Problem 1.

Find the average rate of change of the following function over the given interval.

 $v = x^2 + x$, [1, 9]

Answers *

solution:

10

 $\frac{f(9) - f(1)}{9 - 1} = \frac{(9+9) - (1+1)}{8}$ $= \frac{81 + 9 - 2}{8} = \frac{88}{8} = 11$

88/9

45/4

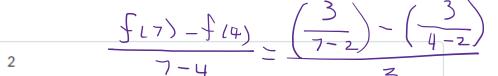
11

Problem2.

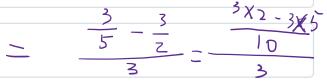
Find the average rate of change of the function over the given interval.

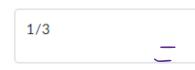
$$f(x) = 3/(x-2), [4, 7]$$

Answers *



7







3/10

Problem 3.

Find the slope of the tangent line of the curve at given point P.

$$y = x^2 + 5x$$
, $P(4, 36)$

Answers

Instantaneous rate of change at x = 4. 1/20

 $\lim_{h \to 0} \frac{(44h)^2 + 5(44h) - [4^2 + 5*4]}{h}$ 13

 $=\lim_{h\to b}\frac{16+8h+h^{2}+20+5h-36}{h}$ -4/25

 $= \lim_{h \to 0} \frac{13h + h^2}{h} = \lim_{h \to \infty} (13 + h) = 13$ -39

Problem 4.

Evaluate

$$\lim_{h o 0}\,rac{f(x_0+h)-f(x_0)}{h}$$

for the given x_0 and function f(x)

$$\lim_{h \to 0} \frac{5(x_0 + h)^2 - 5x_0}{h} = \lim_{h \to 0} \frac{5(x_0 + 2x_0 h + h)^2 - 5x_0}{h}$$

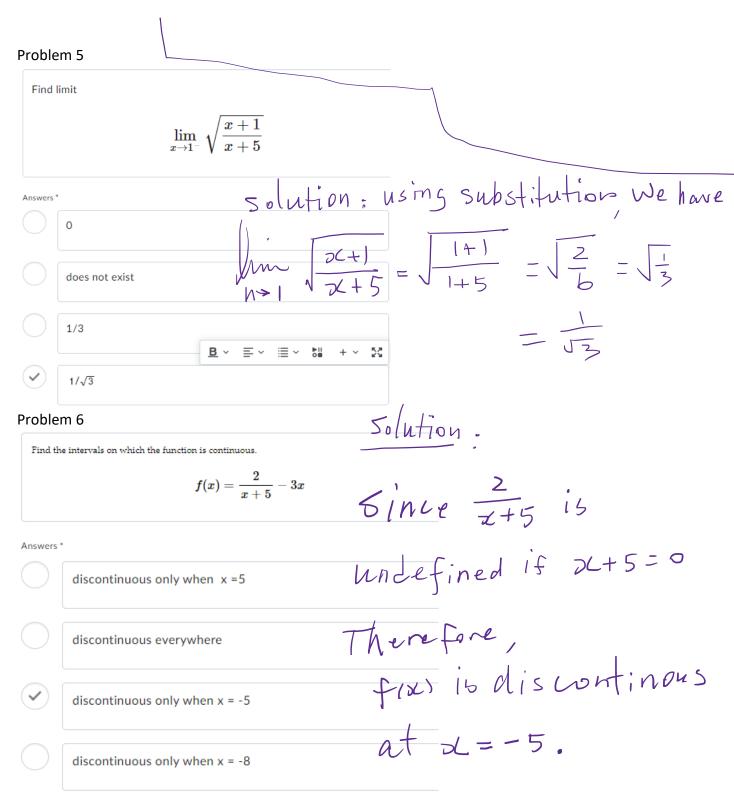
Answers *

$$= \frac{5\chi_0 + 10\chi_0 h + 5h - 5\chi_b^2}{h}$$

15

does not exist
$$= m_0 \left(10 \times 0 + 5 \right) = 10 \times 0$$

45 (Since x = 3).



Problem 7

Find the value of x on which the function is discontinuous.

$$f(x)=\frac{2}{x^2-9}$$

Answers *

Solution:

discontinuous only when x = 9

FIX) is undefined

discontinuous only when x = -3

When x-9=0

=> (== 9 discontinuous only when x = -9 or x = 9

discontinuous when x = 3 or x = -3

 $\alpha = \pm 3$

Problem 8

Find limit

$$\lim_{x\to\infty}\frac{6}{7-\left(5/x^2\right)}$$

Answers *

Solution Bubstitution Method

negative infinity

Problem 9

Find the limit

$$\lim_{x \to \infty} \, \frac{-14x^2 - 3x + 17}{-6x^2 + 8x + 13}$$

Problem 10

Divide numerator and denominator by the highest power of x in the denominator to find the limit.

$$\lim_{x o\infty}\sqrt{rac{25x^2}{3+9x^2}}$$

Solution: direct substitution will Answers * end up with an indeterminate form to 25/3 We divide both numerator and the 5/3 denominator by 2 in the square $\frac{1}{25 \times 2} = \frac{25 \times 2}{25 \times 2} = \frac{25 \times 2}{25 \times 2}$ $\frac{25 \times 2}{3 + 9 \times 2} = \frac{25 \times 2}{3 + 9 \times 2}$ 25/9 does not exist

$$= \lim_{\chi \to 0} \frac{25}{\chi^{2}} + 9 = \int_{\lambda}^{25} \frac{5}{9} = \frac{5}{3}$$

Problem 11

Find the limit $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \text{we do } \text{direct substitution}$ Answers: $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \text{we do } \text{direct substitution}$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \text{limit on } \frac{\sqrt{3}}{3} - \frac{1}{\sqrt{3}} = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \text{limit on } \frac{\sqrt{3}}{3} - \frac{1}{\sqrt{3}} = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \text{limit on } \frac{\sqrt{3}}{3} - \frac{1}{\sqrt{3}} = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \lim_{x \to \sqrt[3]{3}} \left(\frac{\sqrt{3}}{3} - \frac{1}{\sqrt{3}} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \lim_{x \to \sqrt[3]{3}} \left(\frac{\sqrt{3}}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \lim_{x \to \sqrt[3]{3}} \left(\frac{\sqrt{3}}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) \qquad \lim_{x \to \sqrt[3]{3}} \left(\frac{\sqrt{3}}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$ $\lim_{x \to \sqrt[3]{3}} \left(\frac{x^2}{3} - \frac{1}{x} \right) = 0$

Problem 12

Find the derivative of function

$$f(x) = 2023$$

Answers '

Solution:

2022

2023

F(2023) = 0

✓ 0

Problem 13

Find the derivative of function

$$f(x) = x^2 + 6x$$

2x

Answers *

Solution:

V

 $\frac{2x+6}{f(x)} = \left(x^2 + 6x\right)$ $x^2 + 6$

x

 $= (x^2) + (6x)$

/

= 22+6

 $2x^2 + 6$