NAME: Solutions

MATH 132 - Michigan State University
September 21st, 2018.

Quiz 3

Clear your desk of everything except pens, pencils and erasers. **Show all your work.**
If you have a question raise your hand and I will come to you.

I. Multiple Choice

Find the following limits:

1. [1 pt.] $\lim_{x\to 0} \dfrac{\sin(x^2+6x)}{x}$ $= \lim_{X\to 0} \dfrac{\sin(X(X+6))}{X(X+6)}(X+6) = 1\cdot 6 = (6)$

(a) 0

(b) 1

(c) -1

(d) 6

(e) DNE

2. [1 pt.] $\lim_{x\to 64} \dfrac{\sin(\sqrt{x}-8)}{x-64}$ $= \lim_{X\to 64} \dfrac{\sin(\sqrt{X}-8)}{(\sqrt{X}-8)}\left(\dfrac{1}{\sqrt{X}+8}\right) = 1\cdot\dfrac{1}{16} = \left(\dfrac{1}{16}\right)$

(a) 1/64

(b) 16

(c) 64

(d) 1/16

(e) 0/0

II. Standard Response

Find the first derivatives of each of the functions below:

3. [1 pt.] $f(x) = \cos^3(x)$

$f'(x) = 3\cos^2(x)\cdot(-\sin(x))$

4. [1 pt.] $f(x) = (1+2x)^3\sin(x)$

$f'(x) = 3(1+2x)^2\cdot 2\cdot\sin(x) + (1+2x)^3\cdot\cos(x).$

5. [1 pt.] $f(x) = \tan(x)(x^5 - \cos(2x))$

$f'(x) = \sec^2(x)\left(x^5 - \cos(2x)\right) + \tan(x)\left(5x^4 + 2\sin(2x)\right)$

6. [1 pt.] $f(x) = \sec(\sin(x^2 + x))$

$f'(x) = \sec\left(\sin(x^2+x)\right)\tan\left(\sin(x^2+x)\right)\cos(x^2+x)(2x+1)$

7. [1 pt.] $f(x) = \dfrac{x}{\tan(x^2 - 1)}$

$f'(x) = \dfrac{\tan(x^2-1) - x\cdot\sec^2(x^2-1)\cdot 2x}{\tan^2(x^2-1)}$

8. [1 pt.] $f(t) = 7\sec(t)\tan\left(\dfrac{3}{t}\right)$

$f'(t) = 7\sec(t)\tan(t)\tan\left(\frac{3}{t}\right) + 7\sec(t)\sec^2\left(\frac{3}{t}\right)\cdot\left(\frac{-3}{t^2}\right)$

9. [1 pt.] $f(x) = \left(\dfrac{1}{x} + 1\right)(2\sqrt{x^2+1} - 1)$

$f'(x) = \left(-\frac{1}{x^2}\right)\left(2\sqrt{x^2+1} - 1\right) + \left(\frac{1}{x}+1\right)\left(\frac{2x}{\sqrt{x^2+1}}\right)$

10. [1 pt.] $f(y) = 6\tan(3\sin(y))$

$f'(y) = 6\sec^2(3\sin(y))\cdot 3\cos(y).$