

Department of Mathematical Sciences
KFUPM
Term 051

**MATH 101-06, 13 / Quiz#3/ Time allowed=35 minutes
Code 001**

Name:

ID#:

Exercise 1 [4 marks]

Let $f(x) = \frac{\cos x}{1+\sin x}$. The derivative $f'(x)$ of $f(x)$ is equal to :

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

Exercise 2 [4 marks]

An equation of the tangent line to $f(x) = x^{\frac{2}{3}}$ at $x = 1$ is :

- a) $2x + 3y - 5 = 0$ b) $2x - 3y + 1 = 0$ c) $x - 3y + 2 = 0$
d) $2y - 3x + 1 = 0$ e) $y = x$ f) $x + y - 2 = 0$.

Exercise 3 [4 marks]

The function

$$f(x) = \begin{cases} \frac{\sin((k-1)(x-2)^2)}{(x-2)} & \text{if } x < 2, \\ x-2 & \text{if } x \geq 2 \end{cases}$$

is differentiable at $x = 2$ for :

- a) $k = -4$ b) $k = 3$ c) $k = -2$
d) $k = 1$ e) $k = 2$ f) $k = 4$.

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Exercise 1 [4 marks]

Let $f(x) = \frac{\sin x}{1+\cos x}$. The derivative $f'(x)$ of $f(x)$ is equal to :

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

Exercise 2 [4 marks]

An equation of the tangent line to $f(x) = x^{\frac{3}{4}}$ at $x = 1$ is :

- a) $3x + 4y - 7 = 0$ b) $x - 4y + 3 = 0$ c) $3y - 4x + 1 = 0$
d) $3x - 4y + 1 = 0$ e) $y - 3x + 2 = 0$ f) $x - 4y + 3 = 0$.

Exercise 3 [4 marks]

The function

$$f(x) = \begin{cases} \frac{\sin((k-2)(x-3)^2)}{(x-3)} & \text{if } x < 3, \\ x-3 & \text{if } x \geq 3 \end{cases}$$

is differentiable at $x = 3$ for :

- a) $k = -6$ b) $k = 0$ c) $k = 2$
d) $k = 3$ e) $k = 4$ f) $k = 6$.

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Exercise 1 [4 marks]

Let $f(x) = \frac{\sin x}{1 - \cos x}$. The derivative $f'(x)$ of $f(x)$ is equal to :

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

Exercise 2 [4 marks]

An equation of the tangent line to $f(x) = x^{\frac{3}{5}}$ at $x = 1$ is :

- a) $3x + 5y - 8 = 0$ b) $x - 5y + 4 = 0$ c) $5x - y - 4 = 0$
d) $3y - 5x + 2 = 0$ e) $y - 5x + 4 = 0$ f) $3x - 5y + 2 = 0$.

Exercise 3 [4 marks]

The function

$$f(x) = \begin{cases} \frac{\sin((k-3)(x-4)^2)}{(x-4)} & \text{if } x < 4, \\ x - 4 & \text{if } x \geq 4 \end{cases}$$

is differentiable at $x = 4$ for :

- a) $k = -8$ b) $k = 0$ c) $k = 4$
d) $k = 3$ e) $k = 5$ f) $k = 8$.

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Code 004**

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Exercise 1 [4 marks]

Let $f(x) = \frac{\cos x}{1-\sin x}$. The derivative $f'(x)$ of $f(x)$ is equal to :

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

Exercise 2 [4 marks]

An equation of the tangent line to $f(x) = x^{\frac{4}{5}}$ at $x = 1$ is :

- a) $4x + 5y - 9 = 0$ b) $x - 4y + 3 = 0$ c) $4x - 5y + 1 = 0$
d) $4y - 5x + 1 = 0$ e) $y - 5x + 4 = 0$ f) $x - 5y + 4 = 0$.

Exercise 3 [4 marks]

The function

$$f(x) = \begin{cases} \frac{\sin((k-4)(x-5)^2)}{(x-5)} & \text{if } x < 5, \\ x-5 & \text{if } x \geq 5 \end{cases}$$

is differentiable at $x = 5$ for :

- a) $k = -10$ b) $k = 0$ c) $k = 4$
d) $k = 5$ e) $k = 6$ f) $k = 10$.