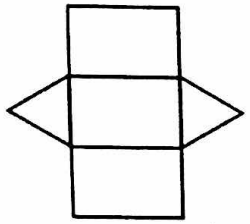
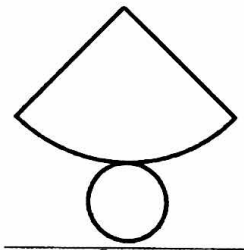
Unit 3 Review - Modeling With Geometry NAME KEY

Shapes and Nets

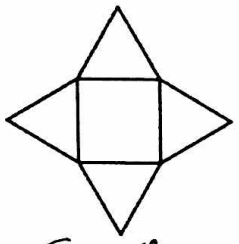
Determine the 3D figure formed by the net.

1. 

Triangular Prism

2. 

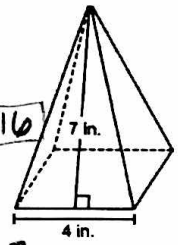
cone

3. 

Square pyramid

Surface Area and Volume

Determine the surface area of each figure.

4. 

1 sq. 4 △s

$A_{\square} = 4 \cdot 4 = 16$

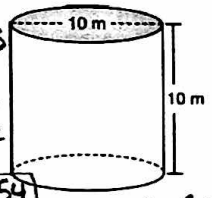
$A_{\triangle} = \frac{1}{2}bh$

$= \frac{1}{2} \cdot 4 \cdot 7$

$= 14$

$SA = 16 + 4(14)$

$= 72 in^2$

5. 

2 circles, 1 rect.

$A_{\circ} = \pi r^2$

$= \pi \cdot 5^2$

$= 78.54$

$A_{\square} = lw$

$= (31.42)(10)$

$= 314.2$

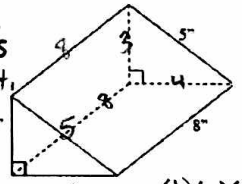
$C = 2\pi r$

$= 2\pi 5$

$= 31.42$

$SA = 2(78.54) + 314.2$

$= 471.28 m^2$

6. 

2 △s, 3 rect.

$A_{\triangle} = \frac{1}{2}bh = (\frac{1}{2})(3)(4) = 6$ ×2

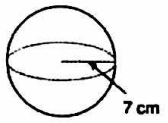
$A_{1} = 5 \cdot 8 = 40$

$A_{2} = 4 \cdot 8 = 32$

$A_{3} = 3 \cdot 8 = 24$

$SA = 2(6) + 40 + 32 + 24$

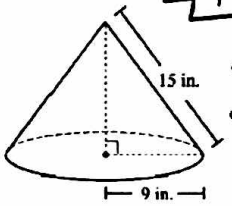
$SA = 108 in^2$

7. 

$SA = 4\pi r^2$

$= 4\pi(7)^2$

$= 615.75 cm^2$

8. 

- 1 circle
- 1 pizza (lateral area)

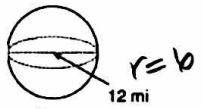
$A = \pi r^2 = \pi \cdot 9^2 = 254.47$

cone $A = \pi r l = \pi \cdot 9 \cdot 15 = 424.12$

$SA = 254.47 + 424.12$

$= 678.59 in^2$

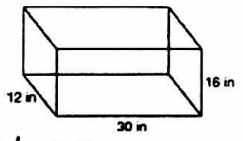
Determine the volume of each figure.

9. 

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

$V = (\frac{4}{3})\pi \cdot 6^3$

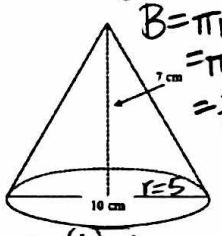
$V = 904.78 mi^3$

10. 

$V = Bh$

$V = 30 \cdot 12 \cdot 16$

$V = 5760 in^3$

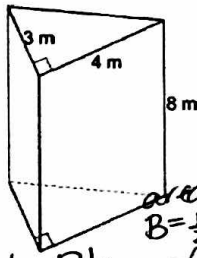
11. 

(Area of circle) $B = \pi r^2 = \pi \cdot 5^2 = 78.54$

$V = (\frac{1}{3})Bh$

$V = (\frac{1}{3})(78.54)(7)$

$V = 183.26 cm^3$

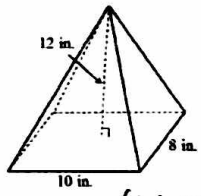
12. 

$V = Bh$

$V = 6 \cdot 8$

$V = 48 m^3$

area of △ $B = \frac{1}{2}bh = (\frac{1}{2})(3)(4) = 6$

13. 

