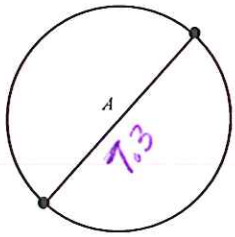
Key

Area, Surface Area, Volume Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

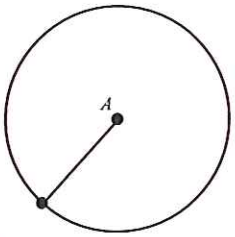
C 1. The diameter of circle A is 7.3 units. Find the circumference of the circle.



$C = 2\pi r$ or $C = \pi d$
$C = \pi(7.3)$
$= 22.9$

a. 14.6π units
b. 53.29π units
c. 7.3π units
d. 21.9π units

D 2. The radius of circle A is 2.2 units. Find the circumference of the circle.

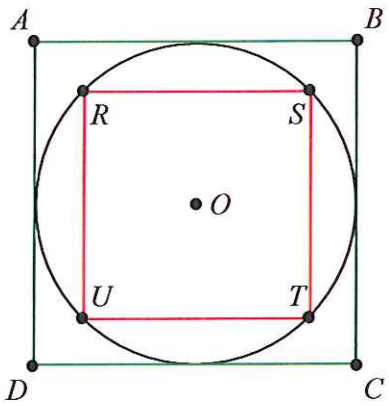


$r = 2.2$

$C = 2\pi(2.2)$ $2(2.2) = 4.4$
4.4π

a. 4.84π units
b. 3.3π units
c. 2.2π units
d. 4.4π units

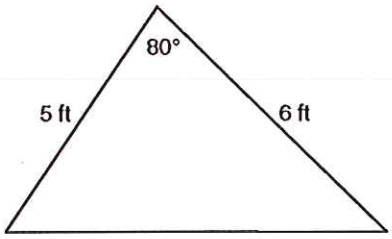
B 3. Describe the relationship between the area of circle O, the area of quadrilateral $ABCD$, and the area of quadrilateral $RSTU$.



a. The area of $\odot O$ is greater than the area of $ABCD$. The area of $ABCD$ is greater than the area of $RSTU$.
b. The area of $ABCD$ is greater than the area of $\odot O$. The area of $\odot O$ is greater than the area of $RSTU$.

c. The area of ⊙O is equal to the area of *ABCD*. *RSTU* has the least area.
d. The area of ⊙O is equal to the area of *RSTU*. *ABCD* has the greatest area.

4. A blueprint of a table is shown below. What is the area of the table to the nearest tenth of a square foot? (*Picture is not to scale.*)



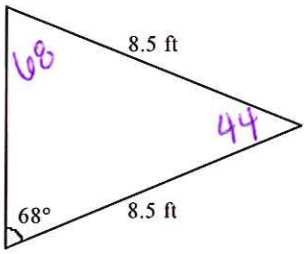
$A = \frac{1}{2}ab\sin C$

$= \frac{1}{2} 5 \cdot 6 \cdot \sin 80$

$= 14.7721$

a. 14.8 ft²
b. 29.5 ft²

5. A flower garden is planted on a piece of land in the shape of an isosceles triangle. Determine the area of the garden to the nearest tenth of a ft².



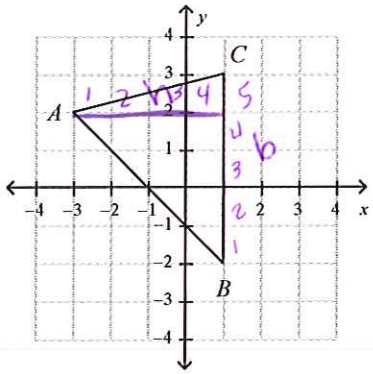
$180 - 68 - 68 = 44$

$\frac{1}{2} 8.5 \cdot 8.5 \cdot \sin 44$

$= 25.0945$

a. 50.2 ft²
b. 12.6 ft²
c. 33.5 ft²
d. 25.1 ft²

6. Find the area of the triangle with vertices $A(-3, 2)$, $B(1, -2)$, and $C(1, 3)$.

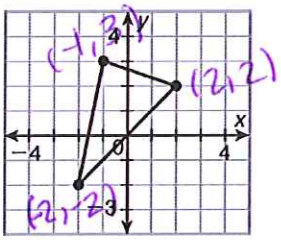


$A = \frac{1}{2} b \cdot h$ $\quad b = 5$ $\quad h = 4$

$\frac{1}{2} \cdot 5 \cdot 4 = 10$

a. 10 units^2
b. 20 units^2
c. 8 units^2
d. 12 units^2

7. Find the perimeter of the triangle to the nearest whole unit.



$(-1,3)$
$(2,2)$
$(-2,-2)$

$\sqrt{(2+1)^2 + (2-3)^2} = \sqrt{3^2 + (-1)^2} = \sqrt{10}$

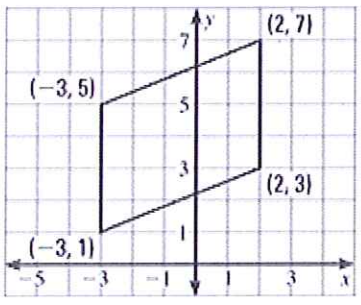
$\sqrt{(2-2)^2 + (-2-2)^2} = \sqrt{(-4)^2 + (-4)^2} = \sqrt{32}$

