

Name Key

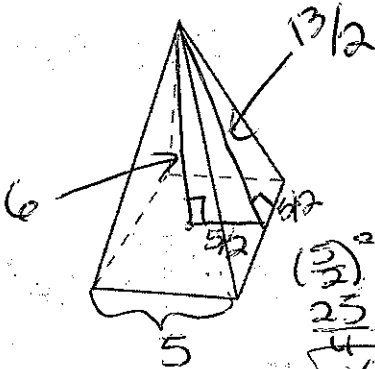
Date _____

Period _____

Accelerated Geometry
Mixed Practice: Pyramids and Cones

Use the given information to answer the questions that follow. Be sure to leave exact answers and include appropriate units for each answer.

A regular square pyramid has base edge 5 m and altitude 6 m. Calculate the following:



1. Lateral area = $65 m^2$

2. Base area = $25 m^2$

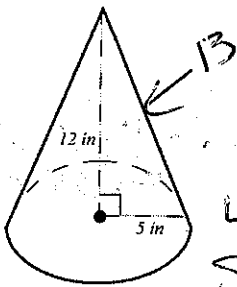
3. Surface area = $90 m^2$

4. Volume = $50 m^3$

$(\frac{5}{2})^2 + 6^2 = l^2$
 $\frac{25}{4} + 36 = l^2$
 $\frac{169}{4} = l^2$
 $\frac{13}{2} = l$

$LA = \frac{1}{2}Pl = \frac{1}{2}(20)(\frac{13}{2}) = 65 m^2$
 $B = 5^2 = 25 m^2$
 $SA = LA + B = 65 + 25 = 90 m^2$
 $V = \frac{1}{3}Bh = \frac{1}{3}(25)(6) = 50 m^3$

Calculate each of the following values for the right cone pictured below:



5. Lateral area = $65\pi in^2$

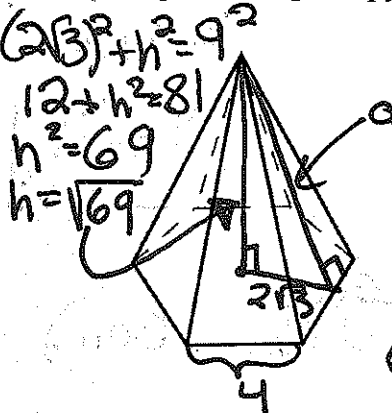
6. Base area = $25\pi in^2$

7. Surface area = $90\pi in^2$

8. Volume = $100\pi in^3$

$LA = \frac{1}{2}Cl = \frac{1}{2}(10\pi)(13) = 65\pi in^2$
 $SA = LA + B = 65\pi + 25\pi = 90\pi in^2$
 $V = \frac{1}{3}Bh = \frac{1}{3}(25\pi)(12) = 100\pi in^3$

The regular hexagonal pyramid shown below has slant height 9 cm and base edge 4 cm. Calculate the following:



$(2\sqrt{3})^2 + h^2 = 9^2$
 $12 + h^2 = 81$
 $h^2 = 69$
 $h = \sqrt{69}$

9. Lateral area = $108 cm^2$

10. Base area = $24\sqrt{3} cm^2$

11. Surface area = $108 + 24\sqrt{3} cm^2$

12. Volume = $24\sqrt{23} cm^3$

$LA = \frac{1}{2}Pl = \frac{1}{2}(24)(9) = 108 cm^2$
 $SA = LA + B = 108 + 24\sqrt{3} cm^2$

$2 = 2\sqrt{3}$
 $B = \frac{1}{2}P_2 = \frac{1}{2}(24)(2\sqrt{3}) = 24\sqrt{3} cm^2$

$V = \frac{1}{3}Bh = \frac{1}{3}(24\sqrt{3})(\sqrt{69})$
 $= 24\sqrt{23} \cdot 8\sqrt{207}$

Use the given information to answer each question. Be sure to leave exact answers and include appropriate units for each answer.

