KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 132 - FINAL EXAM

Wednesday - May 22, 2013

Test Code: 1

Dr. Mohammad Z. Abu-Sbeih TIME: 8:00 - 11:00 A.M.

Student Number:	Serial Number:

Name:

Important Notes

DO NOT USE CALCULATORS OF ANY TYPE

1. Write your serial number, student number, section number and name on both the answer sheet and question paper.

2. The test code is already typed and bubbled in your answer sheet. Make sure that it is the same as that printed on your question paper.

3. When bubbling, make sure that the bubbled space is fully covered.

4. Check that the exam paper has 25 different questions.

(1) $\lim_{x \to 2} \dfrac{x^2 - 4}{x^2 - 5x + 6}$ is equal to:

(a) 0.
(b) 4/5.
(c) 4.
(d) -4.
(e) ∞.

(2) The slope of the tangent line to the curve $xy + 2x = 4y^2 + 2$ at the point (2, 1) is

(a) 1/2
(b) -1/2.
(c) 1/3.
(d) -1/3.
(e) 3/7.

(3) If $y = \dfrac{\cos x}{1 + \sin x}$ then y' is:

(a) $\dfrac{1}{1 + \sin x}$.
(b) $\dfrac{-1}{1 + \sin x}$.
(c) $\dfrac{\cos x}{1 + \sin x}$.
(d) $\dfrac{\sin x}{(1 + \sin x)^2}$.
(e) $\dfrac{-\sin x}{(1 + \sin x)^2}$.

(4) Let $f(x) = \dfrac{x + 3}{x^2 + x - 6}$, which of the following is **true**:

(a) The graph has x- intercept at $x = -3$.
(b) The graph has two vertical asymptotes.
(c) The graph has no maximum but one local minimum.
(d) The graph has only one vertical asymptote and only one horizontal asymptote.
(e) The graph has one inflection point.

(5) Which of the following is **false** about the graph of the function $f(x) = x^3 - 3x + 2$.

(a) The graph is decreasing on the interval (-1, 1).
(b) The graph has absolute minimum on the interval (-1, 1).
(c) The graph has local max. at the point (-1, 4) and local min. at the point (1, 0).
(d) The graph is concave down on $(-\infty, 0)$ and concave up $(0, \infty)$.
(e) The graph has only one inflection point (0, 2).

(6) The value of the constant A which will make the function

$$f(x) = \begin{cases} 2x+1 & \Big| \; if \quad x \geq 1 \\ A - x & \Big| \; if \quad x < 1 \end{cases}$$

continuous is:

(a) 2.
(b) 3.
(c) 4.
(d) 5.
(e) -3.

(7) A manufacturer wants to design a rectangular box with square bottom, having a storage capacity of 1000 cubic ft. The least amount of metal needed to make the box is

(a) 600 ft^2.
(b) 1200 ft^2.
(c) 400 ft^2.
(d) 800 ft^2.
(e) 1000 ft^2.

(8) A company currently sells 850 radios monthly at a price of \$75 each. For each additional dollar the company charges, the public will buy 10 fewer radios monthly. What price should the company charge for each radios to maximum the monthly revenue?

(a) \$80.
(b) \$72.5.
(c) \$75.
(d) \$77.5.
(e) \$70.

(9) The area bounded by the graphs of $x - y = 1$ *and* $x + 1 = y^2$ is equal to:

(a) $\frac{1}{3}$.

(b) $\frac{9}{2}$.

(c) $\frac{4}{3}$.

(d) $\frac{2}{3}$.

(e) 1.

(10) The slope of the line tangent to the graph of $y = 2^{2x} + \ln\sqrt{x} + \pi^2$ when x = 1 is

(a) $\frac{1}{2} + 4\ln 2$.

(b) $4\ln 2 + 2\pi$.

(c) $\frac{1}{2} + 2\ln 2$.

(d) $\frac{1}{2} + 4\ln 4$.

(e) $\frac{1}{2} + 4\ln 2 + 2\pi$.

(11) The profit $P(x, y)$ from selling x computers and y printers is $P(x, y) = 8500 - 2x^2 + xy - y^2 + 49y$. The company will make:

(a) maximum profit when x = 14, and y = 14.

(b) minimum profit when x = 14, and y = 14.

(c) maximum profit when x = 7, and y = 28.

(d) minimum profit when x = 7, and y = 28.

(e) maximum profit when x = 14, and y = 28.

(12) If $f(x, y) = \sin(x + y) + \ln x + \ln y$, then the number of points (x , y) for which $f_{xx} = f_{yy}$ is:

(a) 0.

