

University of Bahrain
Department of Mathematics
MATHS101: Calculus I
Spring 2016



Test 2

Student's Name: _____ ID: _____

Section: _____ Serial Number: _____

- *Do not* open the exam until you are instructed to do so.
- Show sufficient work to justify each answer.
- Calculators are allowed but cell phones are *not* allowed during the exam.
- Exchange of any material such as calculator, pen, eraser is *not* allowed.
- **No** questions are allowed.
- You have 1 hour to finish this exam. You can leave only after 30 minutes of the exam.
- There are 3 questions and 5 pages in this exam.
- The multiple choice question should be filled in the bubble sheet using pencil only.

Question	Points	Score
1	20	
2	16	
3	14	
Total:	50	

Exam Version: **A**

Question 1 (20 points)

Choose the correct answer for each of the following:

(1) The derivative of $f(x) = \int_3^{x^2} \sin(t^6) dt$ is

A. $2x \sin(x^{12})$

B. $\sin(x^{12})$

C. $2x$

D. $\cos(x^6)$

E. $2x \sin(x^6)$

F. $2x \cos(x^{12})$

(2) If $\int_1^9 f(x) dx = 13$ and $\int_1^4 f(x) dx = 10$, then the value of $\int_4^9 f(x) dx$ is

A. 12

B. 3

C. 8

D. 7

E. -12

F. -8

(3) The derivative of $f(x) = \ln x^5$ is

A. $\frac{5}{x^5}$

B. $\frac{1}{x^5}$

C. $\frac{1}{x}$

D. $\frac{1}{5x}$

E. $\frac{5}{x}$

F. $5x$

(4) The linearization of $f(x) = \sqrt{25 - x}$ at $x = 0$ is

A. $5 - \frac{1}{10}x$

B. $25 - \frac{1}{2}x$

C. $5 - \frac{1}{2}x$

D. $5 + \frac{1}{10}x$

E. $25 + \frac{1}{10}x$

F. $5 + \frac{1}{2}x$

(5) The derivative of $f(x) = \log_4(x^2 + 1)$ is

A. $\frac{1}{(x^2 + 1)(\ln 4)}$

B. $\frac{2x}{(x^2 + 1)}$

C. $\frac{2x(\ln 4)}{(x^2 + 1)}$

D. $\frac{1}{x^2 + 1}$

E. $\frac{2x}{(x^2 + 1)(\log_4 x)}$

F. $\frac{2x}{(x^2 + 1)(\ln 4)}$

Question 2 (10 + 6 points)

- (a) Use logarithmic differentiation to find y' for the function

$$y = \sqrt{\frac{(x^2 + 1)^3 \cos x}{\sin^5(2x)}}$$

- (b) Find the derivative of $f(x) = (\sin x)^{\sin x}$.

Question 3 (8 + 6 points)

(a) Find the slope of the tangent line to the curve $x^2y^2 + e = e^y + 1$ at the point $(1, 1)$.

(b) Solve the initial value problem

$$\frac{dy}{dx} = \frac{4}{1+x^2}, \quad y(1) = 0.$$