
Let $f(x) = x^4 + 4x - 1$. Which of the following is true by the Intermediate Value Theorem?

- A. There is no $0 < c < 1$ so that $f(c) = 0$.
- B. There is no $1 < c < 2$ so that $f(c) = 0$.
- C. There is $0 < c < 1$ so that $f(c) = 0$.
- D. There is $1 < c < 2$ so that $f(c) = 0$.
- E. None of the above

Find the slope of the tangent line to the curve $y = x^2 + x - 1$ at $x = 1$.

- A. 4
- B. 3
- C. 1
- D. 2
- E. None of the above

Assume that a rocket is taking off at $t = 0$ and its height at time t is given by $y(t) = t^2 + 2t$. What is the average velocity between $t = 0$ and $t = 3$?

- A. 0
- B. 15
- C. 5
- D. 8
- E. None of the above

Suppose that $f(x) = 3x - 6$. Find $f^{-1}(0)$.

- A. 3
- B. 1
- C. 2
- D. 0
- E. 4

Consider the function

$$f(x) = \begin{cases} x - 1, & x \leq 1 \\ 1 - x, & x > 1 \end{cases}$$

Which of the following is true at the point $x = 1$?

- A. f is not defined.
- B. f is neither continuous nor differentiable.
- C. f is both continuous and differentiable.

- D. f is continuous but not differentiable.
- E. f is differentiable but not continuous.

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18. **(5 points)** `Library/ASU-topics/setDerivativeFunction/3-3-05.pg`

Suppose that

$$f(x+h)-f(x)=1hx^2+4hx+7h^2x-1h^2-4h^3.$$

Find $f'(x)$.

$f'(x)=$ _____

Find the value of p so that the function

$$f(x)=\begin{cases}\dfrac{x-2}{x^2+2x-8}, & x\neq 2\\ p, & x=2\end{cases}$$

is continuous.

- A. $p=1/6$
- B. $p=1$
- C. $p=1/4$
- D. $p=1/2$
- E. There is no value for which the function will be continuous.

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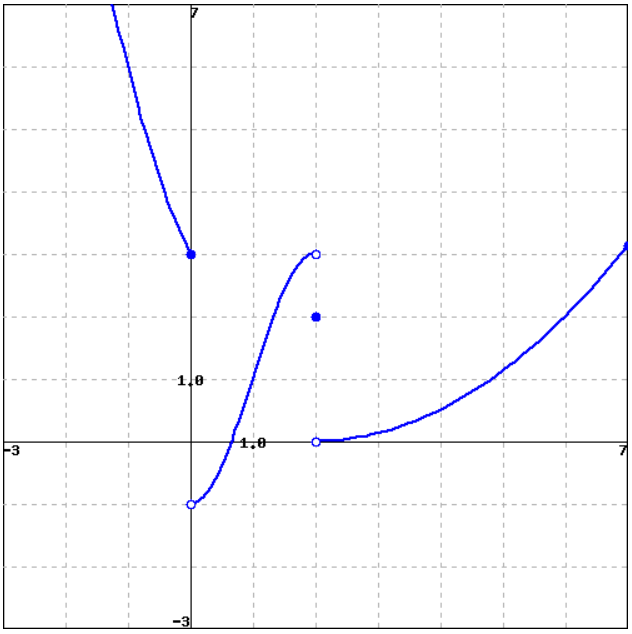
16. **(5 points)** `local/GlobalPandemic/Exam01/MA113_Exam01_Problem16.pg`

Use the given graph of the function g to find the following limits. If the limit does not exist, enter DNE.



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1. $\lim_{x\to 2^-} g(x)=$ _____help (limits)
2. $\lim_{x\to 2^+} g(x)=$ _____
3. $\lim_{x\to 2} g(x)=$ _____
4. $\lim_{x\to 0} g(x)=$ _____

5. $g(2) =$ _____

Note: *You can click on the graph to enlarge the image.*

Let $c \neq 0$ be a real number. Find the horizontal asymptotes of $f(x) = \dfrac{1+cx^2}{1-x^2}$.