A cone has radius 7 in and volume $392\pi \text{ in}^3$. Find its lateral area and surface area.



$$V = \frac{1}{3}Bh = \frac{1}{3}(49\pi)h = 392\pi$$

$$49h = 1176$$

$$h = 24$$

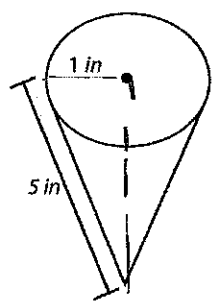
$$LA = \frac{1}{2}Cl = \frac{1}{2}(14\pi)(25) = 175\pi \text{ in}^2$$

$$SA = LA + B = 175\pi + 49\pi = 224\pi \text{ in}^2$$

13. Lateral area = 175

14. Surface area = $224\pi \text{ in}^2$

15. Calculate the volume of the ice cream cone pictured below.



$$V = \frac{1}{3}Bh = \frac{1}{3}(\pi)(2\sqrt{6}) = \frac{2\pi\sqrt{6}}{3} \text{ in}^3$$

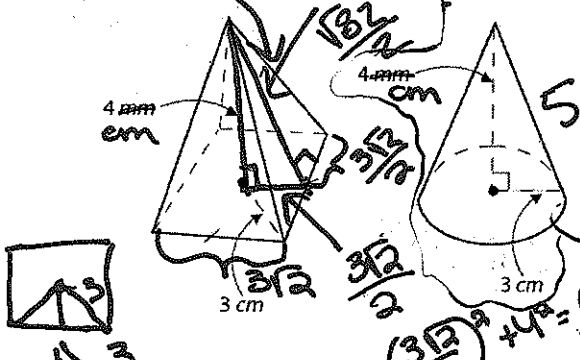
$$1^2 + h^2 = 5^2$$

$$1 + h^2 = 25$$

$$h^2 = 24$$

$$h = 2\sqrt{6}$$

16. Compare the regular pyramid and right cone below. State which measurement is greater for each of the comparisons below. If the two have the same measure, state that they are equal.



$$3 = x\sqrt{2}$$

$$\frac{3}{\sqrt{2}} = \frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$$

$$B = (3\sqrt{2})^2 = 18 \text{ cm}^2$$

$$LA = \frac{1}{2}Cl = \frac{1}{2}(6\pi)(5) = 15\pi \text{ cm}^2$$

$$B = 9\pi \text{ cm}^2$$

$$(3\sqrt{2})^2 + 4^2 = l^2$$

$$\frac{18}{4} + 16 = l^2$$

$$\frac{82}{4} = l^2$$

$$\sqrt{\frac{82}{4}} = l$$

$$\frac{\sqrt{82}}{2} = l$$

$$LA = \frac{1}{2}Pl = \frac{1}{2}(12\sqrt{2})(\frac{\sqrt{82}}{2}) = 24\sqrt{41}$$

$$= 6\sqrt{41} \text{ cm}^2$$

Which has a larger base area? Cone

Which length is greater, a lateral edge of the pyramid or slant height of the cone? equal (both 5cm)

Which has a greater lateral area? Cone

Use the given information to answer each question. Be sure to leave exact answers and include appropriate units for each answer.

17. A local police department orders orange traffic cones with a base diameter of 12 in and a height of 24 in. Calculate the number of square inches of orange plastic required to construct the cone (Assume the cone is hollow and its circumference will be melded to a square black plastic stand that you do not need to account for).



Lateral area!

$$\begin{aligned} 6^2 + 24^2 &= l^2 \\ 36 + 576 &= l^2 \\ 612 &= l^2 \\ 6\sqrt{17} &= l \end{aligned}$$

$$\begin{aligned} LA &= \frac{1}{2}Cl = \frac{1}{2}(12\pi)(6\sqrt{17}) \\ &= \boxed{36\pi\sqrt{17} \text{ in}^2} \end{aligned}$$

18. A conical party hat's height is equal to the diameter of its base. Its slant height is 3 in. Find its surface area.



$$\begin{aligned} r^2 + (2r)^2 &= 3^2 \\ 5r^2 &= 9 \\ r^2 &= \frac{9}{5} \\ r &= \frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{5} \end{aligned}$$

$$SA = LA + B$$

$$LA = \frac{1}{2}Cl = \frac{1}{2} \left(\frac{6\pi\sqrt{5}}{5} \right) (3) = \frac{18\pi\sqrt{5}}{10} = \frac{9\pi\sqrt{5}}{5} \text{ in}^2$$

$$B = \pi r^2 = \pi \left(\frac{3\sqrt{5}}{5} \right)^2 = \frac{45\pi}{25} = \frac{9\pi}{5} \text{ in}^2$$

$$SA = LA + B = \boxed{\frac{9\pi + 9\pi\sqrt{5}}{5} \text{ in}^2}$$

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