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MAT125 HW2 - mostly limits (Homework)

INSTRUCTOR
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Due Date: TUE, SEP 8, 2026 8:00 AM EDT

REQUEST EXTENSION

Current Score: – / 19 POINTS | 0.0 %

Scoring and Assignment Information

QUESTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
POINTS	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1	– / 1

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score.

1. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.1.JIT.004.MI.

Find an equation of the line that satisfies the given conditions.

Through (3, 9); parallel to the line passing through (4, 7) and (0, 3)

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2. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.1.009.

A graphing calculator is recommended.

If a ball is thrown into the air with an initial velocity of 52 ft/s, its height in feet after t seconds is given by $y = 52t - 16t^2$.

(a) Find the average velocity of the ball (in ft/s) for the time interval beginning at $t = 2$ and lasting for each of the following.

(i) 0.5 seconds
[ ] ft/s

(ii) 0.1 seconds
[ ] ft/s

(iii) 0.05 seconds
[ ] ft/s

(iv) 0.01 seconds
[ ] ft/s

(b) Use your answers from part (a) to estimate the instantaneous velocity (in ft/s) when $t = 2$.
[ ] ft/s

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3. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.2.001.

Explain the meaning of the following equation.

$$\lim_{x \to 1} f(x) = 9$$

- The values of $f(x)$ can be made as close to 9 as we like by taking x sufficiently close to 1.
- The values of $f(x)$ can be made as close to 1 as we like by taking x sufficiently close to 9.
- If $|x_1 - 1| < |x_2 - 1|$, then $|f(x_1) - 9| < |f(x_2) - 9|$.
- If $|x_1 - 1| < |x_2 - 1|$, then $|f(x_1) - 9| \leq |f(x_2) - 9|$.
- $f(x) = 9$ for all values of x.

Is it possible for this statement to be true and yet $f(1) = 3$? Explain.

- Yes, the graph could have a hole at (1, 9) and be defined such that $f(1) = 3$.
- Yes, the graph could have a vertical asymptote at $x = 1$ and be defined such that $f(1) = 3$.
- No, if $f(1) = 3$, then $\lim_{x \to 1} f(x) = 3$.
- No, if $\lim_{x \to 1} f(x) = 9$, then $f(1) = 9$.

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4. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.2.002.

Explain what it means to say that $\lim_{x \to 1^-} f(x) = 5$ and $\lim_{x \to 1^+} f(x) = 7$.

- As x approaches 1, $f(x)$ approaches 7, but $f(1) = 5$.
- As x approaches 1 from the right, $f(x)$ approaches 5. As x approaches 1 from the left, $f(x)$ approaches 7.
- As x approaches 1, $f(x)$ approaches 5, but $f(1) = 7$.
- As x approaches 1 from the left, $f(x)$ approaches 5. As x approaches 1 from the right, $f(x)$ approaches 7.

In this situation is it possible that $\lim_{x \to 1} f(x)$ exists? Explain.

- Yes, $f(x)$ could have a hole at (1, 5) and be defined such that $f(1) = 7$.
- Yes, $f(x)$ could have a hole at (1, 7) and be defined such that $f(1) = 5$.
- Yes, if $f(x)$ has a vertical asymptote at $x = 1$, it can be defined such that $\lim_{x \to 1^-} f(x) = 5$, $\lim_{x \to 1^+} f(x) = 7$, and $\lim_{x \to 1} f(x)$ exists.
- No, cannot be defined such that $\lim_{x \to 1^-} f(x) \neq \lim_{x \to 1^+} f(x)$.

Resources

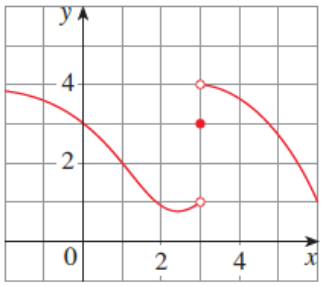
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5. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.2.004.

For the function f whose graph is given, state the value of each quantity, if it exists. (If an answer does not exist, enter DNE.)



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

(b) $\lim_{x \to 3^-} f(x)$

(c) $\lim_{x \to 3^+} f(x)$

(d) $\lim_{x \to 3} f(x)$

(e) $f(3)$

(e) $f(3)$

Resources

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6. **[– / 1 Points]** DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.2.010.

A graphing calculator is recommended.