$\sqrt{(2+1)^2 + (-2-3)^2} = \sqrt{(-1)^2 + (-5)^2} = \sqrt{26}$

$\sqrt{10} + \sqrt{32} + \sqrt{26} = 13.9$

a. 18
b. 16
c. 14
d. 12

8. Find the perimeter of the parallelogram.



$\sqrt{(2-2)^2 + (3-7)^2} = \sqrt{0^2 + (-4)^2} = \sqrt{16} = 4$

$\sqrt{(-3-2)^2 + (1-3)^2} = \sqrt{(-5)^2 + (-2)^2} = \sqrt{29}$

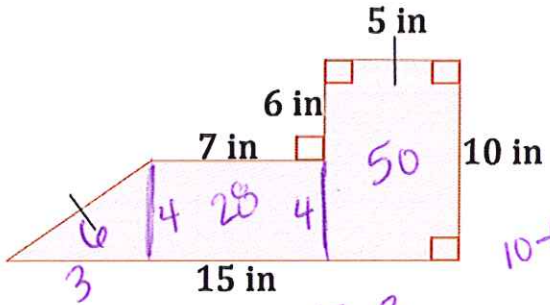
$\sqrt{(-3+3)^2 + (1-5)^2} = \sqrt{0^2 + (-4)^2} = \sqrt{16} = 4$

$\sqrt{(-3-2)^2 + (5-7)^2} = \sqrt{(-5)^2 + (-2)^2} = \sqrt{25+4} = \sqrt{29}$

$4 + 4 + \sqrt{29} + \sqrt{29} = 18.8$

50 + 28 + 6 = 84

9. Find the area of the composite 2D figure below.



5 x 10 = 50

7 x 4 = 28

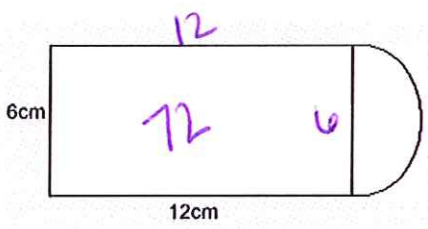
10 − 6 = 4

$\frac{1}{2}(4)(3) = 6$

15 − 7 = 8 = 3

84 in²

10. Find the area of the 2D composite figure below.



6 x 12

$\frac{6}{2} = 3$ $\pi 3^2 = \frac{28.2743}{2} = 14.1372$

72 + 14.1372 = 86.1 cm²

$d = \frac{m}{V} = \frac{\text{Pop.}}{\text{area}}$

11. A town has an area of 10.4 mi², The town's population is 3619. What is the population density of the town? Round your answer to the nearest whole number.

a. 362 people/mi²
b. 348 people/mi²
c. 1122 people/mi²
d. 37,368 people/mi²

$\text{pop. density} = \frac{\text{Pop.}}{\text{area}}$

area = 10.4 mi²

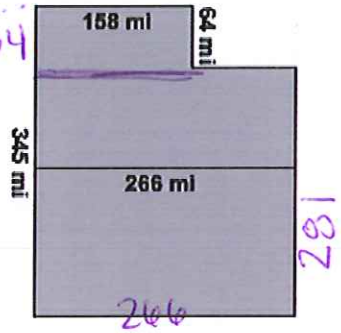
Pop = 3619

$\text{pop d} = \frac{3619 \text{ people}}{10.4} = 347.981 \text{ people/mi}^2$

12. The borders of the state of Utah have approximately the lengths shown on the map. The United States Department of the Census projects that Utah will have a population of 2,990,094 in the year 2020. Based on this information, find the population density of Utah in 2020. Round your answer to the nearest whole number.

Pop d = 2,990,094 / 84858 = 35.23...

