

APY compounded continuously APY=

APY compounded n times APY=

Compounded Continuously A=

Compounded n times A=

Simple Interest A=

Three Exponential models

Q= using  $T_{half}$

Q= using  $T_{double}$

Q= using r

r=  $T_{Double} =$

r=  $T_{Half} =$

$T_{Double} \approx$

$T_{Half} \approx$

Slope=

Point Slope formula for a line  $y - y_1 =$

Slope intercept formula for a line  $y =$

Scaling New value=

shape	Area	Perimeter
Circle		
Square		
rectangle		
Parallelogram		
Triangle		

Surface area to volume ratio =

$$\text{Savings Plan Formula } A = PMT \times \frac{(1 + \frac{APR}{N})^{NY} - 1}{\frac{APR}{N}}$$

$$\text{Loan Payment Formula } PMT = \frac{P \times (\frac{APR}{N})}{1 - (1 + \frac{APR}{N})^{-NY}}$$

solid	Surface Area	Volume
sphere		
cube		
rectangular prism (box)		
right circular cylinder		

Math 1030 Section 8 Test 2

Name: \_\_\_\_\_

Read all directions carefully and show all your work for full credit. Be sure to read the question completely and do each part of the question completely. Each question is worth 20 points, all questions will be graded. How you do the problem is more important than getting the correct answer.

Good Luck and if you have any questions let me know!!

1. Barry wants to buy a fabulous house worth 750,000 dollars. If Barry has to take out a home loan in order to buy the house at a rate of 9% and makes 24 payments a year for 25 years how much does he have to pay each payment period? How much in interest does Barry pay on top of the cost of the home over the life of the loan? If Barry had the forethought to put away 400 dollars a month in a mutual fund account with an APR of 20% starting at age 20, what age would he be when he could afford the house without a loan of any kind?

2. The number of buffalo in the United States declined at an exponential rate in the late 1800's. If there were 10,000,000 buffalo in 1840 and the population started halving every 23 years write an exponential model that describes the buffalo population in terms of time. Using the model find how many buffalo there are in 1900. At what time will the buffalo population be 1 according to the model. What is the decay rate of the buffalo population (express as a percentage)?

3. Say that four roads form a parallelogram with sides of length 1200 feet and 1000 feet and the perpendicular height between the sides with length 1000 feet is 850 feet. Inside the parallelogram is a circular building of radius 100 feet, a rectangular office building with a length of 100 feet and a width of 150 feet, and a cement parking lot in the shape of a right triangle with sides of length 50 feet, 120 feet, and 130 feet. If the rest of the area inside the parallelogram is covered in grass, what is the area and the perimeter of the grass covered area. Draw a picture of the situation.

4. Say that you have a basketball of radius 6in sitting inside a trashcan with a lid in the shape of a right circular cylinder with a height of 24in and a radius of 7in. On top of the basketball is a cardboard box with dimensions 6in $\times$ 3in $\times$ 4in. Find the surface area and the volume of each shape. Find the surface area to volume ratio of each shape in the trashcan. Which shape has the greatest surface area, greatest volume, and greatest surface area to volume ratio?

5. The number of movies produced in the United states was 2000 in 1932 and 154,000 were produced in 2005. Using these two points write both a linear and an exponential model that describes the situation. Graph the two models seperatly. Find the number of movies produced in 1957 using both models.

6. Say that there is an object in your backyard with a volume of  $15 \text{ ft}^3$  and a surface area to volume ratio of 1.5. If you scale the object and end up with a surface area of  $56 \text{ ft}^2$  what is the new volume of the object and the new surface area to volume ratio of the object? If you scale the object and end up with a volume of  $.4 \text{ ft}^3$  what is the new surface area and the new surface area to volume ratio of the object?

7. Say that Ann, Peter, and Fred are all planning to retire in 30 years. Ann decides to put 25,000 dollars in an account with simple interest at a rate of 9%. Peter decides to put 20,000 dollars in an account with an APR of 7.5% that is compounded semi-annually. Fred decides to put 15,000 dollars in an account that is compounded continuously at a rate of 7%. Find the Annual Percentage Yield (APY) of Fred and Peters accounts. Who has the most money when they all retire in 30 years?