Use technology to sketch the graph of the function and find the value of each limit, if it exists. (If an answer does not exist, enter DNE.)

$$f(x) = \frac{4}{1 + e^{1/x}}$$

(a) $\lim_{x \to 0^-} f(x)$

(b) $\lim_{x \to 0^+} f(x)$

(c) $\lim_{x \to 0} f(x)$

Resources

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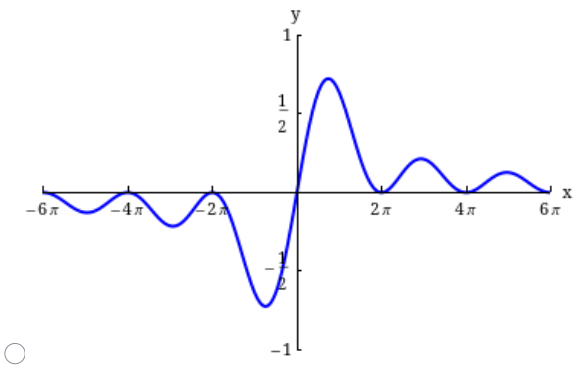
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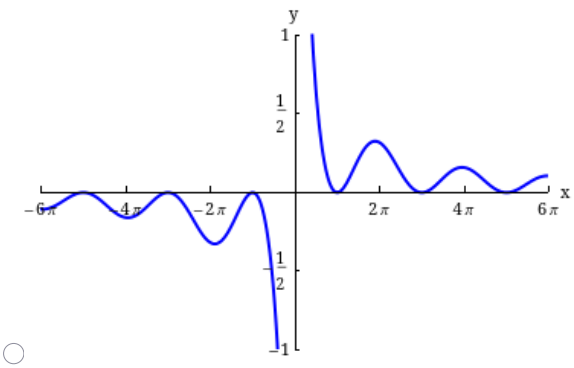
7. **[– / 1 Points]** DETAILS MY NOTES ASK YOUR TEACHER

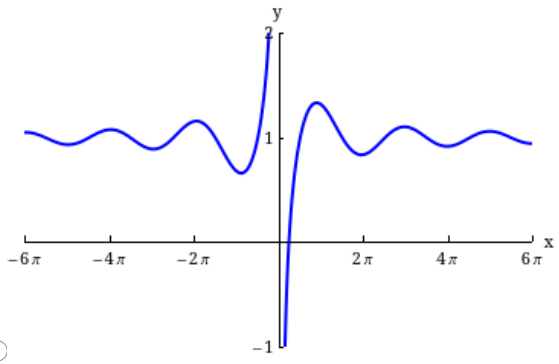
SCalcCC5 2.2.JIT.008.

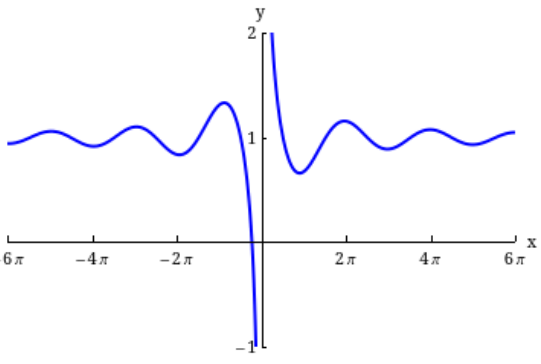
Use a graphing utility to graph the function.

$$f(x) = \frac{1 - \cos x}{x}$$









Describe the behavior of the function as x approaches zero.

As $x \to 0$, $f(x) \to$ [ ] .

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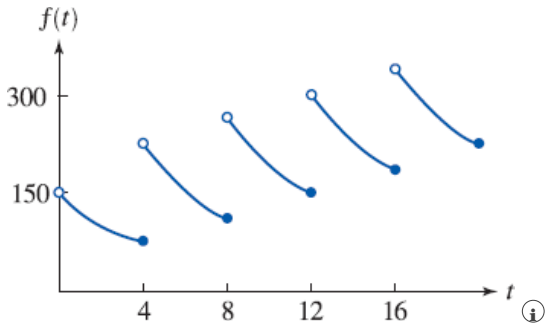
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8. **[– / 1 Points]** DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.2.007.MI.

A patient receives a 150 mg injection of a drug every 4 hours. The graph shows the amount $f(t)$ of the drug in the bloodstream after t hours.



Find $\lim_{t \to 12^-} f(t)$ and $\lim_{t \to 12^+} f(t)$.