345 - 64



Pop d = Pop / area

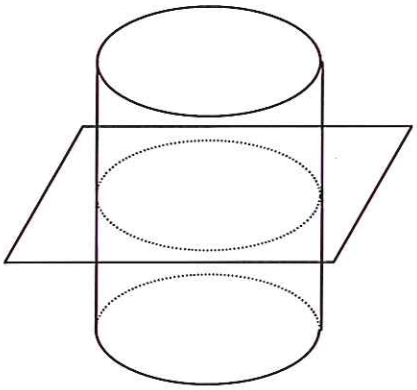
Pop = 2,990,094

158 × 64 = 10112

266 × 281 = 74746

area = 10112 + 74746 = 84858

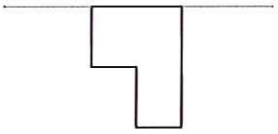
a. 35 people/mi^2
b. 42 people/mi^2
c. 33 people/mi^2
d. 27 people/mi^2



A 13. Describe the cross section.

a. The cross section is a circle.
b. The cross section is a cylinder.
c. The cross section is a plane.
d. The cross section is a parallelogram.

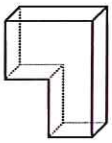
A 14. Which solid of revolution is produced by rotating the shape below 360° about the given axis?



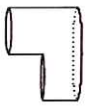
a.

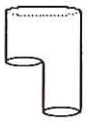
b.

c.

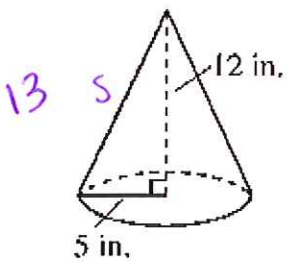


d.





____ 15. Find the surface area and volume of the cone.



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

$= \pi(5)(13) + \pi(5)^2$

$= 282.7 \text{ in}^2$

$5^2 + 12^2 = s^2$

$25 + 144 = \sqrt{169}$

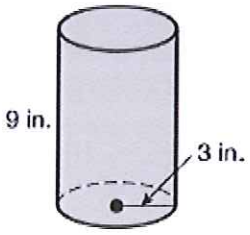
$s = 13$

$V = \frac{1}{3}(b)(H) = \frac{1}{3}\pi r^2 \cdot h = \frac{1}{3}(\pi)(5)^2 \cdot (12)$

$= 314.2 \text{ in}^3$

$\pi(3)^2 = 28.3$

16. Find the surface area and volume of the cylinder. (28.3) (28.3)



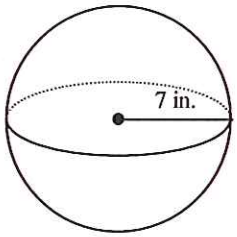
$SA =$ 169.2 (9)

$2\pi(3) = 18.8$ $\quad 18.8 \times 9 = 169.2$

$28.3 + 28.3 + 169.2 = 225.8 \text{ in}^2$

$V = bh = \pi r^2 h = \pi(3)^2 \cdot 9 =$ 254.5 m^3

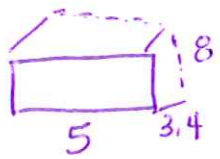
____ 17. Find the volume and surface area of the sphere.



$SA = 4\pi r^2 = 4\pi 7^2 = 615.752 \text{ in}^2$

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(7)^3 = 1436.76 \text{ in}^3$

18. Find the volume and surface area of a rectangular prism with length 5 meters, width 3.4 meters, and height 8 meters. Round to the nearest tenth.



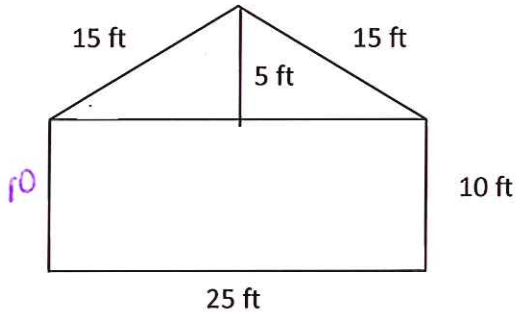
$SA =$ 40 (8) 40 (8) 17 (3.4) 17 (3.4) 27.2 (8) 27.2 (8)

$SA = 40 + 40 + 17 + 17 + 27.2 + 27.2$

$= 168.4 \text{ m}^2$

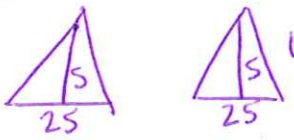
$V = lwh = 5(3.4)(8) = 136 \text{ m}^3$

19 .Find the surface area and volume of the triangular prism.



