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## Calculus & Analytical Geometry-I

Question No: 1 (Marks: 1) - Please choose one If f is a twice differentiable function at a stationary point  $\int_0^{x_0} f''(x_0) > 0$ 

then f has relative ...... At  $x_0$ 

- Minima
- ► Maxima
- ► None of these

Question No: 2 (Marks: 1) - Please choose one If f is a twice differentiable function at a stationary point  $\int_0^{x_0} f''(x_0) < 0$ 

then f has relative ...... At  $x_0$ 

- ► 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

$$\lim_{x \to +\infty} f(x) = y_0 \quad or \quad \lim_{x \to -\infty} f(x) = y_0$$

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

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

If 
$$f(x) = 3x^8 + 2x + 1$$
 then  $f'(x) =$  \_\_\_\_\_

- $\rightarrow 3x^7 + 2$
- $\rightarrow$  3 $x^9$  + 2 $x^2$
- $\triangleright$  24 $x^9$  + 2 $x^2$

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

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

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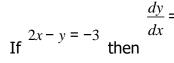
- ightharpoonup sec x
- ightharpoonup  $\sec^2 x$
- cosec 2
- $ightharpoonup co \sec^2 x$

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

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

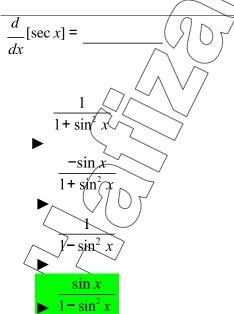
- ▶ 0
- $\rightarrow \frac{-1}{x^2}$
- $-\frac{4}{x^2}$

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



- **▶** 2
- **▶** -2
- **L** -3

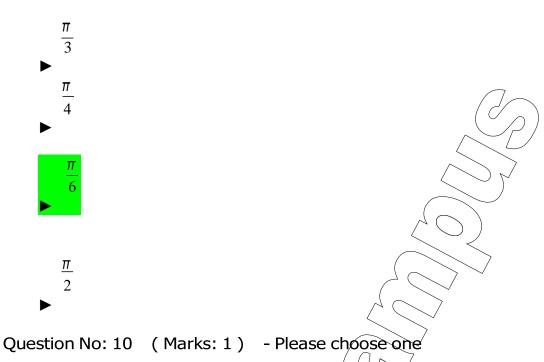
## Question No: 8 (Marks: 1) - Please choose one



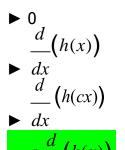
### Question No: 9 (Marks: 1) - Please choose one

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.5U° =		

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



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

Suppose that f and f are differentiable functions of x then

$$\frac{d}{dx} \left| \frac{f}{g} \right| =$$

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

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

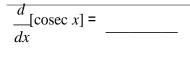
$$\Rightarrow$$

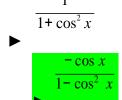
$$[g'][f] - [f'][g]$$

	$\underline{[g'][f]} - \underline{[f'][g]}$
<b>&gt;</b>	$f^2$

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





$$\frac{-\cos x}{1-\cos^2 x}$$

$$\frac{1}{1-\cos^2 x}$$

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

 $y = f\left(g\left(h\left(x\right)\right)\right)$ 

$$u=g\left( h\left( x\right) \right)$$

$$v = h(x)$$
  $\frac{dy}{dx} =$ 

<del>dy</del> <del>du</del> <del>dv</del> du dv dx

> dy du dv du dv dx

<del>dv du dy</del> du dv dx

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

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

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  $y_2$ x2 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?

- ▶ <sup>f</sup> is a decreasing function
- ightharpoonup f is an increasing function
- ► f is a constant function

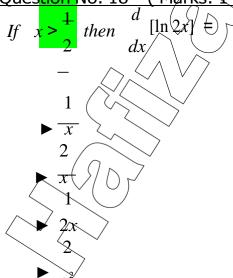
Question No: 17 (Marks: 1) - Please choose one

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 fis linear  $\overline{on}$  (a, b).

1) / - Please choose one



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

Question No: 19 (Marks: 1) - Please choose 
$$y = (x^3 + 2x)^{37}$$
  
Let . Which of the following is correct?

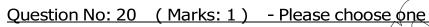
$$\frac{dy}{dx} = (37)(x^3 + 2x)^{36}$$

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$$\frac{dy}{dx} = 111x^2(x^3 + 2x)^{36}$$

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

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



$$\frac{dy}{dx} = \underline{\qquad}$$
f we have then

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

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

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

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

$$\log_b a^r =$$

$$a\log_b r$$

$$r\log_b a$$

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

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

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

$$\log_b a$$

$$1 - \log_b c$$

$$-\log_b c$$

$$ightharpoonup 1 + \log_b c$$

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

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

$$\log_b$$

$$1 - \log_b t$$

$$1 + \log_b t$$

Question No: 25 (Marks: 3)

$$f(t) = (t^3 + 4)^4$$

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)

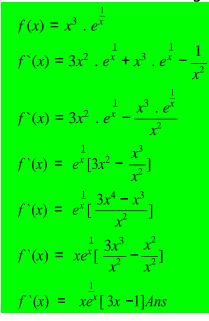
$$\sqrt{13x^2 - 5x + 8}$$

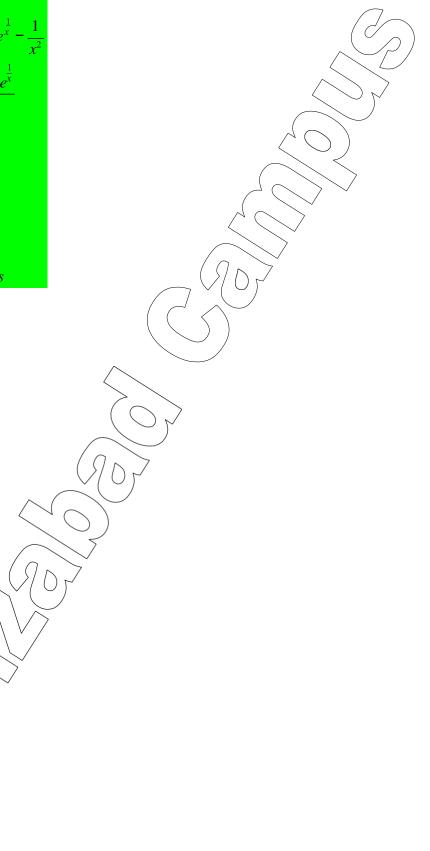
Differentiate  $f^*(x) = \frac{1}{2\sqrt{13x^2 - 5x + 8}} \frac{d}{dx} 13x^2 - 5x + 8$ 

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

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





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