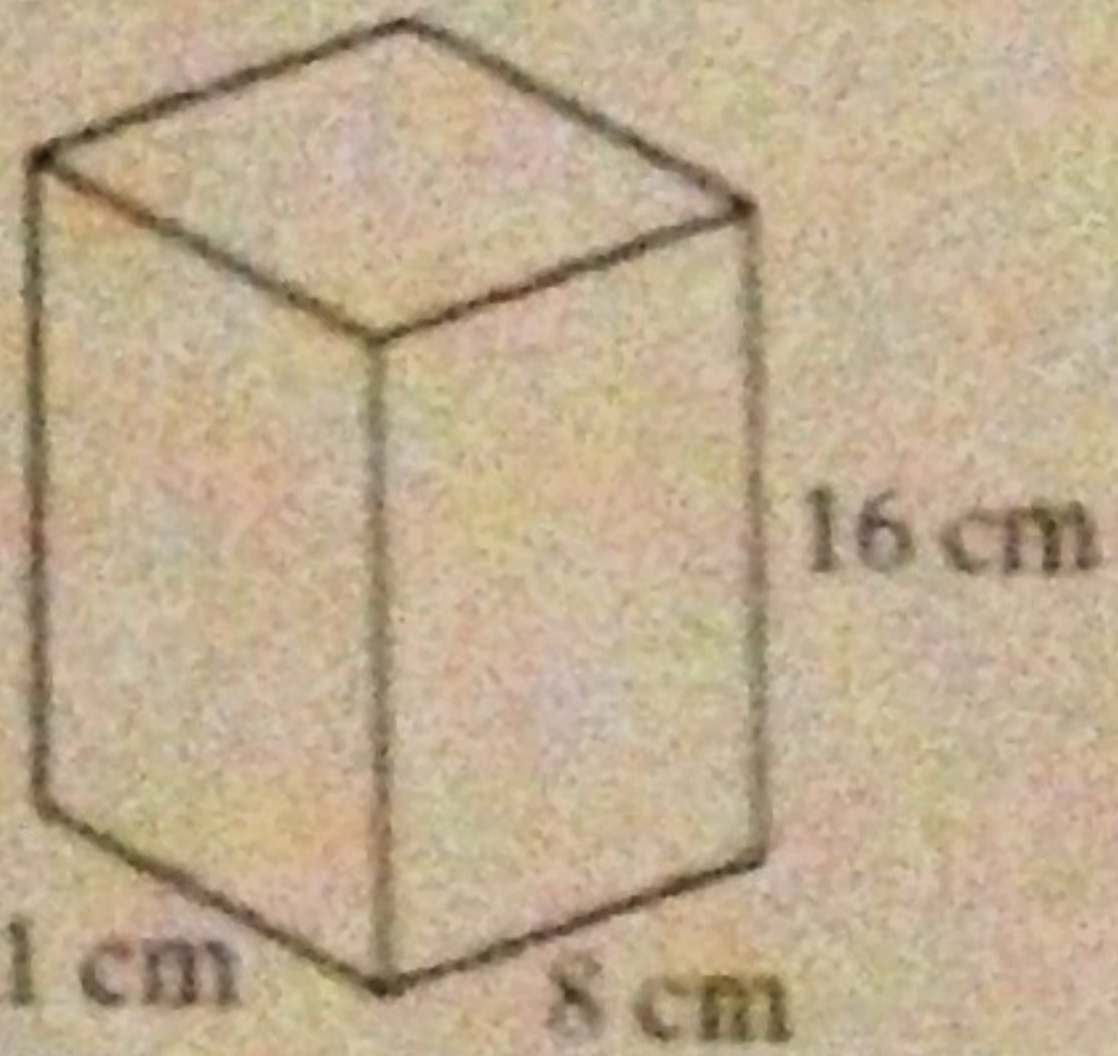


1. Volume Formulas. Write out each formula and what each variable stands for

Prism:  $V = Bh$  *B = base area, h = height of prism*  
 Cylinder:  $V = \pi r^2 \cdot h$  *r = radius, h = height of cylinder*  
 Pyramid:  $V = \frac{1}{3} Bh$  *B = base area, h = height of pyramid*  
 Sphere:  $V = \frac{4}{3} \pi r^3$  *r = radius*  
 Cone:  $V = \frac{1}{3} \pi r^2 \cdot h$  *r = radius, h = height of cone*

For the following problem, find the surface area and/or volume of the figures. Write out each formula you will be using. (Remember for volume formulas find the area of the base (B) first then plug it into the rest of the formulas)

