

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

Section: \_\_\_\_\_

Zid: \_\_\_\_\_

1. Only a basic **non-text capable, non-graphing** calculator is permitted.
2. **Graphing calculators, cell phones and pdas shall be stowed out of sight.**  
IF VISIBLE YOU WILL BE DEEMED TO BE CHEATING AND WILL RECEIVE A ZERO SCORE FOR THE EXAM!!!
3. Clearly show sufficient work to justify your answers.
4. Check that your exam contains exactly 20 problems.
5. Each problem is worth 5 points.

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[1A] A population of rats dying from a plague follows the exponential law. If the population decreased from 4,000 to 1,000 in the last 3 months, what will the population be in another 3 months?

[2A] Simplify  $\left(\frac{\cos(\theta) - \sin(\theta)}{\cos(\theta) + \sin(\theta)}\right) \left(\frac{1 + \tan(\theta)}{1 - \tan(\theta)}\right)$

[3A] Simplify  $(\sin x) \left(\frac{1}{\tan x} + \tan x\right)$

[4A] Give three values of  $\theta$  for which  $\cos \theta = 1$ . [Radians!!!]

[5A] Give three values of  $\theta$  for which  $\sin \theta = 1$ . [Radians!!!]

[6A] Give three values of  $\theta$  for which  $\tan \theta = 1$ . [Radians!!!]

[7A] Which of the following are identities?

(I)  $\sec \theta \cot \theta \sin \theta = 1$

(II)  $\sin^2 t - \cos^2 t = 1 - 2 \sin^2 t$

(III)  $\cot \beta \cos \beta = \csc \beta - \sin \beta$

[8A] Suppose that  $\triangle ABC$  is a right triangle with  $\angle C = \frac{\pi}{2}$ . If  $AC = 10$  and  $BC = 24$  then:

$\sin A =$

$\cos A =$

$\tan A =$

[9A] (a) Change to radians:  $585^\circ =$

(b) Change to degrees:  $\frac{7\pi}{6} =$

[10A] Two angles of a triangle are  $\frac{\pi}{6}$  and  $\frac{2\pi}{5}$ . What is the third angle?

[11A] Find the arc length determined by a central angle of  $60^\circ$  in a circle of radius 7 inches.

[12A] If  $\sin t = -.678$  and  $\cos x = .456$  then

(a)  $\sin(-t) =$

(b)  $\cos(-x) =$

[13A] (a) Evaluate  $\cos\left(\frac{14\pi}{3}\right)$

(b) Evaluate  $\tan\left(\frac{71\pi}{4}\right)$

[14A] If  $\sin(\theta) = \frac{2}{5}$  and  $\theta$  is in the second quadrant then  $\cos(\theta) =$

[15A] Complete the following table with EXACT values:

$\sin(0)$	
$\sin(\pi/6)$	
$\sin(\pi/4)$	
$\sin(\pi/3)$	
$\sin(\pi/2)$	

[16A] Complete the following table with EXACT values:

$\cos(0)$	
$\cos(\pi/6)$	
$\cos(\pi/4)$	
$\cos(\pi/3)$	
$\cos(\pi/2)$	

[17A] Complete the following table with EXACT values:

$\tan(0)$	
$\tan(\pi/6)$	
$\tan(\pi/4)$	
$\tan(\pi/3)$	
$\tan(\pi/2)$	

[18A] Simplify

$$\frac{1 - \tan^2 x}{1 + \tan^2 x} + 2 \sin^2 x$$

Hint: The answer is a constant!!

[19A] A wheel of radius 3 feet is rotating at 100 rpm (revolutions per minute). What is the angular speed?

[20A] A wheel of radius 3 feet is rotating at 100 rpm (revolutions per minute). What is the linear speed of a point on the circumference?