$\lim_{t \to 12^-} f(t) =$ [ ] mg

$\lim_{t \to 12^+} f(t) =$ [ ] mg

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9. **[– / 1 Points]** DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC4 2.2.022.MI.SA.

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points

for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Use a table of values to estimate the value of the limit. If you have a graphing device, use it to confirm your result graphically.

$$\lim_{x \to 0} \frac{\tan 8x}{\tan 5x}$$

Click here to begin!

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10. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.2.030.

Use a table of values to estimate the value of the limit (correct to three decimal places). If you have a graphing device, use it to confirm your result graphically.

$$\lim_{x \to 0} \frac{\sqrt{x + 16} - 4}{x}$$

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11. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.3.001.

Given that

$$\lim_{x \to 1} f(x) = 4 \quad \lim_{x \to 1} g(x) = -2 \quad \lim_{x \to 1} h(x) = 0,$$

find each limit, if it exists. (If an answer does not exist, enter DNE.)

(a) $\lim_{x \to 1} [f(x) + 5g(x)]$

(b) $\lim_{x \to 1} [g(x)]^3$

(c) $\lim_{x \to 1} \sqrt{f(x)}$

(d) $\lim_{x \to 1} \frac{2f(x)}{g(x)}$

(e) $\lim_{x \to 1} \frac{g(x)}{h(x)}$

(f) $\lim_{x \to 1} \frac{g(x)h(x)}{f(x)}$

Resources

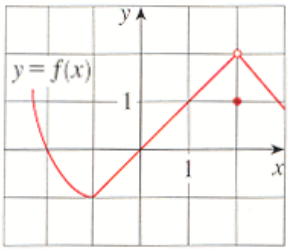
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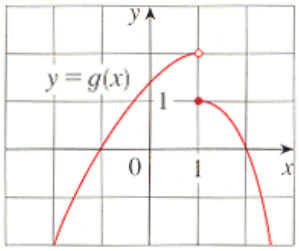
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12. **[– / 1 Points]** DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC4 2.3.002.

The graphs of f and g are given. Use them to evaluate each limit, if it exists. If the limit does not exist, enter NONE.





(a) $\lim_{x \to 2}[f(x) + g(x)]$

(b) $\lim_{x \to 1}[f(x) + g(x)]$

(c) $\lim_{x \to 0}[f(x)\, g(x)]$

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

(e) $\lim_{x \to 2} x^3 f(x)$

(f) $\lim_{x \to 1} \sqrt{3 + f(x)}$

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13. **[– / 1 Points]** DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.3.010.

(a) What is wrong with the following equation?

(a) What is wrong with the following equation?

$$\frac{x^2 + x - 12}{x - 3} = x + 4$$

- $(x - 3)(x + 4) \neq x^2 + x - 12$
- The left-hand side is not defined for $x = 0$, but the right-hand side is.
- The left-hand side is not defined for $x = 3$, but the right-hand side is.
- None of these — the equation is correct.

(b) In view of part (a), explain why the following equation is correct.

$$\lim_{x \to 3} \frac{x^2 + x - 12}{x - 3} = \lim_{x \to 3} (x + 4)$$

- Since $\frac{x^2 + x - 12}{x - 3}$ and $x + 4$ are both continuous, the equation follows.
- Since the equation holds for all $x \neq 3$, it follows that both sides of the equation approach the same limit as $x \to 3$.
- This equation follows from the fact that the equation in part (a) is correct.
- None of these — the equation is not correct.

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14. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.3.016.

Find the limit. (If an answer does not exist, enter DNE.)

$$\lim_{x \to 5} \frac{x^2 - 6x + 5}{x - 5}$$

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15. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC4 2.3.010.MI.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \to 9} \frac{x^2 - 9x}{x^2 - 8x - 9}$$

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16. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC4 2.3.011.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \to 5} \frac{x^2 - 6x + 8}{x - 5}$$

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17. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.3.020.

Find the limit. (If an answer does not exist, enter DNE.)

$$\lim_{h \to 0} \frac{(-5 + h)^2 - 25}{h}$$

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18. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.3.022.

Find the limit. (If an answer does not exist, enter DNE.)

$$\lim_{x \to -5} \frac{x + 5}{x^3 + 125}$$

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19. [– / 1 Points] DETAILS MY NOTES ASK YOUR TEACHER

SCalcCC5 2.3.030.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \to 36} \frac{6 - \sqrt{x}}{36x - x^2}$$

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