(b) 1.

(c) 2.

(d) 4.

(e) infinite.

(13) If $y = (1+e^x)^x$ then $f'(0)$ is equal to:

(a) 0.
(b) 1.
(c) e.
(d) $\ln 2$.
(e) 1+ e^2.

(14) The domain of the function $z = g(x, y) = \ln(4 - x^2 - y^2)$ is

(a) the set of all points inside the circle $x^2 + y^2 = 4$
(b) the set of all points outside the circle $x^2 + y^2 = 4$
(c) the set of all points in the plane
(d) the set of all points (x,y) satisfying $x^2 + y^2 \le 4$
(e) the set of all points in space inside the cylinder $x^2 + y^2 = 4$

(15) The function $f(x, y) = 2x^2 + y^2 - xy - 7y$ has

(a) only one relative maximum at (1,4).
(b) only one relative minimum at (1,4).
(c) one saddle point at (1,4).
(d) only one relative maximum at (4,1).
(e) One local maximum and one local minimum points

(16) $\int \frac{\sin x\, dx}{1+\cos x}$ is equal to

(a) $\frac{1}{(1+\cos x)^2} + C$
(b) $\frac{-1}{(1+\cos x)^2} + C$.
(c) $\cot x - \csc x + C$
(d) $\ln|1+\cos x| + C$.
(e) $-\ln|1+\cos x| + C$.

(17) If $\int \frac{du}{[u^2 \pm a^2]^{\frac{3}{2}}} = \frac{\pm u}{a^2 \sqrt{u^2 \pm a^2}} + C$, then $\int_1^2 \frac{dx}{(x^2+2x+2)^{\frac{3}{2}}}$ is equal to:

(a) $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{6}}$.

(b) $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{6}}$.

(c) $\frac{3+2\sqrt{2}}{\sqrt{10}}$

(d) $\frac{3-2\sqrt{2}}{\sqrt{10}}$

(e) $\frac{3\sqrt{5}-2\sqrt{2}}{\sqrt{10}}$

(18) $\int 4x \ln\sqrt{x}\, dx$ is equal to

(a) $x^2 (\ln x - \frac{1}{2}) + C$

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

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

(d) $x^2 (\ln x - 1) + C$.

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

(19) $\int \left[\frac{1}{(1-x)^2} + \frac{1}{x-1} \right] dx$ is equal to

(a) $\ln|1-x^2| + \ln|x-1| + C.$

(b) $\frac{1}{x-1} + \ln|x-1| + C.$

(c) $\frac{1}{1-x} + \ln|x-1| + C.$

(d) $-\ln|x-1| + C.$

(e) $3\ln|x-1| + C.$

(20) The area bounded by the two graphs $f(x) = x^3 - 1$ and $g(x) = x - 1$ is equal to:

(a) $\frac{1}{4}$.

(b) $\frac{1}{12}$.

(c) 1

(d) 2.

(e) $\frac{1}{2}$.

(21) $\int x\, e^{x-1} dx$ is equal to:

(a) $e^{x-1}(x+1)+C$

(b) $xe^{x-1}+C$

(c) $e^{x-1}(x-1)+C$

(d) $xe^{x-1}-1+C$

(e) $e^{x}+C$

(22) $\int_{0}^{\frac{\pi}{4}} 2^{\tan x} \sec^2 x\, dx$ is equal to:

(a) $\frac{1}{\ln 2}$.

(b) 1

(c) $-\ln 2$.

(d) $\ln 2$.

(e) $\frac{2}{\ln 2}$.

(23) The average cost equation of a certain product is $\overline{C}=2x^2-5x+\frac{5000}{x}$, where x is the number of units produced. The marginal cost when 20 units are produced is

(a) 2000.

(b) 2200.

(c) 2400.

(d) 4200.

(e) 4000.

(24) The volume of the sphere of radius r is given by $V=\frac{4}{3}\pi r^3$. Using differentials to approximate the amount of paint needed to paint a sphere of ***diameter*** 4 cm with a layer of thickness 0.05 cm, we get:

(a) $32\pi\ cm^3$.

(b) $3.2\pi\ cm^3$.

(c) $9.6\pi\ cm^3$.

(d) $1.6\pi\ cm^3$.

(e) $0.8\pi\ cm^3$.

(25) The plane $2x-y+3z=6$ intersects the x-axis, y-axis, and z-axis at a, b, and c respectively. The value of $a+b+c=$

(a) 0
(b) 1
(c) -1
(d) 2
(e) 4