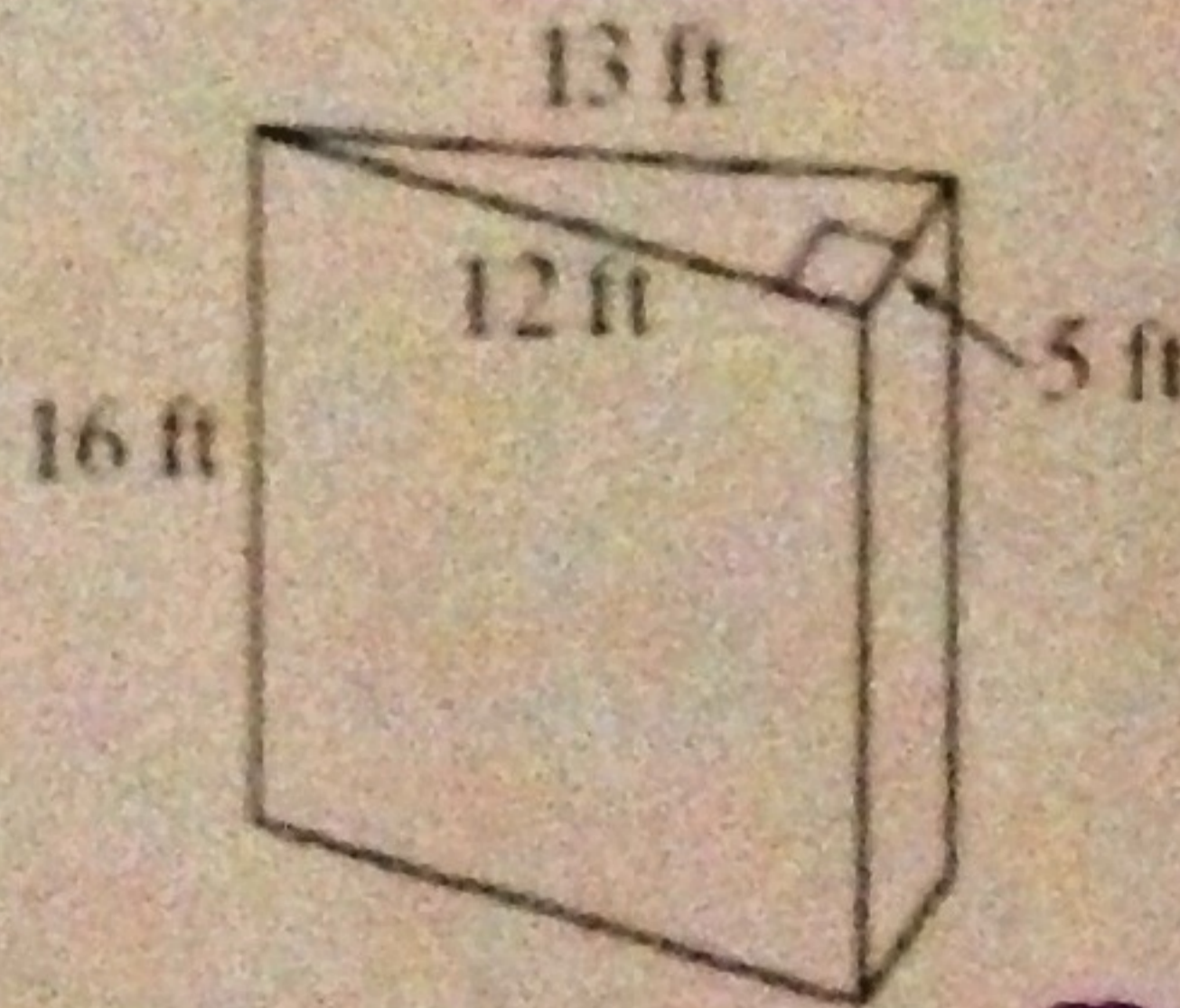
2. SA = 784 cm<sup>2</sup>  
V = 1408 cm<sup>3</sup>



