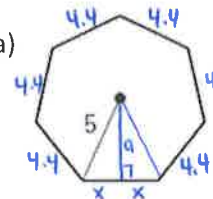


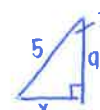
Find the area of the following regular polygons.

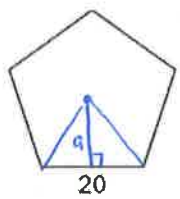
1a)  Central angle =  $360 \div 7 = 51.4^\circ$   
 $P = 4.4 \times 7 = 30.8$

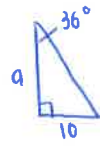
$$A = \frac{1}{2} aP$$

$$= \frac{1}{2} (4.5)(30.8)$$

$$A = 69.3 \text{ units}^2$$

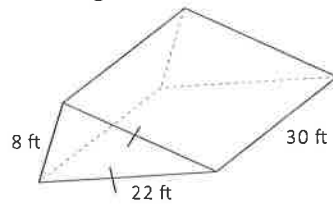
  
 $\cos 25.7 = \frac{a}{5}$      $\sin 25.7 = \frac{x}{5}$   
 $a = 4.5$      $x = 2.2 \Rightarrow \text{each side} = 4.4$


b)  Central angle =  $360 \div 5 = 72^\circ$   
 $P = 20 \times 5 = 100$

  
 $\tan 36 = \frac{10}{a}$   
 $a = 13.8$   
 $A = \frac{1}{2} aP$   
 $A = \frac{1}{2} (13.8)(100)$   
 $A = 690 \text{ units}^2$

2. Please find the surface area of the figure below.

- A) 855.07 ft<sup>2</sup>
- B) 1733.07 ft<sup>2</sup>**
- C) 1342.47 ft<sup>2</sup>
- D) 2625.68 ft<sup>2</sup>



Base:   
 $B = \frac{1}{2} bh$   
 $= \frac{1}{2} (8)(21.6)$   
 **$B = 86.4$**   
 $P = 2a + 2a + 8$   
 **$P = 52$**   
 **$h = 30$**

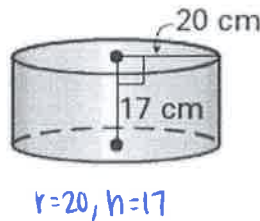
$$SA = 2B + Ph$$

$$= 2(86.4) + 52(30)$$

$$= 172.8 + 1560 = 1732.8$$

3. Please find the surface area of the figure below.

- A) 4647.2 cm<sup>2</sup>**
- B) 2960 cm<sup>2</sup>
- C) 2323.6 cm<sup>2</sup>
- D) 1480 cm<sup>2</sup>



$$SA = 2\pi r^2 + 2\pi rh$$

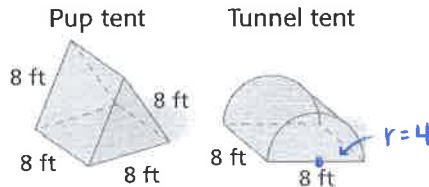
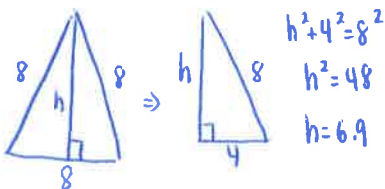
$$= 2\pi(20)^2 + 2\pi(20)(17)$$

$$= 2\pi(400) + 2\pi(340)$$

$$= 2512 + 2136.2$$

$$SA = 4647.2 \text{ cm}^2$$

4. A sporting goods company sells tents in two styles, shown below. The sides and floor of each tent are made of nylon.



 Area =  $(8)(8) = 64$

Which tent requires less nylon to manufacture?

Pup:  $SA = 2B + Ph$   
 $B = \frac{1}{2} bh$   
 $= \frac{1}{2} (6.9)(8)$   
 **$B = 27.6$**   
 $P = 8 + 8 + 8$      **$h = 8$**   
 **$P = 24$**   
 $= 2(27.6) + 24(8)$   
 $= 55.2 + 192$   
 **$= 247.2 \text{ ft}^2$**

Tunnel =  $\frac{1}{2} (2\pi r^2 + 2\pi rh)$   
 $= \frac{1}{2} (2\pi(4)^2 + 2\pi(4)(8))$   
 $= \frac{1}{2} (2\pi(16) + 2\pi(32))$   
 $= \frac{1}{2} (301.44)$   
 $= 150.72$  + Area of Rectangular base  
 $= 150.72 + 64 = 214.72 \text{ ft}^2$

tunnel  
The pup tent  
takes less  
nylon

5. A steel water tank is a cylinder with a diameter of 30 ft and a height of 18 ft. To prevent rust, it is important to keep them painted. If one gallon of paint will cover about 350 square feet, how many gallons of paint are needed to paint the tank?

