

MIDTERM EXAMINATION
Fall 2010

Calculus & Analytical Geometry-I

MIDTERM SOLVED PAPERS (PAPER #4)

Question No: 1 (Marks: 1) - Please choose one

The base of the natural logarithm is

► 2.71

► 10

► 5

► None of these

Question No: 2 (Marks: 1) - Please choose one

A line $x = x_0$ is called ----- for the graph of a function f if $f(x) \rightarrow +\infty$ or $f(x) \rightarrow -\infty$ as x approaches x_0 from the right or from the left

► Horizontal asymptotes

► None of these

► Vertical asymptotes

Question No: 3 (Marks: 1) - Please choose one

If a function satisfies the conditions

$f(c)$ is defined

$$\lim_{x \rightarrow c^+} f(x)$$

Exists

$$\lim_{x \rightarrow c^+} f(x) = f(c)$$

Then the function is said to be

► Continuous at c

► Continuous from left at c

► Continuous from right at c

► None of these

Question No: 4 (Marks: 1) - Please choose one

If $f''(x) < 0$ on an open interval (a,b) then f is ----- on (a,b)

- ▶ None of these
- ▶ Concave up
- ▶ Concave down
- ▶ Closed

Question No: 5 (Marks: 1) - Please choose one

Suppose that f and g are differentiable function of x then $\frac{d}{dx}\left(\frac{f}{g}\right)$

- ▶ $\frac{g \cdot f' - f \cdot g'}{g^2}$
- ▶ $\frac{g \cdot f' + f \cdot g'}{g^2}$



Question No: 6 (Marks: 1) - Please choose one

A line $x = x_0$ is called ----- for the graph of a function f if $f(x) \rightarrow +\infty$ or $f(x) \rightarrow -\infty$ as x approaches x_0 from the right or from the left

- ▶ Horizontal asymptotes
- ▶ None of these
- ▶ Vertical asymptotes

Question No: 7 (Marks: 1) - Please choose one

If $y = \frac{1}{1-x}$ then $\frac{dy}{dx} =$

- ▶ 1
- ▶ -1
- ▶ $\frac{1}{(1-x)^2}$
- ▶ $\frac{-1}{(1-x)^2}$

Question No: 8 (Marks: 1) - Please choose one

Suppose that f and g are differentiable functions of x then

$$\frac{d}{dx}[f][g] =$$

- ▶ $\frac{[f'] [g] - [f] [g']}{g^2}$
- ▶ $[f'] [g']$
- ▶ $[f'] [g] + [f] [g']$
- ▶ $[f'] [g] - [f] [g']$

Question No: 9 (Marks: 1) - Please choose one

If $\frac{x^2}{9} + y^2 =$ then $\frac{dy}{dx} =$

- ▶ $\frac{x}{y}$
- ▶ $\frac{-x}{y}$
- ▶ $\frac{-y}{x}$
- ▶ $\frac{y}{x}$



Question No: 10 (Marks: 1) - Please choose one

If f is a twice differentiable function at a stationary point x_0 and $f''(x_0) > 0$ then f has relative At x_0

- ▶ Minima
- ▶ Maxima
- ▶ None of these

Question No: 11 (Marks: 1) - Please choose one

If f is a twice differentiable function at a stationary point x_0 and $f''(x_0) < 0$ then f has relative At x_0

- ▶ Minima
- ▶ Maxima
- ▶ None of these

Question No: 12 (Marks: 1) - Please choose one

_____ If $f''(x) > 0$ on an open interval (a, b) , then which of the following statement is correct?

- ▶ f is concave up on (a, b) .
- ▶ f is concave down on (a, b) .
- ▶ f is linear on (a, b) .

Question No: 13 (Marks: 1) - Please choose one

_____ Let $y = (x^3 + 2x)^{37}$. Which of the following is correct?

- ▶ $\frac{dy}{dx} = (37)(x^3 + 2x)^{36}$
- ▶ $\frac{dy}{dx} = 111x^2(x^3 + 2x)^{36}$
- ▶ $\frac{dy}{dx} = (111x^2 + 74)(x^3 + 2x)^{36}$
- ▶ $\frac{dy}{dx} = (111x^2 + 74)(x^3 + 2x)^{38}$

Question No: 14 (Marks: 1) - Please choose one

If $x > 0$ then $\frac{d}{dx}[\ln x] =$ _____

- ▶ 1
- ▶ x
- ▶ $\frac{1}{x}$
- ▶ $\ln \frac{1}{x}$

Question No: 15 (Marks: 1) - Please choose one

_____ $\log_b ac =$ _____

- ▶ $\log_b a + \log_b c$
- ▶ $\log_a b + \log_c b$

- $$\log_{a+c} b$$

► None of these

Question No: 16 (Marks: 1) - Please choose one

$$\log_b \frac{1}{c} = \underline{\hspace{2cm}}$$

- $\log_b c$

$$1 - \log_b c$$

$$-\log_b c$$

► $1 + \log_b c$

Question No: 17 (Marks: 1) - Please choose one

$$\log_b \frac{1}{t} = \frac{\quad}{\quad}$$

- $\log_b t$

$1 + \log_b t$

$$\begin{array}{ccc} 1 + \log_b t & & -\log_b t \\ \blacktriangleleft & & \blacktriangleright \end{array}$$

Question No: 18 (Marks: 1) - Please choose one

If we have $x^2 + y^2 = 1$ then $\frac{dy}{dx} =$ _____

$$\frac{-x}{y}$$

$$\frac{-y}{x}$$

$$\frac{x}{y}$$

► None of these

Question No: 19 (Marks: 1) - Please choose one

$$\log_b a^r = \underline{\hspace{2cm}}$$

▶ $a \log_b r$

▶ $r \log_b a$

▶ $\frac{\log_b a}{\log_b r}$

▶

▶ $\log_b a + \log_b r$

Question No: 20 (Marks: 1) - Please choose one

Let a function f be defined on an interval, and let x_1 and x_2 denote points in that interval. If $f(x_1) < f(x_2)$ whenever $x_1 < x_2$ then which of the following statement is correct?

▶ f is an increasing function.

▶ f is a decreasing function.

▶ f is a constant function.

Question No: 21 (Marks: 1) - Please choose one

Let a function f be defined on an interval, and let x_1 and x_2 denote points in that interval. If $f(x_1) > f(x_2)$ whenever $x_1 < x_2$ then which of the following statement is correct?

▶ f is an increasing function.

▶ f is a decreasing function.

▶ f is a constant function.

Question No: 22 (Marks: 5)

Differentiate w.r.t. x by chain rule $y = \sqrt{x^2 + 1}$