

Math 1M03 Summer 2015 Test #2 (Version 1)

Name: _____
(Last Name) (First Name)

Student Number: _____

This test consists of 15 multiple choice questions worth 1 mark each (no part marks), and 1 question worth 1 mark (no part marks) on proper computer card filling. Questions must be answered on the COMPUTER CARD with an HB PENCIL. Marks will not be deducted for wrong answers (i.e., there is no penalty for guessing). You are responsible for ensuring that your copy of the test is complete. Bring any discrepancy to the attention of the invigilator. Only the McMaster standard calculator Casio fx-991 is allowed.

1.) Which of the following describes the domain of the following function:

$$f(x, y) = \frac{x^2 e^{xy}}{\sqrt{1 - x^2 y}}$$

(a) $y < \frac{1}{x^2}$ (b) $y \geq \frac{1}{x^2}$ (c) $y \geq 0$ (d) $x^2 y > 1$ (e) $z \geq 0$

2.) Let $f(x, y) = y^2 + 3x^3 - 2x^2 y$. Find $f_y(1, 2)$.

(a) 2 (b) 3 (c) 4 (d) 11 (e) -3

3.) Let $g(x, y) = x e^{2x^2 y}$. Find $g_{xy}(x, y)$.

(a) $\frac{1}{y} e^{2x^2 y}$ (b) $(6x^2 + 8x^4 y) e^{2x^2 y}$ (c) $(2x^3 + 4x^2 y + 1) e^{2x^2 y}$ (d) $8x^2 y e^{2x^2 y}$
(e) $2x^3 e^{2x^2 y}$

4.) Evaluate the following improper Integral

$$\int_4^\infty \frac{2}{x^{1.5}} dx$$

(a) $\frac{4}{\sqrt{x}}$ (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) diverges (e) 2

5.) Evaluate the following improper Integral

$$\int_1^{\infty} x e^{-2x^2} dx$$

(a) $-\frac{1}{2e^2}$ (b) e^{-2} (c) $\frac{3}{4e^2}$ (d) $\frac{1}{4e^2}$ (e) diverges

6.) Suppose that $\int_1^3 f(x)dx = 5$ and $\int_1^3 g(x)dx = -2$.

Evaluate $\int_1^3 [2f(x) + 3g(x)]dx$

(a) 4 (b) 5 (c) 6 (d) 7 (e) 8

7.) Using integration by parts, which of the following is equal to

$$\int x^5 e^x dx?$$

(a) $x^5 e^x - 5 \int x^4 e^x dx$ (b) $x^4 e^x - 5 \int x^5 e^x dx$ (c) $\frac{1}{5} x^5 e^x - 5 \int x^4 e^x dx$
(d) $\frac{1}{4} x^4 e^x - 5 \int x^4 e^x dx$ (e) $\frac{1}{5} x^5 e^x - 4 \int x^4 e^x dx$

8.) Evaluate the following integral

$$\int_0^1 x e^x dx$$

(a) $e(e-1)$ (b) $1-e$ (c) 1 (d) e (e) $e-1$

9.) Evaluate the following integral

$$\int_0^1 \frac{3x^4 + 2x^3}{x^2} dx$$

(a) $\frac{1}{2}$ (b) 1 (c) $\frac{3}{2}$ (d) 2 (e) 3

10.) Find the area bounded by the curves $y = x^2 - 4$ and $y = -x^2 + 4$

(a) $\frac{50}{3}$ (b) $\frac{64}{3}$ (c) $\frac{60}{3}$ (d) $\frac{56}{3}$ (e) $\frac{53}{3}$

11.) Which of the following represents the area between the curves $y = x^2$ and $y = x$ on the interval $0 \leq x \leq 2$?

- (a) $\int_0^2 (x - x^2) dx$ (b) $\int_0^1 (x - x^2) dx + \int_1^2 (x^2 - x) dx$ (c) $\int_0^2 (x^2 - x) dx$
 (d) $\int_0^1 (x^2 - x) dx + \int_1^2 (x - x^2) dx$ (e) $\int_0^2 (\frac{1}{3}x^3 - \frac{1}{2}x^2) dx$

12.) Let $z = f(x, y) = \frac{\sqrt{x}}{y}$, where $x = 4t^2$ and $y = t^2 + 3t + 1$. Find the value of $\frac{dz}{dt}$ when $t = 1$.

- (a) 2 (b) -2 (c) 1 (d) 0 (e) -1

13.) Consider the function

$$g(x, y) = e^{3x^2 - 4y^2 + 24y}$$

Find and classify (if possible) the critical point of g .

- (a) $(0, 3)$, saddle point (b) $(0, 3)$, relative minimum
 (c) $(0, 3)$, relative maximum (d) $(0, 3)$, inconclusive (e) $(2, 0)$, relative minimum

14.) Find the critical points of the function

$$f(x, y) = e^{y^3 - x^3 + 6xy}$$

- (a) $(0, 0)$ only (b) $(-2, 2)$ only (c) $(0, 0)$ and $(-2, 2)$ (d) $(0, 0)$ and $(3, \ln 2)$
 (e) $(3, \ln 2)$ only

15.) The population of a certain community t years after the year 2000 is given by

$$P(t) = \frac{e^{.4t}}{3 + e^{.4t}}$$

million people. What was the average population of the community during the period from 2000 to 2005?

- (a) 2,287,913 (b) 1,234,879 (c) 477,229 (d) 582,455 (e) 2,487,162

Solutions:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	A	B	E	D	A	A	C	D	B	B	D	A	C	C