

Homework Questions

$$30. \left(\frac{7}{8}, \frac{3}{4}\right) \left(\frac{5}{4}, \frac{-1}{4}\right)$$

$$m = \frac{\left(-\frac{1}{4} - \frac{3}{4}\right)}{\left(\frac{5}{4} - \frac{7}{8}\right)} \cdot \frac{8}{8} = \frac{-2 - 6}{10 - 7} = \frac{-8}{3}$$

$$-\frac{1}{4} = \frac{-8}{3} \left(\frac{5}{4}\right) + b$$

$$\left(-\frac{1}{4} = -\frac{10}{3} + b\right) 12$$

$$-3 = -40 + 12b$$

$$12b = 37$$

$$b = \frac{37}{12}$$

$$y = -\frac{8}{3}x + \frac{37}{12}$$

Evaluating Functions

$$f(x) = 2x^2 - 4x + 1$$

$$f(-4) = 2(-4)^2 - 4(-2) + 1$$

$$32 + 8 + 1$$

$$\textcircled{41}$$

$$f(3a) = 18a^2 - 12a + 1$$

$$\boxed{(a \pm b)^2 = a^2 \pm 2ab + b^2}$$

$$f(x) = 2x^2 - 4x + 1$$

$$f(b-3)$$

$$2(b-3)^2 - 4(b-3) + 1$$

$$2(b^2 - 6b + 9) - 4b + 12 + 1$$

$$2b^2 - 12b + 18 - 4b + 13$$

$$\textcircled{2b^2 - 16b + 31}$$

$$f(4-x)$$

$$f(x) = 2x^2 - 4x + 1$$

$$\frac{f(x + \Delta x) - f(x)}{\Delta x}$$

$$f(x + \Delta x) = 2(x + \Delta x)^2 - 4(x + \Delta x) + 1$$

$$2(x^2 + 2x\Delta x + \Delta x^2) - 4x - 4\Delta x + 1$$

$$\frac{\cancel{2x^2} + 4x\Delta x + 2\Delta x^2 - \cancel{4x} - 4\Delta x + 1 - \cancel{2x^2} - \cancel{4x} + \cancel{1}}{\Delta x}$$

$$\frac{4x\Delta x + 2\Delta x^2 - 4\Delta x}{\Delta x}$$

$$\boxed{4x + 2\Delta x - 4}$$

$$f(x) = -3x^2 - 4x + 5$$

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

$$\frac{-3(x^2 + 2x\Delta x + \Delta x^2) - 4x - 4\Delta x + 5 + 3x^2 + 4x - 5}{\Delta x}$$

$$\frac{-3x^2 - 6x\Delta x - 3\Delta x^2 - 4\Delta x + 3x^2}{\Delta x}$$

$$-6x - 3\Delta x - 4$$

given $f(x) = 3 - 4x$

$$f(x) = 3x^2 + 2$$

find $\frac{f(x+\Delta x) - f(x)}{\Delta x}$

Composite Functions

given: $f(x) = \sqrt{x+3}$ $g(x) = 2x^2$

find:

$$g(f(-5)) \quad f(g(3)) \quad g(f(x)) \quad f(g(x))$$

Transformations

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

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

$$f(x) = x^2 - 5$$

$$f(x) = (x-1)^2$$

$$f(x) = (x+5)^2$$

General Rules for Transformations

$$f(x+a)$$

$$f(x-a)$$

$$f(x)+b$$

$$f(x)-b$$

Homework: p.28 #2, 3, 7, 8,
p.29 #40, 47, 48