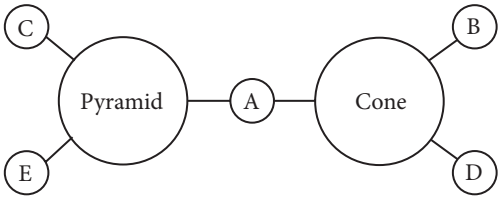
(c)

(d)

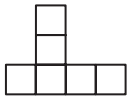


Cone
Pyramid
Cuboid
Cylinder

**3**

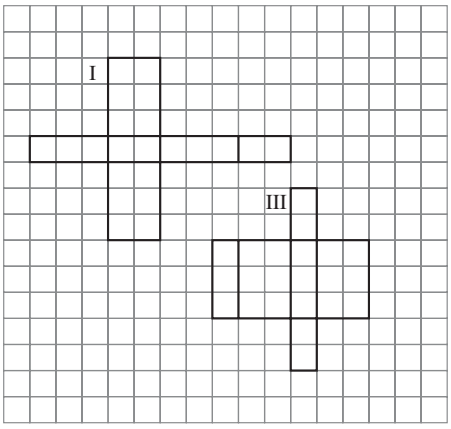



**4**



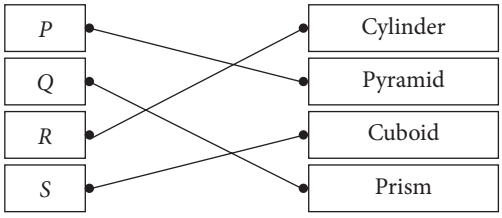
Answer: **C**

**5**

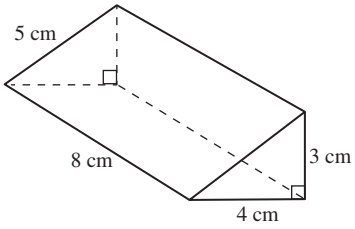



Answer: **C**

**6**



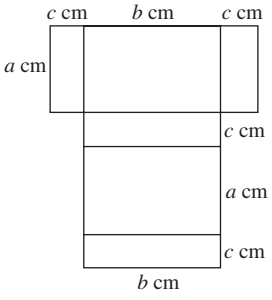

**7**




Surface area of prism

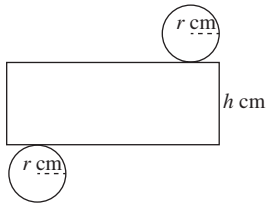
$= (8 \times 4) + (8 \times 5) + (8 \times 3) + \left(2 \times \frac{1}{2} \times 4 \times 3\right)$
$= 32 + 40 + 24 + 12$
$= 108 \text{ cm}^2$
Answer: **B**

**8** (a)



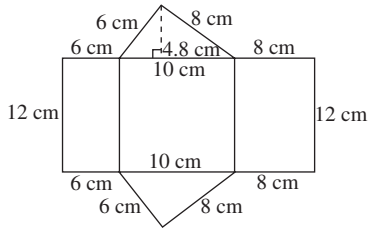
(b) Surface area of cuboid
$= ac + ab + bc + ac + ab + bc$
$= 2ac + 2ab + 2bc$
$= 2(ac + ab + bc)\ \text{cm}^2$

**9** (a)




(b) Length of rectangle = circumference of circle
$= 2\pi r$ cm
Width of rectangle = height of cylinder
$= h$ cm
Surface area of cylinder
= area of rectangle + 2 × area of circle
$= 2\pi r \times h + 2 \times \pi r^2$

**10** (a)

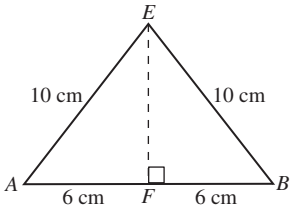



(b) Surface area of prism

$= (12 \times 10) + (12 \times 8) + (12 \times 6) + \left(2 \times \frac{1}{2} \times 10 \times 4.8\right)$
$= 120 + 96 + 72 + 48$
$= 336\ \text{cm}^2$

**11** Surface area of cylinder
$= 2 \times \pi \times 4^2 + 2\pi \times 4 \times 10$
$= 32\pi + 80\pi$
$= 112\pi\ \text{cm}^2$

**12** (a)




$EF^2 = 10^2 - 6^2$
$= 100 - 36$
$= 64$
$EF = 8$ cm
Distance of $E$ from $AB$ is 8 cm.

