Surface Area and Volume Review   Name __Key__

Find the indicated measurements.

|	
1. Height= __12 cm__ Slant height = __13 cm__ Area of Base = __100 cm²__ Lateral Area = __260 cm²__ Surface Area = __360 cm²__ Volume = $\frac{1}{3}(100)(12) = 400 \text{ cm}^3$	 13 cm h 10 cm 10 cm
2. Height= __9 in__ Area of Base = __9π in²__ Lateral Area = $2\pi rh = 2\pi(3)(9) = 54\pi \text{ in}^2$ Surface Area = $2\pi r^2 + 2\pi rh = 2\pi(3)^2 + 2\pi(3)(9)$ $18\pi + 54\pi = 72\pi \text{ in}^2$ Volume = $\pi r^2 h = \pi(3)^2(9) = 81\pi \text{ in}^3$	9 in. 3 in.
3. Height= __15 ft__ Slant height = __17 ft.__ Area of Base = $\pi(8)^2 = 64\pi \text{ ft}^2$ Lateral Area = $\pi r\ell = \pi(8)(17) = 136\pi \text{ ft}^2$ Surface Area = __200π ft²__ Volume = $\frac{1}{3}(\pi r^2 h) = \frac{1}{3}\pi(8)^2(15) = \boxed{320\pi \text{ ft}^3}$	8 ft 17 15 ft
4. Surface Area = __734 cm²__ Volume = __1050 cm³__	25 cm 6 cm 7 cm 42 42 150 150 175 175 ‾‾‾ 734
5. The surface area of a right cylinder is 324π cm². If the radius and height are equal find the length of the diameter. __9 cm__	$SA = 2\pi r^2 + 2\pi rh$ $324\pi = 2\pi(r^2) + 2\pi r(r)$ $324\pi = 2\pi r^2 + 2\pi r^2$ $\frac{324\pi}{4} = \frac{4\pi r^2}{4}$ $81 = r^2 \Rightarrow r = 9$
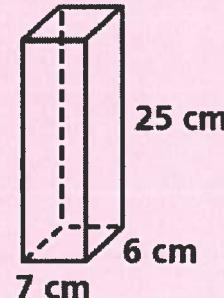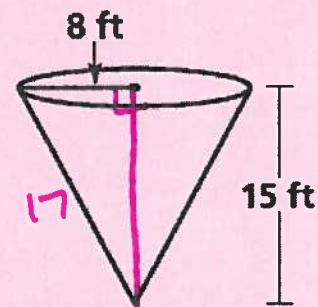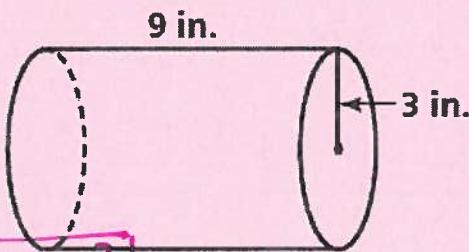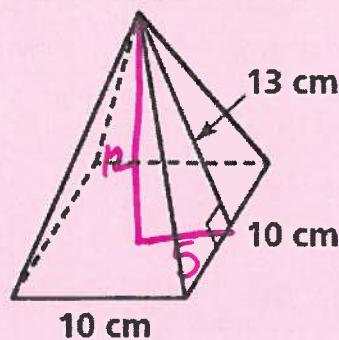
6. Height = **7 cm**

Area of Base = **17 cm²**

Lateral Area = **140 cm²**

Surface Area = $140 + 17 + 17 =$ **174 cm²**

Volume = $70 + 42 + 7 =$ **119 cm³**

$V = B \cdot h$

(diagram: stacked rectangular prisms)
2 cm, 2 cm, 2 cm, 2 cm, 1 cm, 1 cm, 7 cm
14, 14, 7×2×5 = 70, 14, 7×2×3 = 42, 10, 7×1×1 = 7
5
ℓ 114
4
70 56
5.6
14
140
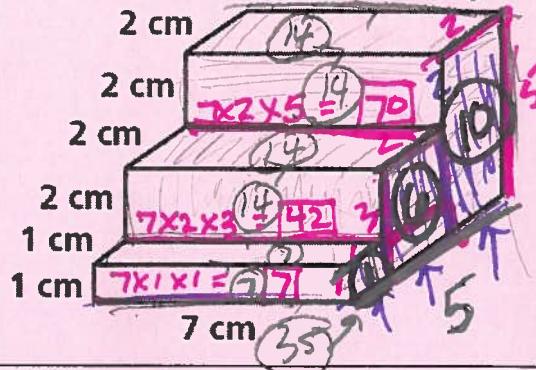
7. Height = **6 m**

Area of Great Circle = $\pi(3)^2 = 9\pi$ m²

$4\pi r^2$
Surface Area = $4\pi(3)^2 = 36\pi$ m²

$\frac{4}{3}\pi r^3$
Volume = $\frac{4}{3}\pi(3)^3 = 36\pi$ m³

(sphere diagram: 3, 3 m, 3)
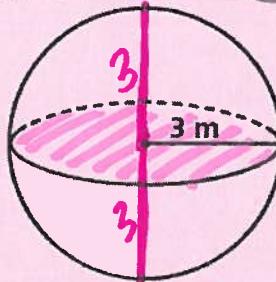
8. Height of cone = **11.3 cm**

