

**CLASS QUIZ: OCTOBER 14: DERIVATIVES**

MATH 152, SECTION 55 (VIPUL NAIK)

Your name (print clearly in capital letters): \_\_\_\_\_

- (1) Suppose  $f$  and  $g$  are functions from  $\mathbb{R}$  to  $\mathbb{R}$  that are everywhere differentiable. Which of the following functions is/are guaranteed to be everywhere differentiable? *Last year: 13/14 correct*

- (A)  $f + g$
- (B)  $f - g$
- (C)  $f \cdot g$
- (D)  $f \circ g$
- (E) All of the above

Your answer: \_\_\_\_\_

- (2) Suppose  $f$  and  $g$  are both twice differentiable functions everywhere on  $\mathbb{R}$ . Which of the following is the correct formula for  $(f \cdot g)''$ ? *Last year: 13/14 correct*

- (A)  $f'' \cdot g + f \cdot g''$
- (B)  $f'' \cdot g + f' \cdot g' + f \cdot g''$
- (C)  $f'' \cdot g + 2f' \cdot g' + f \cdot g''$
- (D)  $f'' \cdot g - f' \cdot g' + f \cdot g''$
- (E)  $f'' \cdot g - 2f' \cdot g' + f \cdot g''$

Your answer: \_\_\_\_\_

**PLEASE TURN OVER FOR THE THIRD AND FOURTH QUESTION.**

(3) Suppose  $f$  and  $g$  are both twice differentiable functions everywhere on  $\mathbb{R}$ . Which of the following is the correct formula for  $(f \circ g)''$ ? *Last year: 14/14 correct*

- (A)  $(f'' \circ g) \cdot g''$
- (B)  $(f'' \circ g) \cdot (f' \circ g') \cdot g''$
- (C)  $(f'' \circ g) \cdot (f' \circ g') \cdot (f \circ g'')$
- (D)  $(f'' \circ g) \cdot (g')^2 + (f' \circ g) \cdot g''$
- (E)  $(f' \circ g') \cdot (f \circ g) + (f'' \circ g'')$

Your answer: \_\_\_\_\_

(4) Suppose  $f$  is an everywhere differentiable function on  $\mathbb{R}$  and  $g(x) := f(x^3)$ . What is  $g'(x)$ ? *Last year: 13/14 correct*

- (A)  $3x^2 f(x)$
- (B)  $3x^2 f'(x)$
- (C)  $3x^2 f(x^3)$
- (D)  $3x^2 f'(x^3)$
- (E)  $f'(3x^2)$

Your answer: \_\_\_\_\_