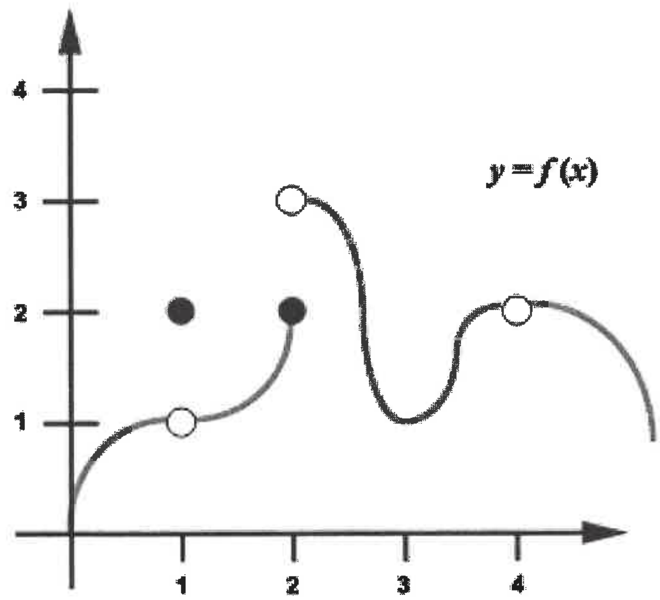
Unit 1 Clicker Review 1

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



$\lim_{x \to 2} f(x) =$ ______

a.) 2

b.) 3

c.) DNE

Unit 1 Clicker Review 2

Find the derivative of the function. You can use 'shortcuts', but show any necessary work. Write your final answer using only positive exponents.

$$g(x) = 5\sqrt[3]{x} - 1$$

$g(x) = 5x^{1/3} - 1$

$g'(x) = \frac{5}{3}x^{-2/3}$

or $\frac{5}{3x^{2/3}}$

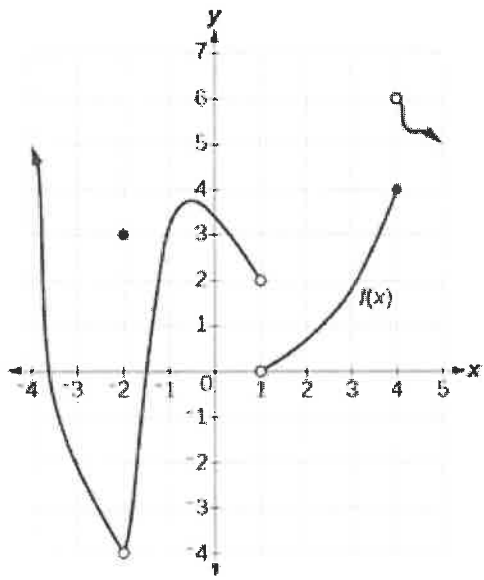
a.) $g'(x) = \frac{15}{4}x^{\frac{4}{3}} - x + c$

b.) $g'(x) = 5x^{\frac{1}{3}}$

c.) $g'(x) = \frac{5}{3x^{\frac{2}{3}}}$

Unit 1 Clicker Review 3

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



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

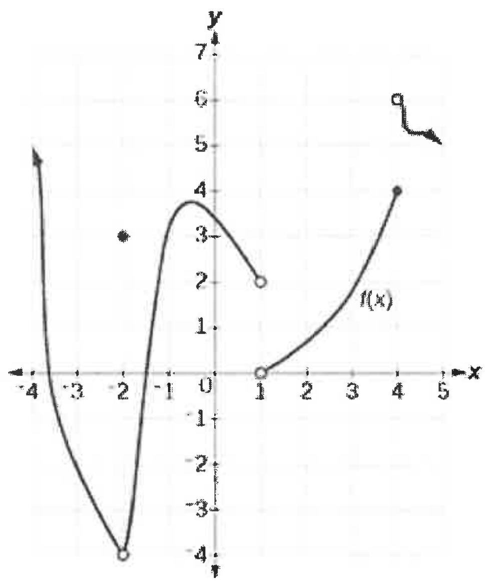
a.) 3

b.) -4

c.) DNE

Unit 1 Clicker Review 4

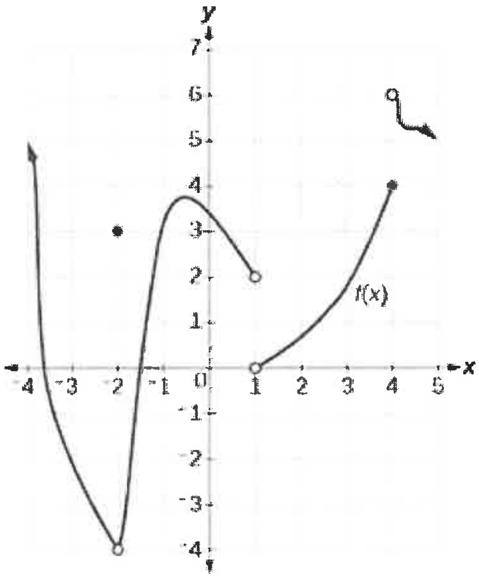
Choose the correct statement about the function that is given below.