$V = Bh$   
 ①  $B = 11 \times 8 = 88$   
 ②  $V = 88(16) = 1408$

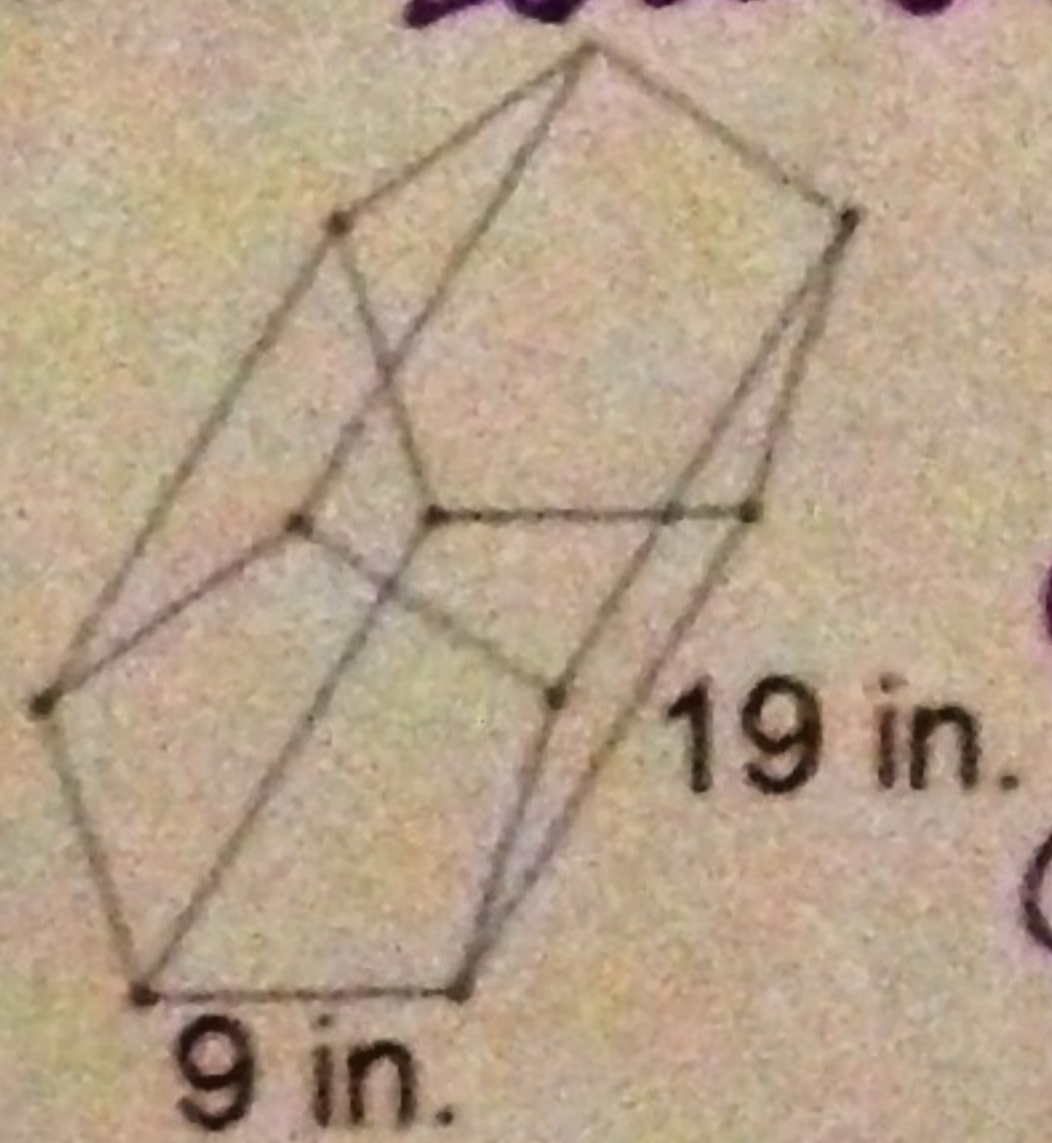
SA:  
 $11 \times 8 = 88$   
 $11 \times 16 = 176$   
 $8 \times 16 = 128$   
 $8 \times 16 = 128$   
 $11 \times 16 = 176$   
 $11 \times 16 = 176$

3. V = 480 ft<sup>3</sup>



$V = Bh$   
 ①  $B = \frac{1}{2}(12)(5) = \frac{1}{2}(60) = 30$   
 ②  $V = 30(16) = 480$

