KFUPM – Math 132– Test 1

Name : ..... **ID** #.....Serial #: .....

Question 1: Find the following limits

- $\lim_{x\to 1} \frac{2x^2+5x+7}{(9x-7)^4+1}$

- $\lim_{x\to -2} \frac{2x^2-8}{x^2+6x+8}$

- $\lim_{x\to 1} \frac{x-1}{x(\sqrt{x}-1)}$

- $\lim_{t\to 3^+} \frac{e^t}{3-t}$

- $\lim_{x\to +\infty} \frac{3x^7-4x^3+20x+9}{4x^7-9x^2+25x}$

Question 2: Find the values of A and B that make the following function continuous everywhere.

$$f(x) = \begin{cases} Ax + 5 & : x < 1 \\ B & : x = 1 \\ |2 - 3x| & : x > 1 \end{cases}$$

Question 3: Find where the function is continuous.

$$f(x) = \frac{\sin x + 2x^3 - 1}{x(x-1)(x-\pi)}$$

Question 4: Use the graph of $y = f(x)$ to find the following.

- $\lim_{x \to 1^+} \ f(x)$

- $\lim_{x \to 1} \ f(x)$

- $\lim_{x \to -1^+} \ f(x)$

- $\lim_{x \to -2} \ f(x)$

- $\lim_{x \to +\infty} \ f(x)$

- $\lim_{x \to +\infty} \ f(x)$

- Where is the function continuous?

- Determine the points and types of discontinuities.

Question 4: Find the first derivatives of the following functions.

- $f(x) = 3^x - 2e^x + \ln x + \pi^3$.

- $h(x) = \frac{5x^2 \cos x}{3x^7 - \pi}$

- $g(x) = (\sqrt{x} + 3\tan 2x)^5$.

Question 5: An object moving along a straight line has the position function $S(t) = t^3 - 9t^2 + 24t$.
a) Find when is the object at rest.

b) Find the acceleration of the object at $t = 3$.