a. The function is differentiable at x=-2.
b. The function is continuous at x=-2.
c. The function is differentiable at x=4.
d. The function is continuous at x=4.
e. $f(-2) = 3$

Unit 1 Clicker Review 5

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



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

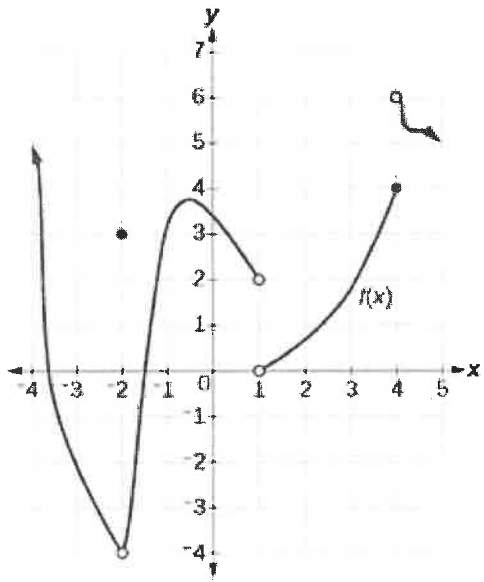
a.) 4

b.) 6

c.) DNE

Unit 1 Clicker Review 6

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



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

a.) 3

b.) -1

c.) DNE

d.) 0

Unit 1 Clicker Review 7

Determine whether the function is continuous on the entire real number line. Explain your reasoning.

$f(x) = (x^2 - 64)^3$

a.) The function is not continuous because the function is not defined at $x = \pm 8$.

b.) The function is not continuous because the function is not defined at $x = 64$.

c.) The function is continuous because the function is a polynomial.

d.) The function is not continuous because the function is not a polynomial.

Unit 1 Clicker Review 8

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

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

$$= \lim_{x \to 1} \frac{1}{x+5}$$

$$= \frac{1}{6}$$

a.) 0

b.) DNE

c.) 6

d.) 1/6

Unit 1 Clicker Review 9

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

$$\lim_{x \to 3} \frac{3}{5}$$

a.) DNE

b.) 0

c.) 3/5

Unit 1 Clicker Review 10

Find the derivative of the function. You can use 'shortcuts', but

show any necessary work. $$g(x) = 3\sqrt[5]{x^2} - 1$$

$g(x) = 3x^{2/5} - 1$

$g'(x) = 3\left(\frac{2}{5}\right)x^{-3/5}$

$= \frac{6}{5}x^{-3/5}$

a.) $g'(x) = \frac{6}{15}x^{\frac{-3}{5}}$

b.) $g'(x) = \frac{6}{5}x^{\frac{-3}{5}}$

c.) $g'(x) = \frac{15}{2}x^{\frac{3}{2}}$

Unit 1 Clicker Review 11

Choose the correct set up for using the **LIMIT DEFINITION** of derivative to find the derivative of *f* at the given point.

$$f(x) = 7 - x^2 \quad ; \quad (1, 6)$$

a.) $f'(x) = \lim_{\Delta x \to 0} \dfrac{7 - x^2 - (x + \Delta x)}{\Delta x}$

b.) $f'(x) = \dfrac{7 - (x + \Delta x)^2 - (7 - x^2)}{\Delta x}$

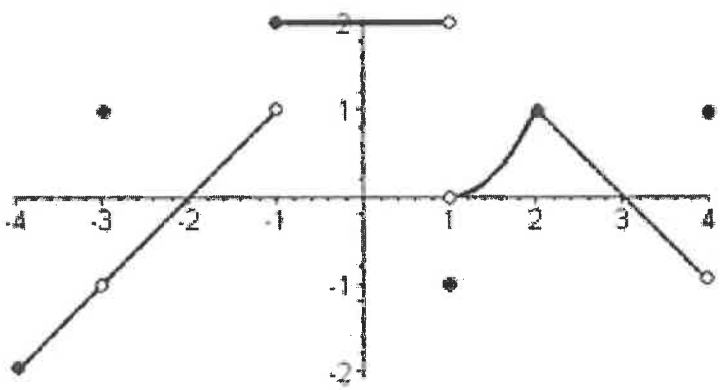
c.) $f'(1) = \dfrac{7 - (1 + \Delta x)^2 - (6)}{\Delta x}$

d.) $f'(1) = \lim_{\Delta x \to 0} \dfrac{7 - (1 + \Delta x)^2 - (6)}{\Delta x}$

**Try to also find the derivative value...

Unit 1 Clicker Review 12

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



$\lim_{x \to 2} f(x) =$ ______

a.) 1

b.) DNE

Is the function continuous at x=2? Yes

Is the function differentiable at x=2? No

Unit 1 Clicker Review 13

Determine whether the function is continuous on the entire real number line. Explain your reasoning.

$$f(x) = \frac{x-6}{x^2+36}$$

a.) The function is not continuous because the function is not defined at x = -6 and 6

b.) The function is continuous because the function's domain is $(-\infty, \infty)$.

c.) The function is continuous because the function is a polynomial.

d.) The function is not continuous because the function is not a polynomial.

