Tutorial Sheet **2425-MA140**
Assignment Assignment-2 due 10/11/2024 at 05:01pm BST

Problem 1. **(2 points)** Library/Valdosta/APEX_Calculus/1.3/APEX_1.3_36.pg

Use the Squeeze Theorem to evaluate the limit $\lim_{x\to 9} f(x)$, if

$$18x-81 \le f(x) \le x^2 \qquad \text{on } [7,11].$$

Enter **DNE** if the limit does not exist.

Limit = ____

Problem 2. **(2 points)** Library/Valdosta/APEX_Calculus/1.6/APEX_1.6_16.pg

A function is given below. Evaluate the indicated limits numerically.

$$f(x) = \frac{x^2+6x+8}{x^3-5x^2-8x+48}$$

Enter **INF** for ∞, **-INF** for $-\infty$, or **DNE** if the limit does not exist, but is neither ∞ nor $-\infty$.

a) $\lim_{x\to 4^-} f(x)$ = _____

b) $\lim_{x\to 4^+} f(x)$ = _____

c) $\lim_{x\to 4} f(x)$ = _____

Problem 3. **(2 points)** Library/Valdosta/APEX_Calculus/1.4/APEX_1.4_18.pg

Evaluate the limits.

$$g(x) = \begin{cases} 5x+4 & x<-6 \\ -30 & x=-6 \\ 5x-4 & x>-6 \end{cases}$$

Enter **DNE** if the limit does not exist.

a) $\lim_{x\to -6^-} g(x)$ = ____

b) $\lim_{x\to -6^+} g(x)$ = ____

c) $\lim_{x\to -6} g(x)$ = ____

d) $g(-6)$ = ____

Problem 4. **(2 points)** Library/Union/setLimitConcepts/ns2_2_xx.pg

Let

$$f(x) = \begin{cases} 12 & \text{if } x<-9 \\ -x+3 & \text{if } -9 \le x < 2 \\ -1 & \text{if } x=2 \\ 3 & \text{if } x>2. \end{cases}$$

Sketch the graph of this function and find the following limits, if they exist.
(*If a limit does not exist, enter* **DNE**.)

1. $\lim_{x\to -9^-} f(x)$ = ___
2. $\lim_{x\to -9^+} f(x)$ = ___
3. $\lim_{x\to -9} f(x)$ = ___
4. $\lim_{x\to 2^-} f(x)$ = ___
5. $\lim_{x\to 2^+} f(x)$ = ___
6. $\lim_{x\to 2} f(x)$ = ___

Problem 5. **(2 points)** local/Library/Union/setLimitContinuity/ur_lr_5_7_nm.pg

Let

$$f(x) = \begin{cases} b-2x & \text{if } x<5 \\ -\dfrac{150}{x-b} & \text{if } x \ge 5. \end{cases}$$

Find the two values of b for which f is a continuous function at 5.

The one with the greater absolute value is b =_____.

Problem 6. **(2 points)** local/Library/WHFrman/Rogawski_Calculus_Early_Transcendentals_Second_Edition/2_Limits/2.4_Limits_and_Continuity/2.4.17_nm1.pg

Warning! You may attempt this question only once!

Determine the point at which the function $f(x) = \dfrac{1}{x-10}$ is discontinuous and state the type of discontinuity: removable, jump, infinite, or none of these.

x = ___

? 1. Choose the type

Problem 7. **(2 points)** local/Library/UMN/calculusStewartCCC/s_2_4_prob02_nm.pg

Warning! You may attempt this question only once!

Sketch the graph of the function f to determine the type of discontinuity at each x-value.

$$f(x) = \begin{cases} x^2+2, & \text{if } x < -3 \\ -5, & \text{if } x = -3 \\ -3x+2, & \text{if } -3 < x \leq 0 \\ \dfrac{-2x}{(x-3)^2}, & \text{if } 0 < x < 3 \\ \dfrac{1}{x^2+1}, & \text{if } 3 \leq x \end{cases}$$

• choose one
• removable
• jump
• infinite

1. What type of discontinuity does f have at $x = -3$?

• choose one
• removable
• jump
• infinite

2. What type of discontinuity does f have at $x = 0$?

• choose one
• removable
• jump
• infinite

3. What type of discontinuity does f have at $x = 3$?

Problem 8. **(1 point)** local/Library/Wiley/setAnton_Section_1.6/Anton1_6_Q68_nm.pg

Warning! You may attempt this question only once!

For the equation

$$8x(x-1) + \cos(x) = 0$$

does the intermediate value theorem show at least one solution on the interval $[0, \frac{\pi}{2}]$?

• ?
• Yes, it shows there must be at least one solution
• No, it is not conclusive
• No, it show no solutions

Problem 9. **(1 point)** local/Library/Rochester/setLimitsRates5Continuity/S02.05.IntermediateValueThm.PTP02_nm.pg

Warning! You may attempt this question only once!

Determine whether the Intermediate Value Theorem implies that the equation $x^3 - 3x - 0.9 = 0$ has a root in the interval $(0, 1)$.

The Intermediate Value Theorem [?] imply that the equation above has a root in that interval.