

Exam 2

NAME: _____

This exam is closed book. Show work.

1. (2 points) True or False. If f is continuous at $x = a$, then f is differentiable at $x = a$.

TRUE**FALSE**

If your answer is FALSE, explain.

2. (2 points) True or False. If f is differentiable at $x = a$, then f is continuous at $x = a$.

TRUE**FALSE**

If your answer is FALSE, explain.

3. (3 points) Give an example of a function which is continuous at $x = 0$ but not differentiable at $x = 0$.

4. (2 points) $\lim_{x \rightarrow 0} \frac{\sin 3x}{4x} =$

5. (2 points) $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{3x}$

6. (2 points) The height of a projectile t seconds after launch is $h(t) = -t^2 + 9t + 10$ meters. Determine the velocity of the projectile when it hits the ground.

7. Find the derivative of each function, and simplify completely.

(a) (2 points) $f(x) = (2x + 1)^2(4 - 3x)^2$

(b) (2 points) $f(x) = \frac{x}{\sin x}$

(c) (2 points) $f(x) = \sqrt{1 + \tan x}$

8. (3 points) Find $f''(x)$ for $f(x) = x \cos x$.

9. (3 points) Find the equation of the tangent line to

$$x^3 + xy + y^2 = 1$$

at $(-1, 2)$.

10. (3 points) Approximate $\sqrt{402}$ using a linear approximation.

11. (3 points) Find d^2y/dx^2 for the relation $xy = 1 + x$.