Unit 1 Clicker Review 14

Determine whether the function is continuous on the entire real number line. Explain your reasoning.

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

a.) The function is not continuous because the function is not defined at x = -3.

b.) The function is not continuous because the function is not defined at x = -2 and -3.

c.) The function is continuous because the function is a polynomial.

d.) The function is not continuous because the function is not a polynomial.

Unit 1 Clicker Review 15

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

$$\lim_{x \to 3}((x-4)(x-3)x)$$

a.) DNE

b.) 0

Unit 1 Clicker Review 16

Use the **LIMIT DEFINITION** of derivative to find the derivative of *f* at the given point.

$$f(x) = x^2 - 5x \quad ; \quad (1, -4)$$

a.) $f'(1) = \lim_{\Delta x \to 0} \cancel{\dfrac{(1+\Delta x)^2 - 5x + 4}{\Delta x}}$

b.) $f'(1) = \cancel{\dfrac{(1+\Delta x)^2 - 5(1+\Delta x) + 4}{\Delta x}}$

c.) $f'(1) = \lim_{\Delta x \to 0} \cancel{\dfrac{(1+\Delta x)^2 + (4)}{\Delta x}}$

d.) $f'(1) = \lim_{\Delta x \to 0} \dfrac{(1+\Delta x)^2 - 5(1+\Delta x) + (4)}{\Delta x}$

**Try to also find the derivative value…

Unit 1 Clicker Review 17

Write the equation of the tangent line to:

$f(x) = x^3 - 7x + 1$ at the point $(1, -5)$.

a.) $f'(x) = 3x^2 - 7$

$f'(x) = 3x^2 - 7$

b.) $f'(1) = -4$

$f'(1) = 3 - 7$

$= -4$

c.) $y = -4x - 5$

$-5 = -4(1) + b$

$+4 \quad +4$

$-1 = b$

d.) $y = -4x - 1$

Unit 1 Clicker Review 18

Given the function: $f(x) = \frac{1}{5}x^5 - 3x^3 + 2$

Find the average rate of change on $[0,1]$ and instantaneous rate of change at x=1.

a.) The average rate of change is 0 and the instantaneous rate of change is -8.

b.) The average rate of change is -8 and the instantaneous rate of change is -14/5.

c.) The average rate of change is -14/5 and the instantaneous rate of change is -8.

$f(1) = \frac{1}{5} - 3 + 2 = \frac{1}{5} - \frac{15}{5} + \frac{10}{5} = \frac{-4}{5}$

Avg: (AROC)

$f(0) = 2$

$\frac{f(1) - f(0)}{1 - 0} = \frac{-4}{5} - \cancel{2}\frac{10}{5} = \frac{-14}{5}$

Inst. (IROC)

$f'(x) = x^4 - 9x^2$

$f'(1) = 1 - 9 = -8$

Unit 1 Clicker Review 19

Find the derivative of the function:

$$f(x)=\frac{4x^3-5x^2+3}{x} = 4x^2-5x+3x^{-1}$$

$$f'(x)=8x-5-3x^{-2}$$

a.) $f'(x)=\dfrac{8x-8}{x^2}$

b.) $f'(x)=8x-5-3x^{-2}$

c.) $f'(x)=4x^2-5x+3x^{-1}$

Unit 1 Clicker Review 20

Discuss the continuity at x=5

$$f(x)=\begin{cases} 2x-9 & x<5 \\ \frac{2}{5}x^2-9 & x\geq 5 \end{cases}$$

(i) $f(5)=\frac{2}{5}(25)-9$
$= 10-9=1$

(ii) $\lim_{x\to 5^-}(2x-9)=2(5)-9=1$

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

$\Rightarrow \lim_{x\to 5} f(x)=1$

a. $f(x)$ is continuous at x=5 because $f(5)$ is defined; $\lim_{x\to 5} f(x)=1$ and thus it exists; and $f(5)=\lim_{x\to 5} f(x)=1$

(iii) Since $f(5)=1=\lim_{x\to 5} f(x)$, $f(x)$ is cont. @ $x=5$

b. $f(x)$ is not continuous at x=5 because $f(5)$ is defined but $\lim_{x\to 5} f(x)=DNE$ and $f(5)\neq \lim_{x\to 5} f(x)$

c. $f(x)$ is not continuous at x=5 because $f(5)$ is not defined. However, $\lim_{x\to 5} f(x)=1$ and thus it exists.