

MATH 229  
MOCK EXAM 2

**Disclaimer:** This mock exam is for practice purposes only. It may not represent your instructor's exam. Doing well on this exam does not guarantee success on your real exam. It also doesn't guarantee failure. Use this exam to find your strengths and weaknesses and to see how long it takes to do certain problems. One of the main obstacles of any calculus exam is time management.

This exam may not be exhaustive. Ask your instructor for the exact sections being covered.

Good luck!

**Calculus Tutoring Center**  
DU 326

Name:

Show all work to receive full credit.

1. Compute the following derivatives.

$$(a) \ y = \frac{5}{\sqrt[3]{x}} + 15x - x^{2/3} - \frac{1}{8x^8} + 6$$

$$(b) \ y = \frac{8}{(x^3 - x^2 + 1)^{5/4}}$$

$$(c) \ y = \tan^2(\sqrt{x})$$

$$(d) \ y = \frac{2x^3 - \frac{5}{x}}{x^{4/3} + x}$$

2. Find all  $x$ -coordinates where the following function has a horizontal tangent line.

$$y = (3x - 1)^4(2x + 1)^{-3}$$

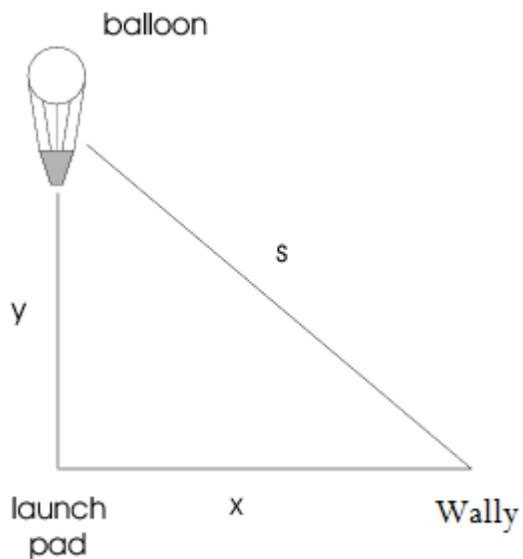
3. Find the equation of the tangent line on the curve

$$\sin(x + y) = 2x - 2y$$

at the point  $(\pi, \pi)$ . Leave it in point-slope form.

4. Carrie and David elope in a hot air balloon, which rises at a constant rate of 5 meters per second. Just as the hot air balloon begins to rise, Carrie's other potential suitor Wally arrives to stop them. He parks 64 meters from the launch pad, and runs towards the pad at 4 meters per second. At what rate is the distance between Wally and the balloon changing when the balloon is 30 meters above the ground.

Here's a picture to get you started.



5. At this point, everyone should know what  $\tan(\pi/4)$  equals. Well, I want you to estimate  $\tan(3\pi/11)$  by following these two easy steps.
- (a) Find the formula for  $L(x)$ , the linearization of  $f(x) = \tan(x)$  near  $a = \pi/4$ .
- (b) Use  $L(x)$  to approximate  $\tan(3\pi/11)$ . Do not round your answer.
6. Brian manufactures and sells super crazy straws. The price  $p$  of selling these crazy straws determines the revenue. The revenue function  $R(p)$  has been determined to be  $R(p) = -5p^2 + 100p$ .
- (a) Determine the price at which revenue is at its max?
- (b) What is the max revenue?