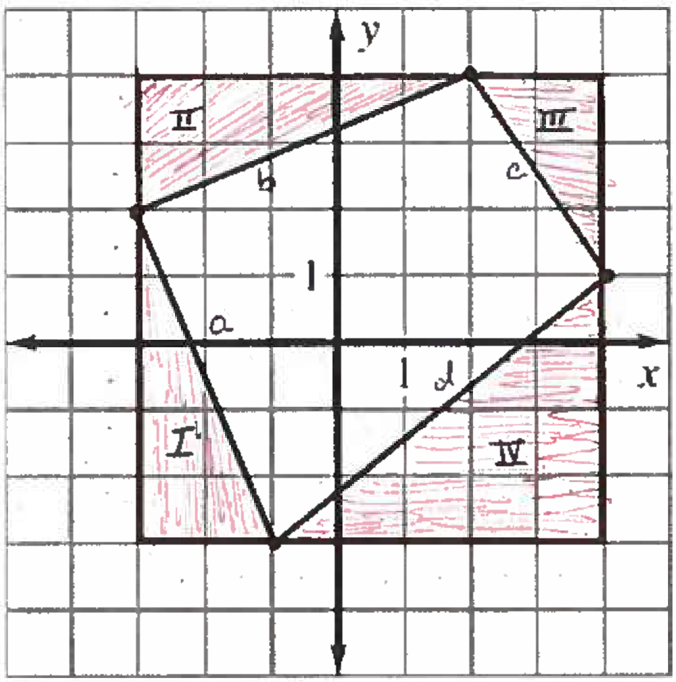
Geometry 2: 2D and 3D shapes
Review

Name ______________________
Period ____________ Date ____________

G-GPE.7 *I can use the distance formula to compute perimeter and area of triangles and rectangles.*

1. Use the figure below to answer the following questions.



Part A: Find the area of the figure to the nearest tenth.

BIG OUTSIDE
FIND THE AREA OF THE QUADRILATERAL THEN SUBTRACT THE AREA OF THE 4 TRIANGLES.

QUADRILATERAL
$l \cdot w$
7×7
49

TRIANGLE 1 $= \frac{1}{2} \cdot 2 \cdot 5 = 5$
TRIANGLE 2 $= \frac{1}{2} \cdot 2 \cdot 5 = 5$
TRIANGLE 3 $= \frac{1}{2} \cdot 3 \cdot 2 = 3$
TRIANGLE 4 $= \frac{1}{2} \cdot 4 \cdot 5 = 10$
TOTAL $= 23$

AREA OF QUAD − AREA OF TRIANGLES
$49 - 23$
26 units^2

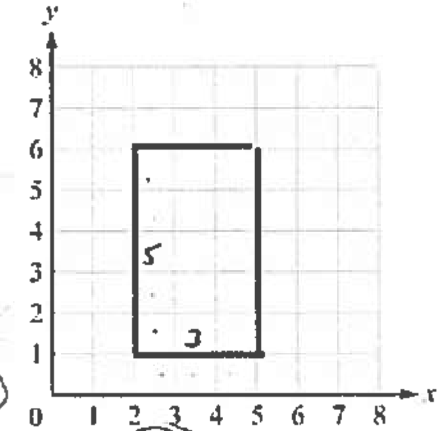
Part B: Find the perimeter of the figure to the nearest tenth.

Find length of a, b, c, & d using Pythagorean Th. Then add the lengths.

$a \Rightarrow 2^2 + 5^2 = a^2$ $a = 5.4$
$b \Rightarrow 2^2 + 5^2 = b^2$ $b = 5.4$
$c \Rightarrow 2^2 + 3^2 = c^2$ $c = 3.6$
$d \Rightarrow 4^2 + 5^2 = d^2$ $d = 6.4$

Perimeter =
$5.4 + 5.4 + 3.6 + 6.4 =$
20.8 units

2. Suppose the figure below was dilated by a scale factor of 2.



Area of the figure is
$l \cdot w$
$3 \cdot 5$
15 units^2

$P = 5 + 3 + 5 + 3 = 16$ units

Part A: What will the area of the dilated figure be?

AREA OF DILATED FIGURE = AREA OF ORIGINAL FIGURE × (SCALE FACTOR)^2
$= 15 \times 2^2 = 15 \cdot 4$
60 units^2

Part B: What will the perimeter of the dilated figure be?

Perimeter of DILATED FIGURE = PERIMETER OF ORIGINAL FIGURE × SCALE FACTOR
$= 16 \times 2 =$ 32 UNITS

3. A landscaping company is estimating the cost to seed a client's lawn. A diagram of the lawn is shown below. If seed costs about \$2.50 per square foot, how much will it cost to seed the lawn below? The units on the graph are in feet.