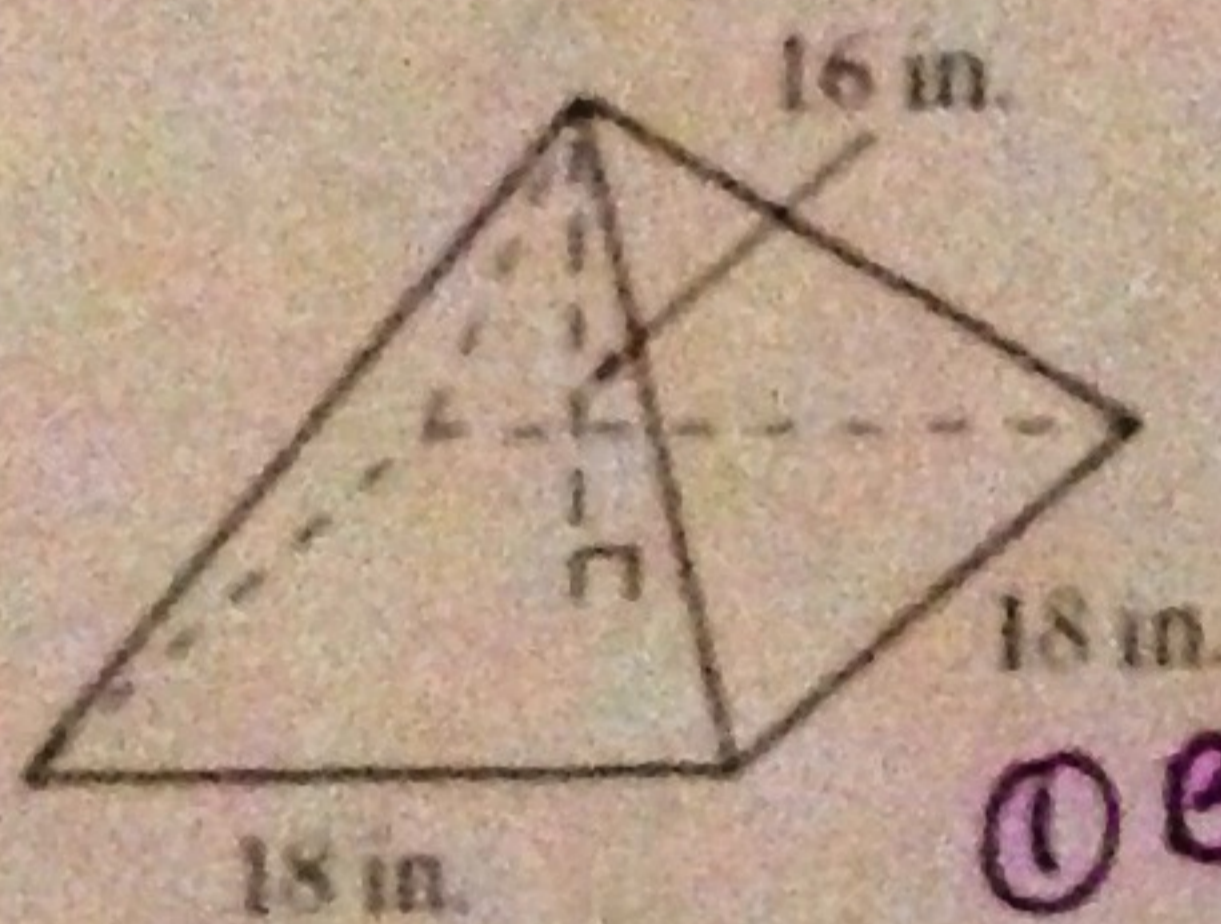
4. V = 2650.5 in<sup>3</sup>



②  $\frac{360}{5} = 72^\circ$   
 ①  $B = \frac{1}{2}ap$   
 ③  $\tan 36^\circ = \frac{4.5}{a}$   
 $a \cdot \tan 36^\circ = 4.5$   
 $a = \frac{4.5}{\tan 36}$   
 $a = 6.2$   
 ④  $P = 9(5) = 45$   
 ⑤  $B = \frac{1}{2}45(6.2) = 139.5$

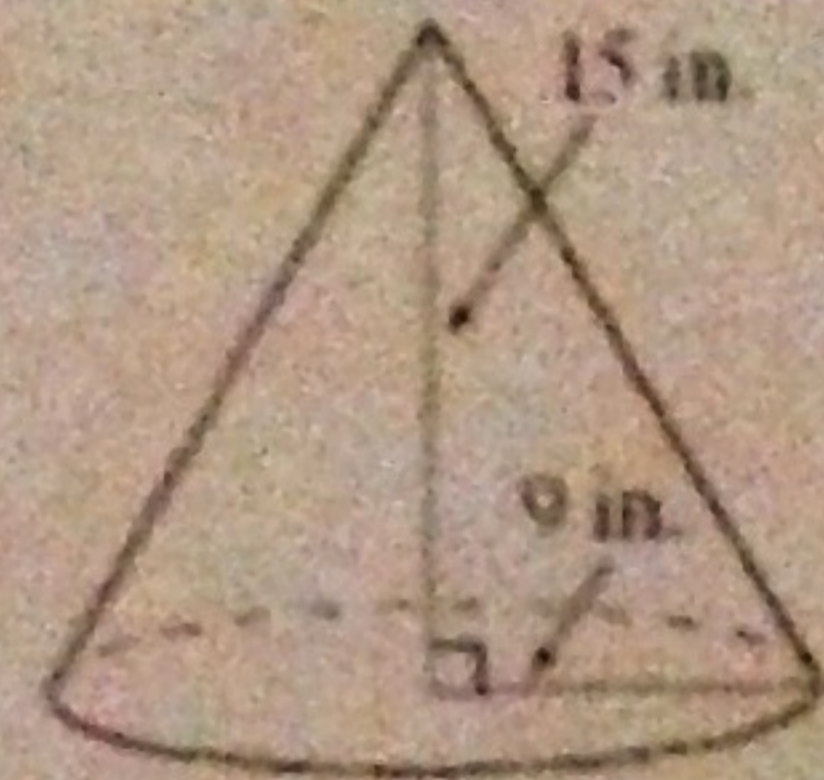
$V = Bh$   
 $= 139.5(19)$   
 $= 2,650.5$

