

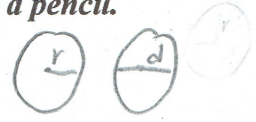
EDUCATIONAL ASSIGNMENT for JOSEPH JOHN WUNDERLICH for 11th grade

This assignment covers the following Educational Objectives (Subjects marked with a "■" are the main subject, and those marked with an "□" are secondary subjects):

- Geometry

Solve the following problems. Put all your work directly on this assignment and do not use a calculator. You may however look up the equations for each of these. Draw a picture for each problem. Use a pencil.

1. Given a Euclidean Shape with a **radius = 3**:



a. What is the **diameter**


The distance from 2 sides of a circle, also $d = 2r$ $d = 2 \cdot 3$

b. What is the **Area of a CIRCLE** in terms of π (leave π as a symbol)


$A = \pi r^2$ $A = \pi 3^2$ $A = 9\pi$ 

$d = 6$


c. What is the **Circumference of a CIRCLE** in terms of π (leave π as a symbol)

$C = 2\pi r$ $C = 2\pi 3$ $C = 6\pi$ 

d. What is the **Volume of a CYLINDER** with a **height = 4** in terms of π (leave π as a symbol)


$V = \pi r^2 h$ $V = \pi 3^2 4$ $V = 36\pi$ 

e. What is the **Surface Area of a CYLINDER** with a **height = 4** in terms of π (leave π as a symbol)


$SA = 2\pi r(h+r)$ $SA = 2\pi 3(4+3)$ $SA = 2\pi 21$ $(SA = 42\pi)$ 

f. What is the **Surface Area of a CONE** with a **height = 4** in terms of π (leave π as a symbol). Use the **Pythagorean Theorem** to find the **length (l')** of the side of the cone.


$S.A. = \pi r(l+r)$
 $S.A. = \pi 3(5+3)$
 $S.A. = 24\pi$

$h=4$  $r=3$ $l=5$


$l^2 = r^2 + h^2$ $l = \sqrt{r^2 + h^2}$
 $l = \sqrt{3^2 + 4^2}$ $l = \sqrt{9 + 16 = 25}$ $l = 5$



g. What is the **Surface Area of a SPHERE** in terms of π (leave π as a symbol)

$SA = 4\pi r^2$ $SA = 36\pi$ 

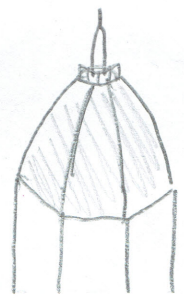
h. What is the **Surface Area of a DOME** in terms of π (leave π as a symbol), (excluding the Area of the Base)

$SA = 2\pi r h$ $36\pi \div 2 = 18\pi$  $SA = 18\pi$

i. What is the **Surface Area of a Brunelleschi's DOME** in Florence, Italy in terms of π (leave π as a symbol)

(Special equation for this shape)
 Dome height = 114m
 Dome radius at base = 22.5 m
 Dome diameter = 45m

$SA = 2\pi(22.5 \cdot 114m)$
 $SA = 2\pi \cdot 2565$
 $SA = 16116$ sq. meters



- j. Describe in words (handwritten in pencil) your experience visiting **Brunelleschi's DOME** in Florence, Italy and why you believe that this was a great Architectural endeavor to complete at the time it was built. Reflect on this picture you took:



Firstly, this was easily the largest structure in the observable city skyline. Gathering enough people and resources to build a church of this magnitude required years of planning. Achieving perfect symmetry on a scale like this is more difficult than it might seem at first. Visiting the building for the first time, I could see differences in the design of each side. I loved how much detail there was in places where you can hardly see from ground view. The various colors of marble in their busy patterns don't appear so detailed as to be difficult to take in, but instead are perfect in their scale and pattern. My eyes and brain were pleased by the high balance between texture and geometry. The large circular windows are a nice touch.

Perfect 10/10

YES!