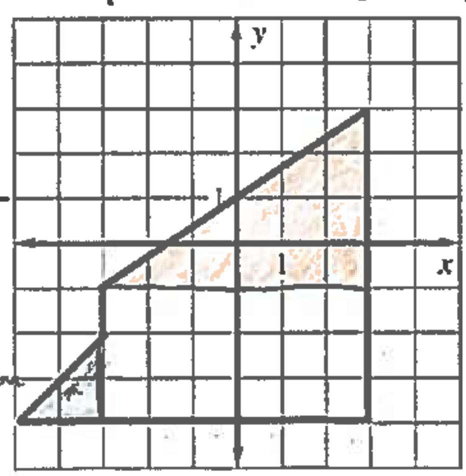
FIND THE AREA OF THE LAWN THEN MULTIPLY BY \$2.50 per sq ft.

TOTAL AREA $= 2 + 9 + 18 = 29$ units^2
TOTAL COST $= 29$ sq ft × 2.50 per sq ft = \$72.50

Area of Blue Δ
$\frac{1}{2}bh = \frac{1}{2} \cdot 2 \cdot 2$
2 units^2

Area of Orange Δ
$\frac{1}{2}bh = \frac{1}{2} \cdot 6 \cdot 3$
9 units^2

Area of Quadrilateral
$l \cdot w = 6 \cdot 3$
18 units^2



G.MG.2 *I can use the concept of density in the process of modeling a situation.*

4. A county has a population density of 365 people per square mile. The current population is 23,000 people. What is the area of this county? Round to the nearest square mile if necessary.

$$\text{Population Density} = \frac{\text{Population}}{\text{Area}}$$

$$365 = \frac{23000}{x}$$

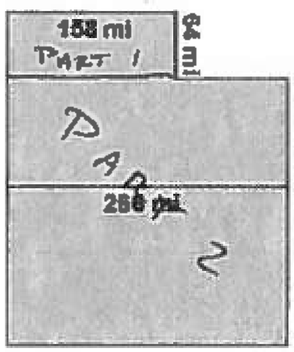
MULTIPLY BOTH SIDES BY x

$365x = 23000$

DIVIDE BOTH SIDES BY 365

$x = 5.479 \approx$ 5 sq miles

5. The borders of the state of Utah have approximately the lengths shown on the map. The U.S. 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 the answer to the nearest whole number.



$$\text{Population Density} = \frac{\text{Population}}{\text{Area}}$$

$$\text{Population Density} = \frac{2,990,094}{84858}$$

$$\text{Population Density} = 35.24$$

TO NEAREST WHOLE NUMBER

Population Density = 35 people/sq mile

AREA OF UTAH

PART 1 + PART 2

$l \cdot w + l \cdot w$

$64 \cdot 158 + 266 \cdot 281$

$84858 = 10,112 + 74746$

6. The volume of a cube is 59.32 cm^3 and its density is 1.62 g/cm^3. What is the mass of the cube? Round to the nearest tenth, if necessary.

$$D = \frac{m}{V} \Rightarrow 1.62 = \frac{m}{59.32} = 96.098\text{ g}$$

MULTIPLY 1.62×59.32

96.1 g

7. A ball has a volume of 36 cubic inches and a mass of 12 grams. What is its density? Round the answer to the nearest hundredth.

$$D = \frac{m}{V} \Rightarrow D = \frac{12}{36} = 0.333\text{ g/in}^3$$

TO THE NEAREST 100TH

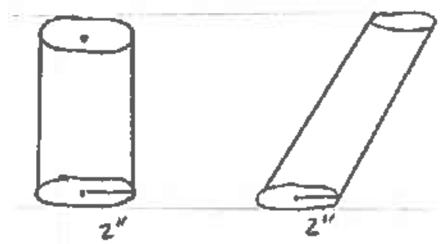
$D = 0.33$ g/in^3

G-GMD.1- *I can explain the formulas for volume of a cylinder, pyramid, and cone by using dissection, Cavalieri's, informal limit argument.*

8. Explain Cavalieri's principle. Then, draw a diagram to support your explanation.

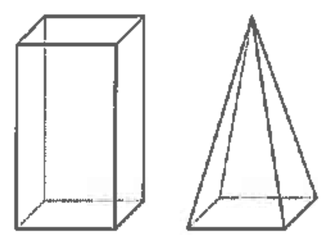
Explanation: If the base of cylinder is equal to the base of another cylinder & their heights are equal. The volume of both cylinders will be congruent

Diagram:



9. Evan has a popcorn container in the shape of a square prism that can hold 360 cubic inches. He also has some square-pyramid-shaped containers with the same height and base side lengths as the square prism. How many pyramid-shaped containers can he can fill from the prism-shaped container? Explain your answer.