5. V = 1728 in<sup>3</sup>



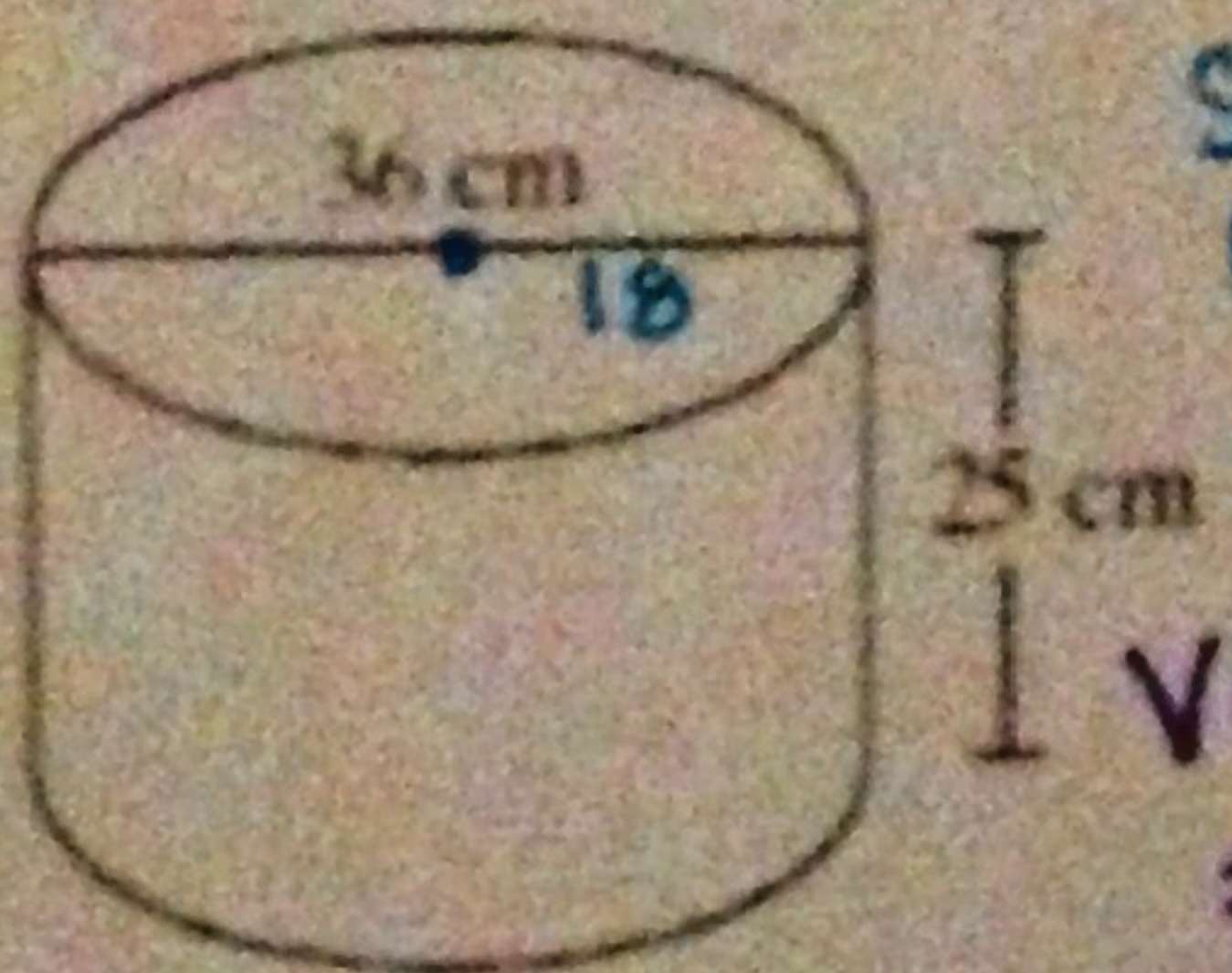
①  $B = 18(18) = 324$   
 $V = \frac{1}{3} Bh$   
 $= \frac{1}{3}(324)(16)$   
 $= 108(16)$   
 $= 1728$

