

# Math 2215 - Calculus 1

Exam #2 - 2017.09.28

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

**Instructions:** Please work out each problem in full detail. No points are given for a correct answer.

1. Fill out the following table of derivatives for the given six trigonometric functions.

$f(x)$	$f'(x)$
$\sin(x)$	
$\cos(x)$	
$\tan(x)$	
$\csc(x)$	
$\sec(x)$	
$\cot(x)$	

2. Fill out the following table of values for the given trigonometric functions at the given points:

$\theta$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	$\pi$
$\sin(\theta)$									
$\cos(\theta)$									

3. State the Mean Value Theorem.

For problems 4–7, compute each derivative.

4.  $\frac{d}{d\theta} \left[ \sec(\theta^2) \sqrt{\theta^2 + 1} \right]$

5.  $\frac{d}{dz} \left( 1 + \left( \frac{z}{2 \sin(z)} \right)^4 \right)^3$

$$6. \frac{d}{dt} [t^2 \sin^4(t) \cos^5(2t)]$$

$$7. \frac{d}{dw} f(g(h(j^2(w) \cdot k(w))))$$

For problems 8–10, use the implicitly defined equation  $\cos(x) + \cos(2y) = \frac{1}{2}$ .

8. Compute  $\frac{dy}{dx}$ .

9. Compute the equation of the tangent line to the implicitly defined function at  $(x, y) = (\pi/3, -\pi/4)$ .

10. Find *all* points  $(x, y)$  on the curve where there is a vertical tangent line.