- A. $y = 1$ and $y = -1$
- B. $y = -c$ and $y = c$
- C. $y = 1$
- D. $y = -c$.
- E. $y = c$

Suppose that the tangent line to the graph of f at $x = 2$ is $y = 3x - 5$. Select the correct statement.

- A. $f'(2) = 3$ and $f(2) = 1$.
- B. $f'(2) = 3$ and $f(2) = 5$.
- C. $f'(2) = -5$ and $f(2) = 3$.
- D. $f'(2) = 2$ and $f(2) = 3$.
- E. $f'(2) = 2$ and $f(2) = -5$.

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20. **(5 points)** `Library/Rochester/setDerivatives1/ur_dr_1_2.pg`

Let $f(x)$ be the function $11x^2 - 11x + 6$. Then the quotient $\frac{f(10+h)-f(10)}{h}$ can be simplified to $ah + b$ for:

$a =$_____

and

$b =$ _____

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19. **(5 points)** `Library/Wiley/setAnton_Section_2.2/Anton2_2Q32.pg`

The limit $\lim\limits_{h\to 0} \dfrac{(5+h)^2 - 25}{h}$

represents $f'(a)$ for some function f and some number a. Find $f(x)$ and a.

$f(x) =$ _____

$a =$ _____

Suppose f and g are continuous on $\mathbb{R}$ such that $g(2) = 2$ and

$$\lim_{x\to 2}[4f(g(x)) - f(x)g(x)] = 6.$$

The find the value of $f(2)$.

- A. 4
- B. 2
- C. 3
- D. 1
- E. None of the above

17. **(5 points)** Library/UCSB/Stewart5_2_5/Stewart5_2_5_6.pg

Which of the following is a function that has a jump discontinuity at $x = 2$ and a removable discontinuity at $x = 4$, but is continuous elsewhere?

(a) $f(x) = \dfrac{2}{(x-2)(x-4)}$.

(b) $f(x) = \begin{cases} 1 & \text{if } x \leq 2 \\ x-3 & \text{if } 2 < x < 4 \text{ or } x > 4 \\ 3 & \text{if } x = 4 \end{cases}$.

(c) $f(x) = \begin{cases} 2-x^2 & \text{if } x \leq 2 \\ \dfrac{1}{x^2-4x} & \text{if } x > 2 \end{cases}$.

_____

Find the horizontal and vertical asymptotes of the graph of the function

$$f(x) = \frac{3x}{\sqrt{x^2-4}}.$$

- A. HA: $y = 3$, $y = -3$; VA: $x = -2$, $x = 2$
- B. HA: $y = 3$; VA: $x = 2$
- C. HA: $y = 3$, $y = -3$; VA: $x = 2$
- D. HA: $y = 3$, $y = -3$; VA: none
- E. None of the above

Suppose that $\sin(t) = 3/5$ and the angle t lies in $[\pi/2, 3\pi/2]$. Find $\cos(t)$.

- A. $2/5$
- B. $4/5$
- C. $-2/5$
- D. $-4/5$
- E. $-3/5$

Given $f(x) = \sqrt{1-x}$ and $g(x) = \dfrac{1}{x-2}$, find the domain of $f(g(x))$.

- A. $(-\infty, 2) \cup [3, +\infty)$
- B. $(-\infty, 2) \cup (2, +\infty)$
- C. $[3, +\infty)$
- D. $(-\infty, 1]$
- E. None of the above

Suppose that $\lim_{x\to 7} f(x) = 3$. Find the limit $\lim_{x\to 7} \left((f(x))^2 - x\right)$.

- A. 2
- B. 4
- C. 5

- D. 1
- E. 3

Find the value of $\arcsin(\sin\frac{7\pi}{6})$

- A. $\frac{5\pi}{6}$
- B. $-\frac{\pi}{6}$
- C. $\frac{\pi}{6}$
- D. $\frac{7\pi}{6}$
- E. None of the above

How many distinct solutions does the equation $4^x \cdot 2^{x^2} = 1/2$ have?

- A. Three solutions
- B. One solution.
- C. Infinitely many solutions
- D. Two solutions
- E. No solutions