6. V = 405π in<sup>3</sup> = 1272.3 in<sup>3</sup>



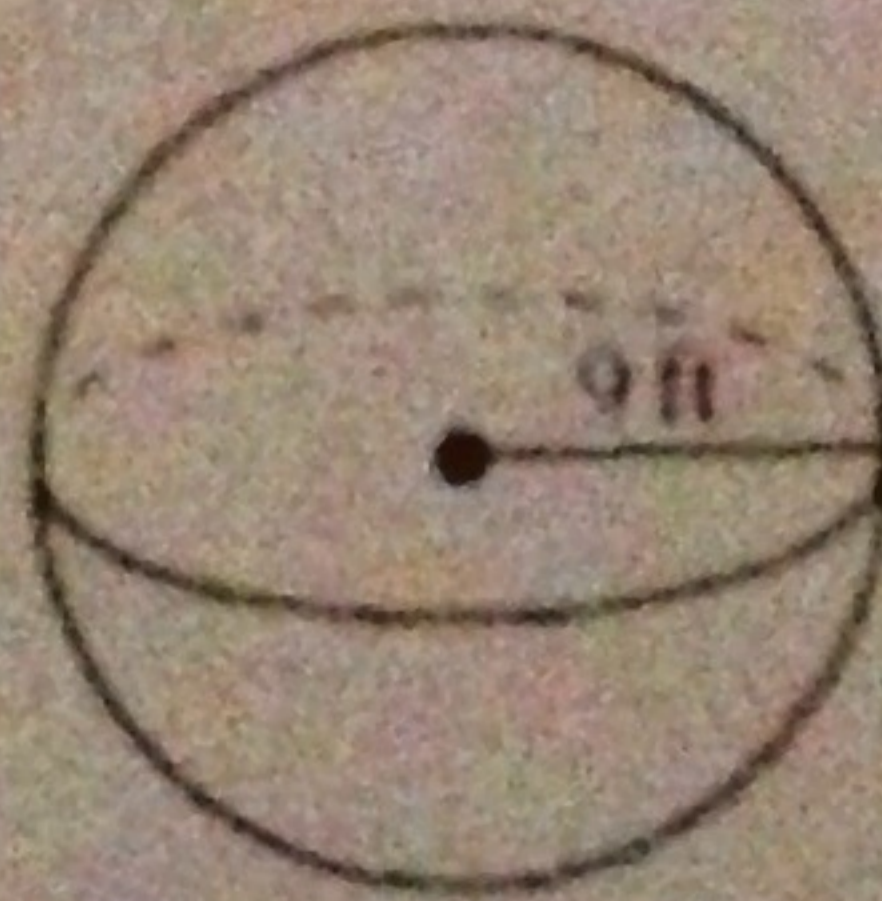
$V = \frac{1}{3} \pi r^2 \cdot h$   
 $= \frac{1}{3} \pi 9^2 \cdot 15$   
 $= \frac{1}{3} \pi \cdot 81 \cdot 15$   
 $= 405\pi \approx 1,272.3$

7. V = 8100π cm<sup>3</sup>  
SA = 1548π cm<sup>2</sup>



SA:  
 bases =  $\pi 18^2 = 324\pi$   
 $= 324\pi$   
 curved =  $2\pi \cdot 18 \cdot 25 = 900\pi$   
 $V = \pi r^2 \cdot h$   
 $= \pi 18^2 \cdot 25$   
 $= 8100\pi$

8. SA = 324π ft<sup>2</sup>  
V = 972π ft<sup>3</sup>



SA =  $4\pi r^2$   
 $= 4\pi 9^2$   
 $= 324\pi$   
 $V = \frac{4}{3} \pi r^3$   
 $= \frac{4}{3} \pi 9^3$   
 $= 972\pi$

Explain the difference between surface area (SA) and volume (V)

Surface area is the amount of space around the outside of 3D object. Volume is the space inside the 3D object.