$V = (\frac{1}{3})Bh$

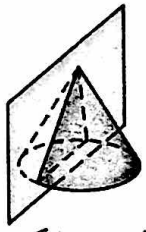
$= (\frac{1}{3})(80)(12)$

$= 320 in^3$

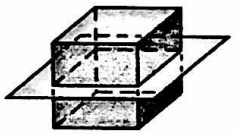
(area of rectangle) $B = lw = 10 \cdot 8 = 80$

Cross-Sections

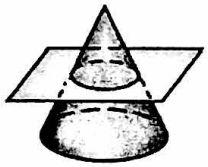
Describe the cross-section formed by the 3D figure and the plane.

14. 

Triangle

15. 

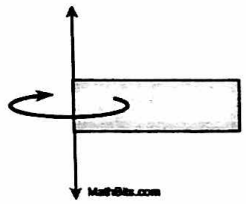
Square

16. 

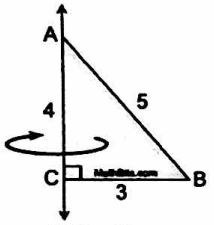
circle

Rotations of 2D Figures to Create 3D Figures

Describe the 3D figure created by rotating the 2D figure around the given line.

17. 

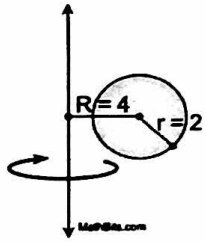
cylinder

18. 

cone

19. 

Sphere

20. 

Donut

21. 

cylinder on its side within a cylinder! (cylinder shaped hole inside a cylinder)

Geometric Modeling

22. Determine the surface area of the cover of a textbook that has a length of 11 inches, a width of 8 inches, and a height of 3 inches.

cover = 1 big rect (front + back of book)
1 skinny rect (the spine of book)

$A_1 = 8 \times 11 = 88$

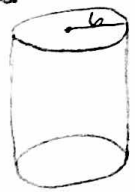
$A_2 = 3 \times 11 = 33$

$SA = 2(88) + 33$

$= 209 in^2$

23. Judy has a cylindrical jar with a radius of 6 cm and a height of 10 cm. She puts 20 spherical marbles, each with a radius of 2 cm, into the jar. The rest of the space in the jar is filled with sand. Determine the volume of the sand.

jar



marble (x20)

* Find V of jar then subtract the V of the marbles!

Jar $V = Bh = 133.10(10)$ jar

$A_0 = \pi \cdot 6^2 = 133.10$

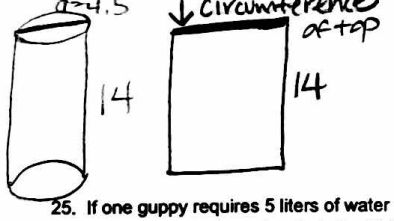
$= 1130.97 cm^3$

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

$= \frac{4}{3}\pi(2)^3 = 33.51 \times 20 = 670.20 cm^3$ all 20 marbles

Sand $= 1130.97 - 670.2 = 460.77 cm^3$ volume of the sand

24. Brittany is going to cover the label on a Pringles can and decorate it for Easter. The can has a diameter of 4.5 in. and a height of 14 in. She only needs to cover the label, not the top or bottom of the can, what is the minimum amount of paper needed?

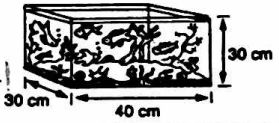


$C = 2\pi r = 2\pi(2.25) = 14.14$

$A = lw = 14.14(14)$

$= 197.96 in^2$

25. If one guppy requires 5 liters of water to live happily, what is the maximum number of guppies that should be kept in this aquarium? ($1000 cm^3$ = 1 liter)



Find volume in cm then convert to liters!

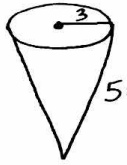
$V = Bh = 30 \cdot 40 \cdot 30 = 36000 cm^3$

$36{,}000 cm^3 \cdot \frac{1 \text{ liter}}{1000 cm^3} = 36 \text{ liters} / 5 = 7.2$

1 guppy per 5 liters

7 guppies

26. Pedro created a cone-shaped cup out of paper. If his cup has a radius of 3 inches and a slant height of 5 inches, how much paper did he use?



* Only find the "pizza" (cones lateral area)

$A = \pi r l$

$= \pi \cdot 3 \cdot 5 = 47.12 in^2$

27. A section of concrete pipe 3.0 m long has an inside diameter of 1.2 m and an outside diameter of 1.8 m. What is the volume of concrete in this section of pipe?

* Find V of outside cylinder then subtract the V of the inside cylinder!

Big cylinder $V = Bh = 2.54(3)$

Base Area $= \pi r^2$

$= \pi(.9)^2$

$= 2.54$

$V_{BC} = 7.62$

$= \pi r^2$

$= \pi(.6)^2$

$= 1.13$

$V_{SC} = Bh = 1.13(3)$

$= 3.39$

concrete $= 7.62 - 3.39$

$= 4.23 m^3$