Slant height of cone = **12 cm**

Area of Hemisphere = $\pi r^2 = 16\pi$ cm²

Lateral Area of cone = $\pi r \ell = \pi(4)(12) = 48\pi$ cm²

$4\pi r^2 \div 2$
Surface Area of figure = $4 \cdot 16\pi = \frac{64\pi}{2} = 32\pi + 48\pi = 80\pi$ cm²

Volume of figure = $\frac{1}{3}\pi r^2 h + \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$

$\frac{1}{3}(16)(11.3)\pi + \frac{1}{2}\left(\frac{4}{3}\pi(4)^3\right)$

$60.3\pi + 42.7\pi = 103\pi$ cm³
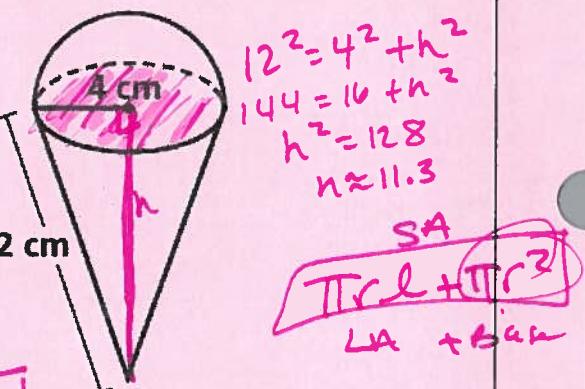
(cone diagram: 4 cm, 12 cm, h)
$12^2 = 4^2 + h^2$
$144 = 16 + h^2$
$h^2 = 128$
$h \approx 11.3$

SA
$\pi r \ell + \pi r^2$
LA + Base

9.

Surface Area = **192π m²**

Volume = **384π m³**

$V_{cyl} = \pi r^2 h = \pi(6)^2(8) = 288\pi$

$+ V_{cone} = \frac{1}{3}\pi r^2 h \quad +\frac{1}{3}\pi(6)^2(8) = 96\pi$

384π
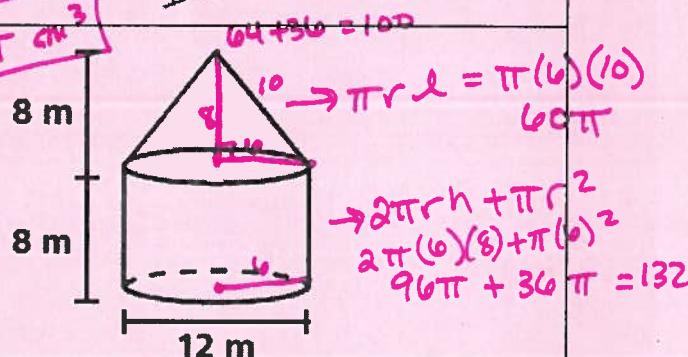
(cone on cylinder diagram: 8 m, 8 m, 12 m, 10, 6)
$64 + 36 = 100$
$10 \to \pi r \ell = \pi(6)(10)$
60π
$\to 2\pi r h + \pi r^2$
$2\pi(6)(8) + \pi(6)^2$
$96\pi + 36\pi = 132\pi$

10.

Surface Area = $2624 + 224\pi =$ **3327.7 cm²**

Volume = $10240 + 640\pi =$ **12250.6 cm³**

$V_{prism} = 16 \times 20 \times 32 = 10240$

$V_{\frac{1}{2}cyl} = \frac{1}{2}(\pi r^2 \cdot h) = \frac{1}{2}\pi(8)^2(20) = 640\pi$

(prism with half-cylinder top diagram: 8 cm, 32 cm, 20 cm, 8, 20, 32, 32, 16)
$\to \frac{1}{2}(2\pi r h + 2\pi r^2)$
$\frac{1}{2}(2\pi(8)(20) + 2\pi(8)^2)$
$\frac{1}{2}(320\pi + 128\pi)$
$= 224\pi$
$16 \times 20 = 320$
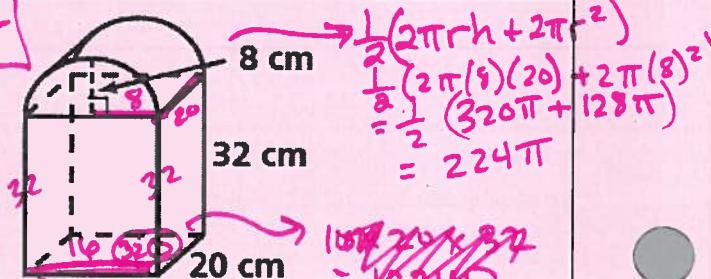
Front: 512
Back: 512
Side: 640
Side: 640
Bottom: 320 = 2624