

# 232 TEST 1

You may use your notebook during the last fifteen minutes of this exam.  
You may NOT use calculators, cell phones, loose papers, or peeking.

Math 232  
September 23, 2011.

Name:                     \* key \*                    VZ.  
By printing my name I pledge to uphold the honor code.

1. True or false?

T  F The cosine of a sum of angles is equal to the sum of the cosines of the angles.

T  F If the terminal edge of an angle  $\theta$  is in the third quadrant, then the values of all six trigonometric functions of  $\theta$  are negative. ~~⊕~~

T F Every point  $(x, y)$  on the unit circle satisfies  $x^2 + y^2 = 1$ .

T F All exponential growth functions have a constant quadrupling time.

T F Every exponential function has a horizontal asymptote at  $y = 0$ . ~~≠ ≠~~

T F If  $Q(t)$  is an exponential function with yearly continuous growth rate  $r$ , then  $Q'(t) = rQ(t)$ .  $Q(t) = Q_0 e^{rt}$

2. Determine whether each of the following values is zero, positive, negative, or undefined.

~~(Hint: Each answer is used one time.)~~

$\log_{\frac{1}{2}} 1$        (zero)      (positive)      (negative)      (undefined)

$(\frac{1}{2})^0 = 1$

$\ln(\frac{1}{e^2})$       (zero)      (positive)       (negative)      (undefined)

$\ln(e^{-2}) = -2$

$\sin \frac{16\pi}{5}$       (zero)      ~~(positive)~~       (negative)      (undefined)

~~⊕~~ ~~⊕~~

$\sec(-\frac{9\pi}{8})$       (zero)      (positive)       (negative)      (undefined)

~~⊕~~

4 pts each  
(24 pts)

4 pts each  
(16 pts)

40

V2.

3. Circle the correct answer for each limit. (Hint: Each answer is used exactly once.)

hints

$$\lim_{x \rightarrow \infty} \frac{3^x + 1}{e^{-x}} \quad 0 \quad 1 \quad e \quad 3 \quad \infty \quad -\infty$$

$$\frac{\infty}{0^+} = \infty$$

$$\lim_{x \rightarrow 0^+} (1 + 3x)^{\frac{1}{3x}} \quad 0 \quad 1 \quad e \quad 3 \quad \infty \quad -\infty$$

$$(e^3)^{1/3}$$

$$\lim_{x \rightarrow \frac{\pi}{2}} (\tan x - \sec x) \quad 0 \quad 1 \quad e \quad 3 \quad \infty \quad -\infty$$

$$\frac{\sin x - 1}{\cos x}, \text{ L'H}$$

$$\lim_{x \rightarrow 0^+} e^x \ln x \quad 0 \quad 1 \quad e \quad 3 \quad \infty \quad -\infty$$

$$1(-\infty) = -\infty$$

$$\lim_{x \rightarrow 3^+} \frac{\sqrt{x-3}}{\sin \sqrt{x-3}} \quad 0 \quad 1 \quad e \quad 3 \quad \infty \quad -\infty$$

$$\frac{\theta}{\sin \theta} \rightarrow 1$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sin(3 \cos x)}{\cos x} \quad 0 \quad 1 \quad e \quad 3 \quad \infty \quad -\infty$$

$$\frac{0}{0}, \text{ L'H}$$

6 pts each

(36 pts)

4. Calculate the derivatives of the functions below.

a)  $f(x) = \cot^2(x^3)$

$$f'(x) = 2 \cot(x^3) \cdot (-\csc^2(x^3)) \cdot (3x^2)$$

oops

8 pts each

(24 pts)

b)  $f(x) = 2e^{3 \sin x \sec x}$

$$f'(x) = 2e^{3 \sin x \sec x} \cdot (3 \cos x \sec x + 3 \sin x \sec x \tan x)$$

c)  $f(x) = (\cos x)^x$

$$\ln y = x \ln(\cos x)$$

$$\frac{1}{y} y' = 1 \cdot \ln(\cos x) + x \cdot \frac{1}{\cos x} (-\sin x)$$

$$y' = (\cos x)^x \left( \ln(\cos x) - \frac{x \sin x}{\cos x} \right)$$

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