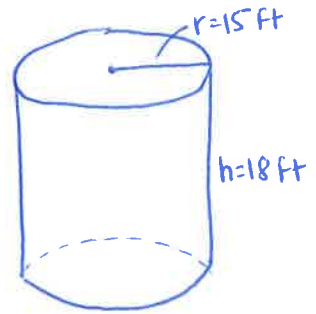
$$r = 15 \text{ ft}$$

Surface Area!

$$\begin{aligned} SA &= 2\pi r^2 + 2\pi rh \\ &= 2\pi(15)^2 + 2\pi(15)(18) \\ &= 1413 + 1695.6 \end{aligned}$$

$$\begin{aligned} SA &= 3108.6 \text{ ft}^2 \\ &\div 350 \\ \hline &8.8 \end{aligned}$$

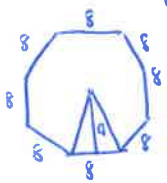
You would need about 9 gallons of paint



6. Find the surface area of a right octagonal prism with all edges measuring 8 feet. Round your answer to two decimal places.

including height

$$\text{Central angle} = 360 \div 8 = 45^\circ$$



$$\begin{aligned} \tan 22.5^\circ &= \frac{a}{4} \\ a &= 1.7 \end{aligned}$$

$$B = \frac{1}{2}aP$$

$$B = \frac{1}{2}(1.7)(64)$$

$$B = 54.4$$

$$SA = 2B + Ph$$

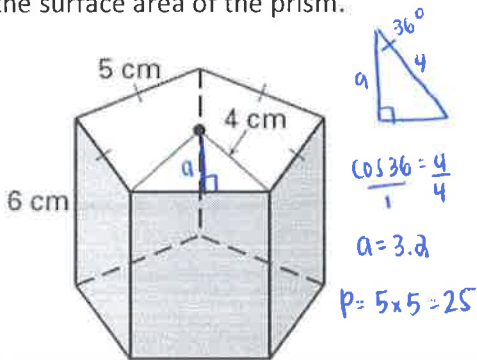
$$= 2(54.4) + 64(8)$$

$$= 108.8 + 512$$

$$SA = 620.8 \text{ ft}^2$$

$$P = 8 \times 8 = 64$$

7. Find the surface area of the prism.



$$\cos 36^\circ = \frac{4}{a}$$

$$a = 3.2$$

$$P = 5 \times 5 = 25$$

$$B = \frac{1}{2}aP$$

$$B = \frac{1}{2}(3.2)(25)$$

$$B = 40$$

$$P = 5 \times 5$$

$$P = 25$$

$$h = 6$$

$$SA = 2B + Ph$$

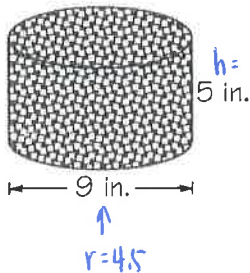
$$= 2(40) + 25(6)$$

$$= 80 + 150$$

$$SA = 230 \text{ cm}^2$$

$$\text{Central angle} = 360 \div 5 = 72^\circ$$

8. Mr. Butterworth baked a cake in the shape of a cylinder. The cake had a diameter of 9 inches and a height of 5 inches. He spread icing over the entire cake (except for the bottom). How much frosting did he use?



$$SA = 2\pi r^2 + 2\pi rh$$

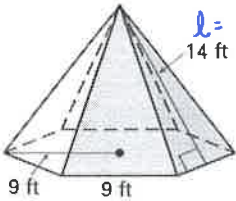
$$SA_{\text{cake}} = \pi r^2 + 2\pi rh \leftarrow \text{minus the area of one base}$$

$$= \pi(4.5)^2 + 2\pi(4.5)(5)$$

$$= 204.9$$

$$SA = 204.9 \text{ in}^2$$

9. Find the surface area of the figure below. Round your answers to two decimal places.



$l = 14 \text{ ft}$   
 $9 \text{ ft}$

Central angle =  $60^\circ$   
 $B = \frac{1}{2} a P$   
 $B = \frac{1}{2} (7.8)(54)$   
 $B = 210.6$

$SA = B + \frac{1}{2} P l$   
 $= 210.6 + \frac{1}{2} (54)(14)$   
 $SA = 588.6 \text{ ft}^2$

$P = 4 \times 6 = 54$

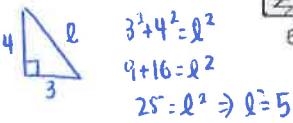
Right triangle with angle  $30^\circ$ , side  $9$ , and hypotenuse  $a$ .  
 $\cos 30^\circ = \frac{9}{a}$   
 $a = 7.8$

10. Find the surface area of the figure shown below.

Pyramid Base:



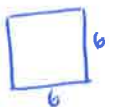
$P = 6 + 6 + 6 + 6 = 24$



Pyramid:  $L = \frac{1}{2} P l$   
 $= \frac{1}{2} (24)(5)$   
 $L = 60 \text{ ft}^2$

Prism:  $SA = B + Ph$   
 $= 36 + 24(15)$   
 $= 36 + 360$   
 $SA = 396$

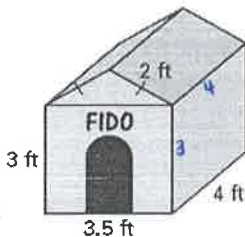
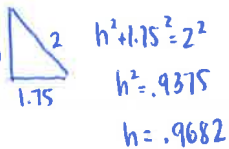
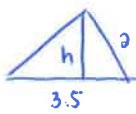
Base:



