Practice Exam 2 - Multiple Choice

Practice Multiple choice problems

Name: _____ Section and/or TA: _____

Last Four Digits of Student ID: _____

Do not remove this answer page — you will return the whole exam. You will be allowed two hours to complete this test. No books or notes may be used except for a one-page sheet of formulas and facts. You may use a graphing calculator during the exam, but NO calculator with a Computer Algebra System (CAS) or a QWERTY keyboard is permitted. Absolutely no cell phone use during the exam is allowed.

The exam consists of 10 multiple choice questions and 4 free response questions. Record your answers to the multiple choice questions on this page by filling in the circle corresponding to the correct answer.

Show all work to receive full credit on the free response problems. Unsupported answers on free response problems will receive *no credit*.

Multiple Choice Questions

1	A	B	C	D	E	**6**	A	B	C	D	E
2	A	B	C	D	E	**7**	A	B	C	D	E
3	A	B	C	D	E	**8**	A	B	C	D	E
4	A	B	C	D	E	**9**	A	B	C	D	E
5	A	B	C	D	E	**10**	A	B	C	D	E

SCORE

Multiple Choice	11	12	13	14	Total Score
50					100

1. The domain of the function

$$f(x,y) = e^x\sqrt{x-1} + \log y - 2 + \sqrt{3-x} + \sqrt{4-y}$$

is:

A. A square in the xy plane.

B. The region between two vertical lines

C. The region between two horizontal lines

D. The first quadrant

E. None of the above

2. The equation of the tangent line to the curve $\mathbf{r}(t) = \langle 3\cos(t), 2\sin(2t), -e^{4t}\rangle$ at $t = 0$ is:

A. $\mathbf{r}(t) = \langle 2, 6t, 4t+1\rangle$

B. $\mathbf{r}(t) = \langle 2, 6t, -4t+1\rangle$

C. $\mathbf{r}(t) = \langle 3, 4t, 4t-1\rangle$

D. $\mathbf{r}(t) = \langle 3, 4t, -4t-1\rangle$

E. $\mathbf{r}(t) = \langle 4, 3t, 4t+1\rangle$

3. If $f(x,y) = 2x^2 - y^2$, $x = u - v$ and $y = u + v$ then $\partial f(x,y)/\partial u$ is equal to:

A. $-2(u^2 + 6uv + v^2)$

B. $2u - 6v$

C. $6u + 2v$.

D. $-(2u + 6v)$

E. $2(u^2 - v^2)$

4. Suppose that z satisfies the equation $2z^3 - xy + y^2 = 56$. Assuming that this defines z as an implicit function of x, y, determine $\partial z/\partial x + \partial z/\partial y$ at the point $(x, y, z) = (1, 2, 3)$.

   A. $-25/12$

   B. -2

   C. -54

   D. 0

   E. $-1/54$

5. The Laplacian of a function $f = f(x, y)$ is defined to be $f_{xx} + f_{yy}$. Which of the following functions has Laplacian equal to zero?

   A. $f = 3x^3y + 3y^3x + 12xy$

   B. $f = x^3y - 3y^3x - 12xy$

   C. $f = x^3y + 3y^3x + x + y$

   D. $f = x^2y - 3y^2x + 12xy$

   E. $f = 3x^3y - 3y^3x + 12xy$

6. A curve C is the intersection of the surfaces $F = 3x^2 + y^2 - 28 = 0$ and $G = z - 3x^2 - 4y^2$. The tangent line to C at the point $P = (3, 1, 31)$ has a direction vector equal to

   A. $\langle 6, -6, -108 \rangle$

   B. $\langle 2, -18, -108 \rangle$

   C. $\langle 3, 1, 0 \rangle$

   D. $\langle -3, -4, 1 \rangle$

   E. $\langle 6, -6, 31 \rangle$

7. Let $f(x,y,z) = xy^2 + yz^2 + zx^2$. The directional derivative of $f(x,y,z)$ at the point $P = (-1,-1,2)$ in the direction $v = \langle 1,2,3\rangle$ is:

   A. $-2\sqrt{6}$

   B. 0

   C. $2\sqrt{6}$

   D. 1

   E. 3

8. Let $f(x,y) = 2xe^y - 3ye^x + x - y$. The directional derivative of $f(x,y)$ at the point $(0,0)$ is equal to zero for which of the following directions?

   A. $\langle 2,-1\rangle$

   B. $\langle 4,1\rangle$

   C. $\langle 1,2\rangle$

   D. $\langle 3,4\rangle$

   E. $\langle 4,3\rangle$

9. Let $I = \int\int_R f(x)g(y)\,dA$ where $R = [0,3]\times[1,5]$. If $\int_0^3 f(x)\,dx = 15$ and $\int_1^5 g(y)\,dy = 9$, which of the following is the correct value of I?

   A. 15

   B. 9

   C. 135

   D. 12

   E. Not enough information to decide

10. Let $I = \int\int_R (x^2 + xy)\,dA$ where R is the region defined by $0 \le x \le 2$ and $0 \le y \le x$. Which of the following is the correct value of I?

    A. 16

    B. 6

    C. 16/3

    D. 28/3

    E. 4