(b) Area of square $ABCD$
$= 12 \times 12$
$= 144\ \text{cm}^2$

(c) Area of triangle $ABE$

$= \frac{1}{2} \times 12 \times 8$
$= 48\ \text{cm}^2$

(d) Surface area of pyramid
$= 144 + 4 \times 48$
$= 336\ \text{cm}^2$

**13** (a) Area of circle
$= 3.142 \times 10^2$
$= 314.2\ \text{cm}^2$

(b) Curved surface area
$= 3.142 \times 10 \times 30$
$= 942.6\ \text{cm}^2$

(c) Surface area of cone
$= 314.2 + 942.6$
$= 1\ 256.8\ \text{cm}^2$

**14** Radius of balloon, $r = 2$ m
Surface area of balloon
$= 4\pi(2)^2$
$= 16\pi\ \text{m}^2$

**15** (a) Surface area of sphere

$= 4 \times \frac{22}{7} \times 7^2$
$= 616\ \text{cm}^2$

(b) Surface area of sphere

$= 4 \times \frac{22}{7} \times 14^2$
$= 2\ 464\ \text{cm}^2$

**16** $2 \times \pi \times 6^2 + 2\pi \times 6 \times y = 216\pi$
$72 + 12y = 216$
$12y = 144$
$y = 12$

**17** (a) Surface area of $ABCD$
$= 10 \times 16$
$= 160\ \text{cm}^2$
Surface area of $ABFE$
$= 10 \times 12$
$= 120\ \text{cm}^2$
Surface area of $BCGF$
$= 16 \times 12$
$= 192\ \text{cm}^2$
Surface area of $EFKJ$

$= \frac{1}{2} \times (4 + 10) \times 4$

$= \frac{1}{2} \times 14 \times 4$
$= 28\ \text{cm}^2$
Surface area of $FGLK$
$= 16 \times 5$
$= 80\ \text{cm}^2$
Surface area of $JKLM$
$= 4 \times 16$
$= 64\ \text{cm}^2$

(b) Surface area of composite solid
$= 160 + 2(120) + 2(192) + 2(28) + 2(80) + 64$
$= 160 + 240 + 384 + 56 + 160 + 64$
$= 1\ 064\ \text{cm}^2$

**18** Volume of pyramid

$= \frac{1}{3} \times 12 \times 10 \times 15$

$= 600 \text{ cm}^3$

Answer: **B**

**19** Volume of prism $= \frac{1}{2} \times$ volume of cuboid

$= \frac{1}{2} \times a \times b \times c$

= area of base × height

**20** Volume of cylinder = Area of circle × height

$= \pi r^2 h$

**21** (a) Volume of cuboid = 3 × volume of pyramid

(b) Volume of pyramid $= \frac{1}{3} \times$ base area × height

**22** Volume of prism

$= \frac{1}{2} \times 8 \times 6 \times 4$

$= 96 \text{ cm}^3$

**23** (a) Volume of pyramid

$= \frac{1}{3} \times 21 \times 4$

$= 28 \text{ cm}^3$

(b) Volume of pyramid = 20 cm³

$\frac{1}{3} \times A \times 5 = 20$

$5A = 60$

$A = 12$

Base area = 12 cm²

(c) Volume of cone = 80 cm³

$\frac{1}{3} \times 30 \times h = 80$

$10h = 80$

$h = 8$

Height = 8 cm

**24** (a) Volume of tennis ball

$= \frac{4}{3} \times \frac{22}{7} \times 3.5^3$

$= 179.7 \text{ cm}^3$

(b) Volume of softball

$= \frac{4}{3} \times \frac{22}{7} \times 4.9^3$

$= 493 \text{ cm}^3$

(c) Volume of football

$= \frac{4}{3} \times \frac{22}{7} \times 10.85^3$

$= 5\,352.4 \text{ cm}^3$

**25** (a) Volume of prism

$= \frac{1}{2} \times 8 \times 16 \times 11$

$= 704 \text{ cm}^3$

(b) $\frac{22}{7} \times r^2 \times 14 = 704$

$r^2 = 16$

$r = 4$ cm

**26** Volume of composite solid

$= \pi \times 3^2 \times 4 + \frac{2}{3}\pi \times 3^3$

$= 36\pi + 18\pi$

$= 54\pi \text{ cm}^3$

**27** (a) $x(3)(15) + 10(x)(8) = 1\,500$

$45x + 80x = 1\,500$

$125x = 1\,500$

$x = 12$

(b) Surface area of composite solid

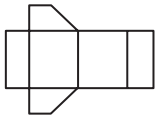
$= (12 \times 15) + 2(12 \times 3) + 2(15 \times 3) + 2(10 \times 12) + 2(10 \times 8) + (8 \times 12) + (7 \times 12)$

