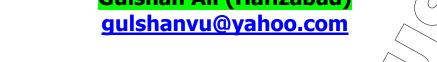
Calculus & Analytical Geometry-I

Gulshan Ali (Hafizabad)



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

 x_0 $f''(x_0) > 0$ If f is a twice differentiable function at a stationary point

then f has relative At χ_0

- Minima
- ► Maxima
- ► None of these

Question No: 2 (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

- ► Minima
- ▶ Maxima
- ► None of these

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

A line $y = y_0$ is called a for the graph f if $\lim_{x \to \infty} f(x) = y_0$ or $\lim_{x \to \infty} f(x) = y_0$

- Vertical asymptotes
- ► Horizontal asymptotes
- ► None of these/

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

If $f(x) = \overline{3x^8}$ then

$$\frac{d(\tan x)}{dx} =$$





- co sec x
- $ightharpoonup co \sec^2 x$

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

$$\frac{dy}{dx} =$$
If $xy = 4$ then

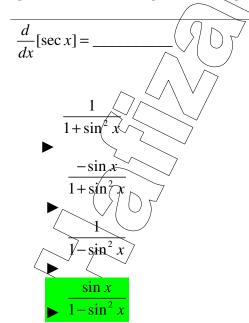
- **▶** 0
 - $\frac{-1}{r^2}$
- 4
- $\rightarrow x^2$
- $\frac{-4}{x^2}$

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

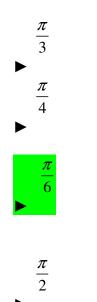
$\frac{d}{dx}$ If 2x - y = -3 then

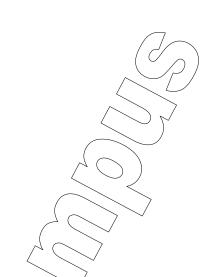
- **▶** 2
- **▶** -2
- **▶** 0
- **▶** -3

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



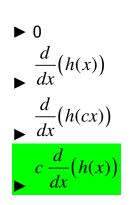
Question No: 9 (Marks: 1) - Please choose one

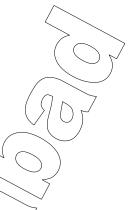




Question No: 10 (Marks: 1) - Please choose one

Consider a function h(x) and a constant then $\frac{d}{dx}(c)\{h(x)\} = \underline{\hspace{1cm}}$





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

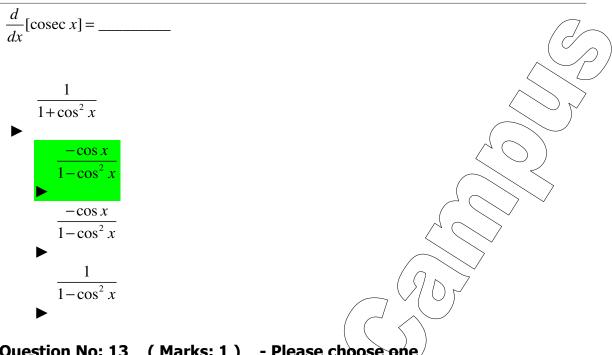
Suppose that f and g are differentiable functions of x then

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

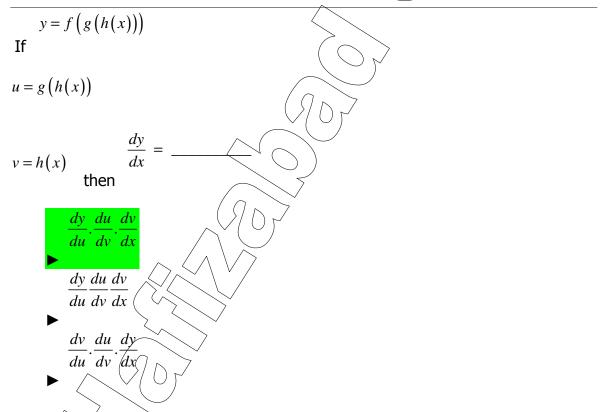
$$\frac{[g'][f'] - [f][g']}{f^2}$$

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

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



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



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

Chain rule is a rule for differentiating ______ of functions.

- ► Product
- ► Sum
- **▶** Difference
- Composition

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

$$\frac{d}{dx}[x^n] = nx^{n-1}$$

The power rule,

holds if n is _____

- ► An integer
- ► A rational number
- ► An irrational number
- ► All of the above

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

Let a function f be defined on an interval, and let x_1 and x_2 denotes two distinct points in that interval. If $f(x_1) = f(x_2)$ for all points x_1 and x_2 then which of the following statement is correct?

- ightharpoonup f is a decreasing function
- ightharpoonup f is an increasing function
- ▶ f is a constant function

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

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

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

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

If $x > \frac{1}{2}$ then $\frac{d}{dx} [\ln 2x] =$



 $\rightarrow \frac{-}{x}$

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

Let $(x^3 + 2x)^{37}$. 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: 20 (Marks: 1) - Please choose one

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



 $\frac{x}{v}$



► None of these

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

 $\log_b ac =$

 $\log_b a + \log_b c$

 $\log_b a - \log_b c$

 $\frac{\log_b a}{\log_b c}$

 $(\log_b a)(\log_b c)$

Question No: 22 (Marks: 1) - Please choose one

 $\log_b a^r = \underline{\hspace{1cm}}$

 $a\log_b r$

 $r\log_b a$

$$\frac{\log_b a}{\log_b r}$$

Question No: 23 (Marks: 1) - Please choose one

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

$\log_b a$

$$1 - \log_b c$$

$$-\log_b a$$

$$\rightarrow 1 + \log_b c$$

Question No: 24 (Marks: 1) - Please choose one

$$\log_b \frac{1}{t} = \underline{\hspace{1cm}}$$

$$\log_b t$$

$$1 - \log_b t$$

$$1 + \log_b t$$

$$-\log_b t$$

Question No: 25 (Marks: 3)

$$f\left(t\right) = \left(t^3 + 4\right)^4$$

Differentiate:

$$f'(t) = 4(t^3 + 4)^3 \cdot \frac{d}{dx}(t^3 + 4)$$

$$f'(t) = 4(t^3 + 4)^3 .3t^2$$

$$f'(t) = 12t^2(t^3 + 4)^3$$

Question No: 26 (Marks: 5)

$$\sqrt{13x^2 - 5x + 8}$$

Differentiate $f^*(x) = \frac{1}{2\sqrt{13x^2 - 5x + 8}} \frac{d}{dx} 13x^2 - 5x + 8$

$$f^{(x)} = \frac{1}{2\sqrt{13x^2 - 5x + 8}}.26x - 5$$

Question No: 27 (Marks: 10) Differentiate the following function

$$f(x) = x^{3} \cdot e^{\frac{1}{x}}$$

$$f^{*}(x) = 3x^{2} \cdot e^{\frac{1}{x}} + x^{3} \cdot e^{\frac{1}{x}} - \frac{1}{x^{2}}$$

$$f^{*}(x) = 3x^{2} \cdot e^{\frac{1}{x}} - \frac{x^{3} \cdot e^{\frac{1}{x}}}{x^{2}}$$

$$f^{*}(x) = e^{\frac{1}{x}} [3x^{2} - \frac{x^{3}}{x^{2}}]$$

$$f^{*}(x) = e^{\frac{1}{x}} [\frac{3x^{4} - x^{3}}{x^{2}}]$$

$$f^{*}(x) = xe^{\frac{1}{x}} [\frac{3x^{3}}{x^{2}} - \frac{x^{2}}{x^{2}}]$$

$$f^{*}(x) = xe^{\frac{1}{x}} [3x - 1] Ans$$