V =



$$V_{\text{pyramid}} + V_{\text{prism}}$$

$$\textcircled{3} 128 + 64 = 192 \text{ mm}^3$$

$$\textcircled{1} V_{\text{pyramid}} = \frac{1}{3} Bh = \frac{1}{3} (64)(6)$$

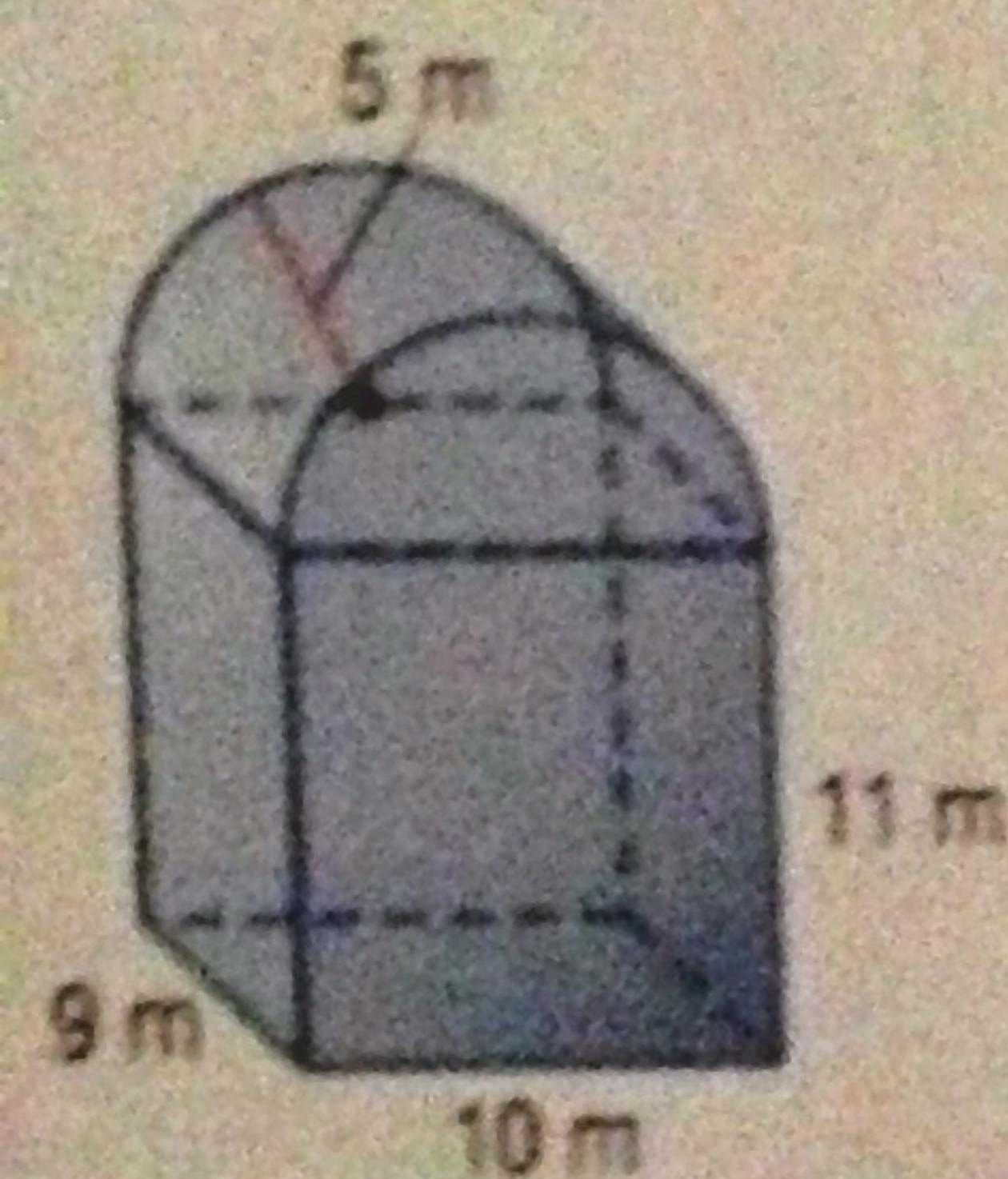
$$B = 8(8) = 64$$

$$= 128$$

$$\textcircled{2} V_{\text{prism}} = Bh = 64(9) = 576$$

$$B = 8(8) = 64$$

V =



$$\frac{1}{2} V_{\text{cylinder}} + V_{\text{prism}}$$

$$\frac{1}{2} (225\pi) + 990 = 112.5\pi + 990 \text{ m}^3$$

$$\textcircled{1} V_{\text{cylinder}} = Bh$$

$$= \pi r^2 \cdot h$$

$$= \pi 5^2 \cdot 9$$

$$= 225\pi$$

$$\textcircled{2} V = Bh$$

$$= 90(11)$$

$$= 990$$

$$B = 9(10) = 90$$

Hint: The shape on top of the prism is a half cylinder)

2. The dimensions of a prism are multiplied by  $\frac{3}{4}$ . Describe the effects on the volume.

The volume is then multiplied by  $(\frac{3}{4})^3$  or  $\frac{27}{64}$

3. The radius of a sphere is multiplied by 15. Describe the effect on the volume.

The volume is then multiplied by  $15^3$  or 3,375.