$= 180 + 72 + 90 + 240 + 160 + 96 + 84$

$= 922 \text{ cm}^2$

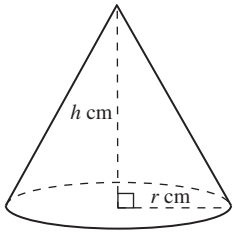
## Summative Practice

**1**



Answer: **A**

**2**




$h : r = 3 : 4$

$\frac{h}{r} = \frac{3}{4}$

$h = \frac{3}{4}r$

$\frac{1}{3}\pi r^2 h = 2\,000\pi$

$\frac{1}{3}\pi r^2\left(\frac{3}{4}r\right) = 2\,000\pi$

$\frac{1}{4}r^3 = 2\,000$

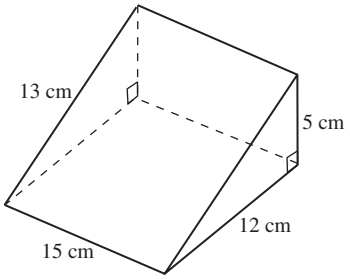
$r^3 = 8\,000$

$r = \sqrt[3]{8\,000}$

$= 20$ cm

Answer: **C**

**3**




Surface area of prism

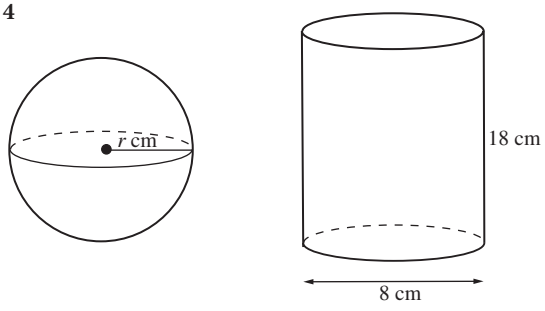
$= (15 \times 12) + (15 \times 13) + (15 \times 5) + \left(2 \times \frac{1}{2} \times 12 \times 5\right)$

$= 180 + 195 + 75 + 60$

$= 510 \text{ cm}^2$

Answer: **D**

**4**




$\frac{4}{3}\pi r^3 = \pi(4)^2(18)$

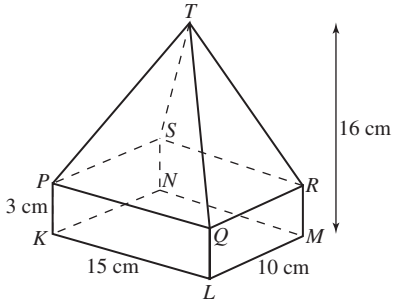
$\frac{4}{3}r^3 = 288$

$r^3 = 216$

$r = 6 \text{ cm}$

Answer: **B**

**5**




Volume of composite solid

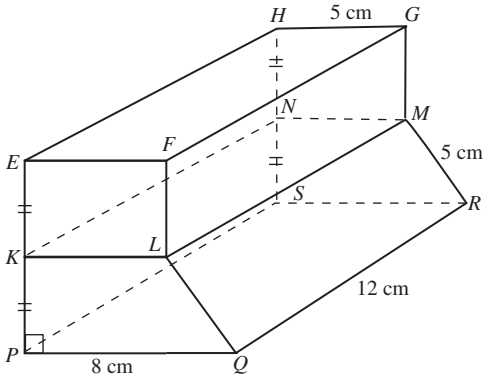
$= (15 \times 10 \times 3) + \left(\frac{1}{3} \times 15 \times 10 \times 13\right)$

$= 450 + 650$

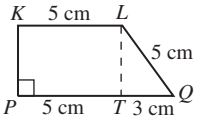
$= 1\,100 \text{ cm}^3$

Answer: **B**

**6**




(a)




$LT^2 = 5^2 - 3^2$

$= 25 - 9$

$= 16$

$LT = 4 \text{ cm}$

$KP = 4 \text{ cm}$

(b) Volume of solid

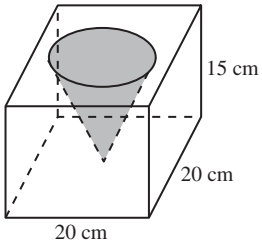
$= \left[\frac{1}{2} \times (5 + 8) \times 4 \times 12\right] + (5 \times 12 \times 4)$

$= \left(\frac{1}{2} \times 13 \times 4 \times 12\right) + 240$

$= 312 + 240$

$= 552 \text{ cm}^3$

**7**




$(20^2 \times 15) - \left(\frac{1}{3} \times \pi \times 7^2 \times h\right) = 5\,384$

$6\,000 - \left(\frac{1}{3} \times \frac{22}{7} \times 7^2 \times h\right) = 5\,384$

$6\,000 - \frac{154}{3}h = 5\,384$

$\frac{154}{3}h = 616$

$h = 12 \text{ cm}$