$\frac{1}{2}(25)(5) = 62.5$

SA



250 | 10 (25) | 150 | 10 (15) | 150 | 10 (15)

$SA = 62.5 + 62.5 + 250 + 150 + 150$

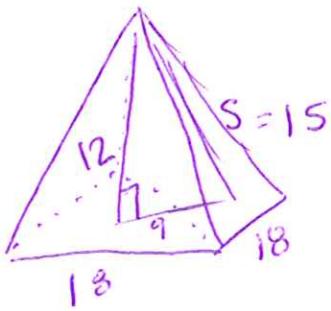
$= 675 ft^2$

$V = bh = \frac{1}{2}bh \cdot h$ or Area Δ + height

$= 62.5(10) = 625 ft^3$

____ 20. What is the volume of a square pyramid if each side of the base is 18 meters and the height is 12 meters?

a. $3888\,m^3$
b. $2592\,m^3$
c. $1944\,m^3$
d. $1296\,m^3$



$12^2 + 9^2 = S^2$

$144 + 81 = S^2$

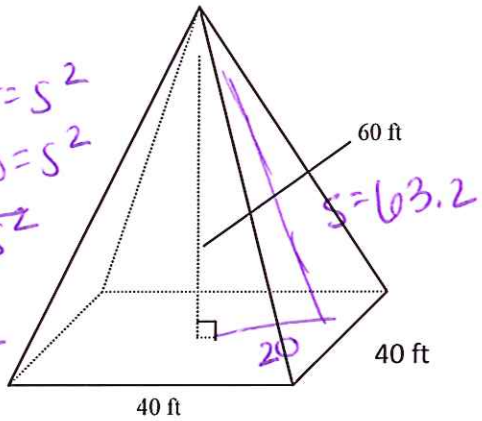
$\sqrt{225} = \sqrt{S^2}$

$S = 15$

$V = \frac{1}{3}bh = \frac{1}{3}(18)(18)(12)$

$V = 1296\ m^3$

____ 21. Find the volume and surface area of the pyramid.



$60^2 + 20^2 = S^2$

$3600 + 400 = S^2$

$\sqrt{4000} = \sqrt{S^2}$

$S = 63.2$

$SA =$ □ 40 (40) + △ 63.2 (40) × 4

1600 $\quad \frac{1}{2}(40)(63.2) = 1264 \times 4$

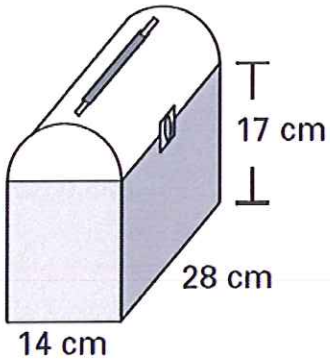
$= 5056$

$SA = 1600 + 5056$

$= 6656 ft^2$

$V = \frac{1}{3}bH = \frac{1}{3}(1600)(60) = 32000 ft^3$

____ 22. A lunch box consists of half of a cylinder placed on top of a rectangular prism. What the is the volume of the lunch box?



$V_{prism} = lwh = 14(28)(17) = 6664$

$V_{half\ cylinder} = \frac{1}{2}(bh) = \frac{1}{2}\pi r^2 h = \frac{1}{2}\pi(7)^2(28)$

$= 2155.13$

$V_{total} = 6664 + 2155.13$

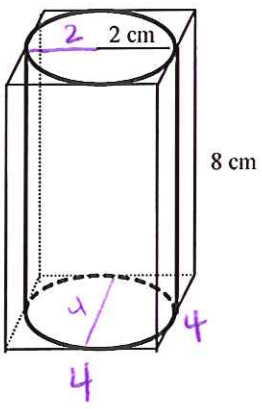
$= 8819.13\ cm^3$

a. 2155 cm^3
4310 cm^3

c. 8819 cm^3
d. 10,974 cm^3

23. A square prism has a cylinder fitted inside it so that the square just touches the circle, as shown. The radius of the cylinder is 2 cm and its height is 8 cm.

Find the volume of the prism that is outside the cylinder.

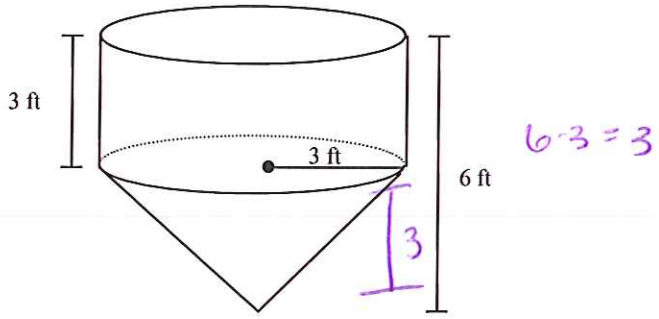


$V_{prism} = lwh = 4 \cdot 4 \cdot 8 = 128$

$V_{cyl} = \pi r^2 h = \pi(2)^2(8) = 100.531$

$128 - 100.531 = 27.469\ cm^3$

____ 24. Find the volume of the composite figure. Round to the nearest hundredth.



a. 28.26 ft^3
b. 84.78 ft^3
c. 113.04 ft^3
d. 197.82 ft^3

$V_{cyl} = \pi r^2 h = \pi(3)^2(3) = 84.823$

$V_{cone} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(3)^2(3) = 28.2743$

$V_{total} = 84.823 + 28.2743 = 113.1\ ft^3$