14. The surface area of a sphere is  $256\pi \text{ in}^2$ . What is the volume of that sphere?

$$\textcircled{1} SA = 256\pi$$

$$SA = 4\pi r^2$$

$$256\pi = 4\pi r^2$$

$$64 = r^2$$

$$r = 8$$

$$\textcircled{2} V = \frac{4}{3}\pi r^3$$

$$= \frac{4}{3}\pi (8)^3$$

$$= 682.7\pi \text{ in}^3$$

15. The volume of a sphere is  $2,304\pi \text{ m}^3$ . What is the surface area of the sphere?

$$\textcircled{1} V = 2,304\pi$$

$$V = \frac{4}{3}\pi r^3$$

$$2304\pi = \frac{4}{3}\pi r^3$$

$$1728 = r^3$$

$$r = 12$$

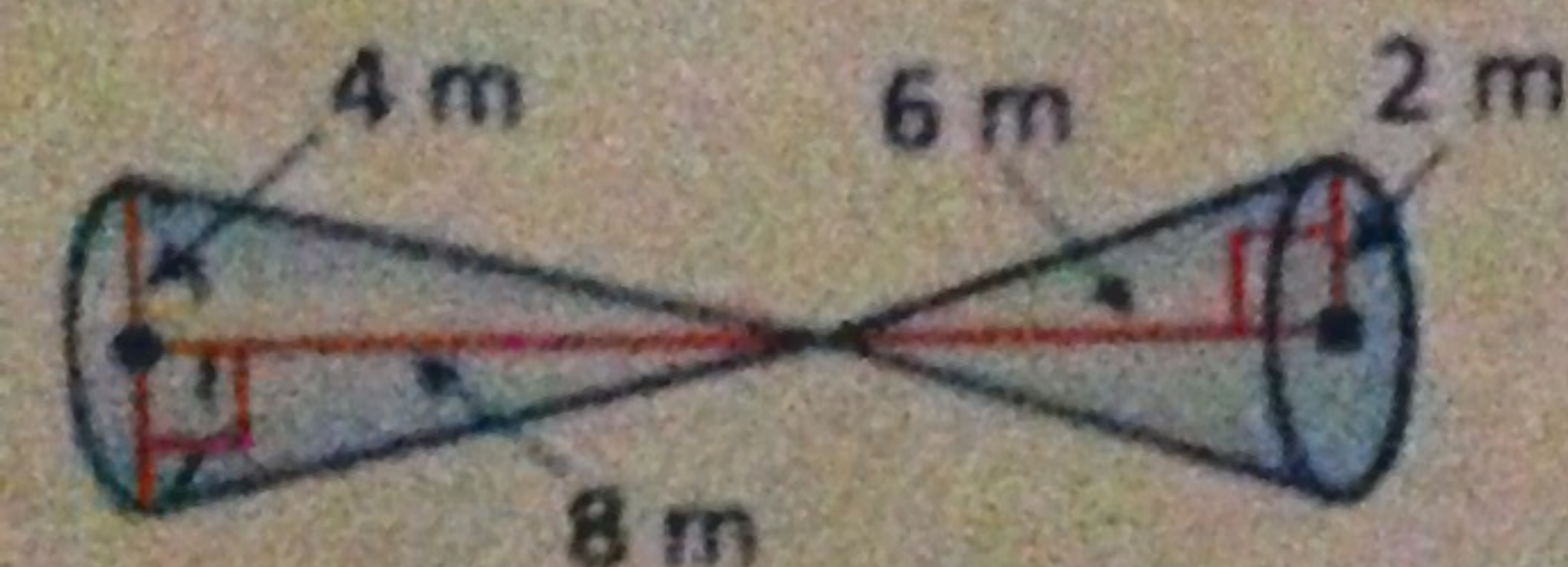
$$\textcircled{2} SA = 4\pi r^2$$

$$= 4\pi 12^2$$

$$= 4\pi 144$$

$$= 576\pi \text{ m}^2$$

16. V =



$$\textcircled{3} V_{\text{small cone}} + V_{\text{big cone}}$$

$$8\pi + 10.7\pi = 18.7\pi \text{ m}^3$$

$$\textcircled{1} V_{\text{small cone}} = \frac{1}{3}\pi r^2 \cdot h$$

$$= \frac{1}{3}\pi 2^2 \cdot 6$$

$$= 8\pi$$

$$\textcircled{2} V_{\text{big cone}} = \frac{1}{3} Bh$$

$$= \frac{1}{3}\pi 2^2 \cdot 8$$

$$= 10.7\pi$$