$B = (6)(6) = 36$   
 $P = 6 \times 4 = 24$

Total SA =  $60 + 396$   
 $= 456 \text{ ft}^2$

11. Please find the surface area of Fido's doghouse.



$SA_{\text{Bottom}} = 2(3 \times 3.5) + 2(3 \times 4) + (3.5 \times 4)$   
 $= 2(10.5) + 2(12) + 14$   
 $= 59$

$SA_{\text{Top}} = 2(a \times 4) + 2(\frac{1}{2}(3.5)(.9682))$   
 $= 2(8) + 2(1.69435)$   
 $= 19.4$

Total =  $59 + 19.4$   
 $= 78.4 \text{ ft}^2$

12. The Catfish Factory sells tuna, but is run by cats. They decided to design their label first (those silly cats), and has an area of approximately  $50.3 \text{ in}^2$ . The label will wrap exactly around the can. If the diameter of the can is 8 inches, what is the height of the can?

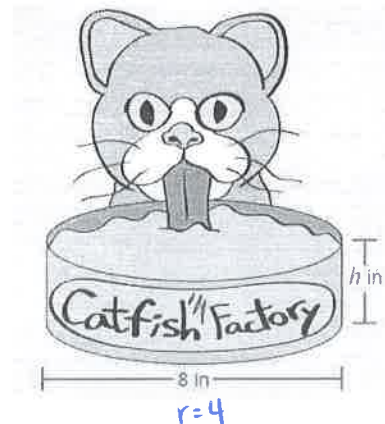
Label = Lateral area

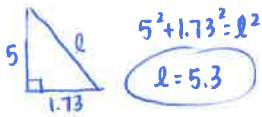
$50.3 = 2\pi r h$

$50.3 = 2\pi(4)h$

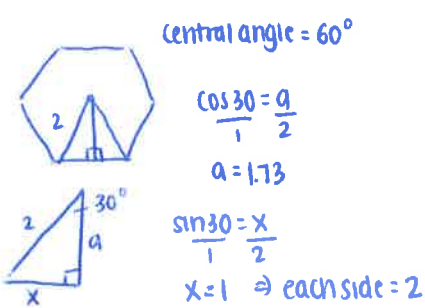
$50.3 = 8\pi h$

$h = 2 \text{ in}$





13. A regular hexagonal pyramid has a height of 5 feet, radius of 2 feet, and the perimeter of the base is  $P = 12$  feet. What is the surface area of the pyramid to the nearest square foot?



$$B = \frac{1}{2} a P$$

$$B = \frac{1}{2} (1.73)(12)$$

$$B = 10.38$$

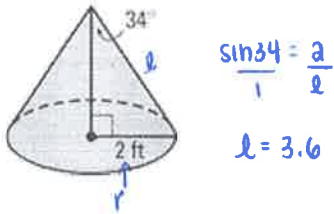
$$P = 12$$

$$SA = B + \frac{1}{2} P l$$

$$SA = 10.38 + \frac{1}{2} (12)(5.3)$$

$$SA = 42.2 \text{ ft}^2$$

14. Please find surface area of the right cone. Round your answers to two decimal places.

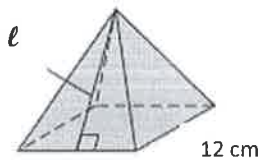


$$SA = \pi r^2 + \pi r l$$

$$= \pi (2)^2 + \pi (2)(3.6)$$

$$SA = 35.1 \text{ ft}^2$$

15. For the regular square pyramid below, the surface area is 384 square centimeters, and each side of the base is 12 centimeters. What is the slant height of the pyramid?



$$B = (12)(12)$$

$$B = 144$$

$$P = 12 \times 4$$

$$= 48$$

$$SA = B + \frac{1}{2} P l$$

$$384 = 144 + \frac{1}{2} (48) l$$

$$384 = 144 + 24 l$$

$$240 = 24 l$$

$$l = 10 \text{ cm}$$

**Answer Key:**

- |                                |                           |                           |
|--------------------------------|---------------------------|---------------------------|
| 1.) a) 68.5 units <sup>2</sup> | b) 688 units <sup>2</sup> | 10) 456 ft <sup>2</sup>   |
| 2.) B                          |                           | 11) 78.4 ft <sup>2</sup>  |
| 3.) A                          |                           | 12) 2 in                  |
| 4.) Tunnel                     |                           | 13) 42 ft <sup>2</sup>    |
| 5.) 9 gallons                  |                           | 14) 35.04 ft <sup>2</sup> |
| 6.) 1130.88 ft <sup>2</sup>    |                           | 15) 10 cm                 |
| 7.) 228 cm <sup>2</sup>        |                           |                           |
| 8.) 204.99 in <sup>2</sup>     |                           |                           |
| 9.) 588.44 ft <sup>2</sup>     |                           |                           |