3



Square prism Square pyramid

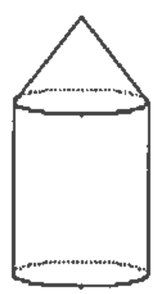
The volume of a square prism will have 3 times the volume of a square pyramid with an equal base and an equal height.

G-GMD.4: *I can identify shapes of 2-dimensional cross-section of 3-dimensional objects. I can identify 3-dimensional objects generated by rotations of 2-dimensional objects.*

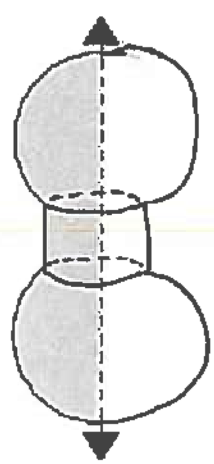
10. Complete the following table.

Shape	Cross-section parallel to bases	Cross-section perpendicular to bases
Cone	Circle	Rectangle
Sphere	Circle	Circle
Rectangular Prism	Rectangle	Rrectangle
Cylinder	Circle	Triangle

11. Draw the 2D shape that would produce the solid below if rotated 360°. Make sure to label the axis of rotation.



12. Draw the solid of revolution formed by the shape rotated around the axis given.



G-GMD.3- *I can use volume formulas for cylinders, pyramids, cones and spheres to solve problems.*

13. Find the volume for each of the following shapes, given the dimensions shown. Be sure to show your work! Round your answers to the nearest tenth, if necessary.

Shape	Dimensions	Volume
Cylinder	Radius = 4 cm Height = 8 cm	$401.9\ cm^3$
Cone	Radius = 4 cm Height = 10 cm	$167.5\ cm^3$
Sphere	Radius = 4 cm	$268.0\ cm^3$
Rectangular prism	Length = 4 cm Width = 2 cm Height = 5 cm	$40 cm^3$

$V_{cylinder} = Bh$
$= \pi r^2 h$
$V = 3.14 \cdot 4^2 \cdot 8$
$= 401.92$

$V_{cone} = \frac{1}{3} Bh$
$= \frac{1}{3}\pi r^2 h$
$V = \frac{1}{3} 3.14 \cdot 4^2 \cdot 10$
167.47

$V_{sphere} = \frac{4}{3}\pi r^3$
$= \frac{4}{3}(3.14)4^3$
$V = 267.95$

$V_{prism} = Bh$
$= l \cdot w \cdot h$
$= 4 \cdot 2 \cdot 5$
$= 40 cm^3$

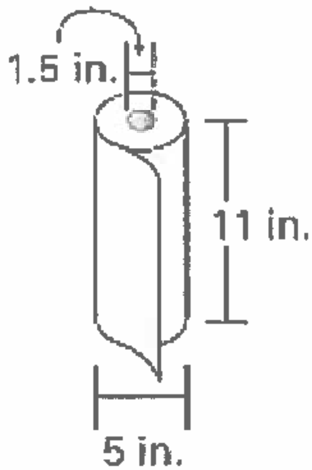
14. You have 3,700 cubic centimeters of soap. How many cones of soap can you make if each cone is 12 centimeters tall and has a diameter of 14 centimeters?

$V_{cone} = \frac{1}{3} Bh$
$= \frac{1}{3} \pi r^2 \cdot 12$
$= \frac{1}{3} 3.14 \cdot 7^2 \cdot 12 = 615.44$
For 1 cone of soap

Divide total soap by volume of 1 cone.
$3700 \div 615.44 = 6.01$

Answer: 6 Complete Cones of Soap

15. A roll of paper towels is wrapped around a cardboard cylinder with a diameter of 1.5 in. The diameter of the whole roll of paper towels is 5 in. What is the volume of the paper on the role to the nearest cubic inch?



$V_{PAPER} = V_{BIG\ CYLINDER} - V_{HOLE}$

$= Bh - Bh$

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

$= 3.14(2.5)^2 \cdot 11 - 3.14(.75)\ 11$

$= 215.875 \quad = 19.429$

$V_{PAPER} = 196.446\ in^3$

TO THE NEAREST CUBIC IN

$V_{PAPER} = 196\ in^3$