Math 75 **Exam 2** **Name:** _____
Spring 2015 **Version C**

Section (circle one): Cusick(10:00) Cusick(11:00) Wagoner (12:00) Wagoner (1:00)

Instructions.

- **Write your full name and circle your section time above.**
- Please write the following information on your Scantron form:
  - Under **NAME**, write your full name.
  - Under **SUBJECT**, write your section time (10:00, 11:00, 12:00, or 1:00).
  - Under **TEST NO.**, write "**C**".
- Your answers to the **multiple choice questions** must be marked on your Scantron form (and nothing written in your exam booklet will be considered for the multiple choice questions). Use the space provided in the booklet to complete the **free response questions**.
- Please make sure to double-check your answers.
- **No calculators, no cellphones, or notes are allowed on this exam. All electronic devices must be silent and stowed.**

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1. Find $\frac{dy}{dx}$ given the curve $2x + xy^2 + y = 3$.

   (a) $\frac{dy}{dx} = -\frac{2+y^2}{1+2xy}$

   (b) $\frac{dy}{dx} = -\frac{1+y^2}{1+2xy}$

   (c) $\frac{dy}{dx} = \frac{1+y^2}{1-2xy}$

   (d) $\frac{dy}{dx} = -\frac{1-y^2}{1-2xy}$

   (e) $\frac{dy}{dx} = \frac{2+y^2}{1-2xy}$

2. Find the equation of the tangent line to the graph of the function $f(x) = \dfrac{e^x}{x^2+2}$ at $x = 0$.

(a) $y = 1/2$

(b) $y = \dfrac{1}{2}x + 1/2$

(c) $y = x + 1/2$

(d) $y = -x + 1/2$

(e) $y = -\dfrac{1}{2}x + 1/2$

3. The slope of the tangent at $x = 1$ of $f(x) = \dfrac{x+2}{xe^x}$ when **simplified** is:

(a) $-\dfrac{3}{e}$

(b) $\dfrac{3}{e}$

(c) $\dfrac{1}{2e}$

(d) $-\dfrac{5}{e}$

(e) $\dfrac{5}{e}$

4. Find $\dfrac{d^2}{dx^2}(3\log_2(x-5))$

(a) $\dfrac{3}{(x-5)\ln 2}$

(b) $\dfrac{3}{(x-5)(\ln 2)^2}$

(c) $\dfrac{3}{(x-5)^2\ln 2}$

(d) $-\dfrac{3}{(x-5)\ln 2}$

(e) $-\dfrac{3}{(x-5)^2\ln 2}$

5. Find $\lim\limits_{h\to 0}\dfrac{\sqrt{2-x-h}-\sqrt{2-x}}{h}$.

(a) $-\dfrac{1}{2\sqrt{2-x}}$

(b) 0

(c) Does not exist.

(d) $2\sqrt{2-x}$

(e) $-\dfrac{1}{\sqrt{2-x}}$

6. A bullet is fired vertically into the air at an initial velocity of 48 ft/s. On Mars, the height s (in feet) of the bullet above the ground after t seconds is $s = 48t - 6t^2$ and on Earth, $s = 48t - 16t^2$. How much higher will the bullet travel on Mars than on Earth?

(a) 16 ft

(b) 6 ft

(c) 10 ft

(d) 48 ft

(e) 60 ft

7. Find the equation of the tangent line to the graph of the function $f(x) = \tan^{-1}(3x - 1)$ at the point $(0, -\pi/4)$.

(a) $y = -3x - \pi/4$

(b) $y = 3/2x - \pi/4$

(c) $y = 3x - \pi/4$

(d) $y = -3/2x - \pi/4$

(e) $y = -\pi/4$

8. If $f(x) = (\sec x + \tan x)^5$, then $f'(x) = \ldots$

   (a) $5(\sec x + \tan x)^4(-\csc x \cot x + \sec^2 x)$

   (b) $5 \sec x(\sec x + \tan x)^5$

   (c) $5(\sec x + \tan x)^4(\sec x \tan x - \csc^2 x)$

   (d) $5 \sec x(\sec x + \tan x)^4$

   (e) $5(\sec x + \tan x)^4$

9. A 13-foot ladder is leaning against a building. If the bottom of the ladder is sliding along the pavement directly away from the building at 1 ft/sec, what is the rate of change of the vertical distance from the pavement to the top of the ladder when the foot of the ladder is 12 feet from the wall?

   (a) $-8/5$ ft/sec

   (b) $-3/2$ ft/sec

   (c) $-5/3$ ft/sec

   (d) $-12/5$ ft/sec

   (e) $-7/4$ ft/sec

10. Let $g(x) = x\sin(3x+1)$. Find $g'(x)$.

(a) $3\cos(3x+1)$

(b) $3x\cos(3x+1)$

(c) $1-\cos(3x+1)$

(d) $x\sin(3x+1)\cos(3x+1)$

(e) $\sin(3x+1)+3x\cos(3x+1)$