Key

Math 4

Name _____

5-2 Practice

Date _____

Show your work on another sheet of paper.

3

1. Find the average rate of change in $q(x) = x^2 + 12$ from $x = -1$ to $x = 4$.

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2. Find the average rate of change in $g(n) = 3n^3 - n^2 + 6$ over the interval $-2 \le n \le 2$.

3. Let $f(x) = 2x^2 + 3x$. Find the average rate of change in f over the given interval.

$4x + 2\Delta x + 3$ a. From x to $x + \Delta x$

Find the formula for the difference quotient. Use the formula to calculate the following:

11.2 b. From 2 to 2.1

11.02 c. From 2 to 2.01

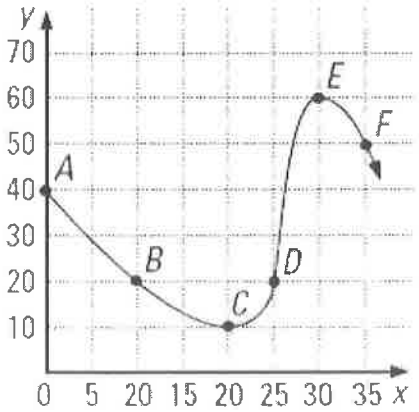
4. A stone is thrown upward from a height of 2 meters with an initial velocity of 8 meters per second. If only the effect of gravity is considered, then the stone's height in meters after t seconds is given by the equation $h(t) = -4.9t^2 + 8t + 2$.

$-1.8 - 4.9\Delta t$ **a.** Find a formula for the average velocity from $t = 1$ to $t = 1 + \Delta t$.

Find the formula for the difference quotient. Use the formula to calculate the following:

-14.05 m/s **b.** Use your answer in part a to find the average from $t = 1$ to $t = 3\frac{1}{2}$.

5. Refer to the graph of g at the right. Find the average rate of change in g over each interval.



5 a. C to E 5

$\frac{2}{7}$ b. $0 \le x \le 35$ 2/7

Over what interval does the average rate of change in g have the given value?

c. 0 B to D

d. $-\frac{3}{5}$ A to C

$a = -3$ 6. Suppose $P = (3, 7)$ and $Q = (9, a)$ are points on the graph of the function h. If the average rate of change in h from $x = 3$ to $x = 9$ is $-\frac{3}{5}$, find a.

$a = -3$

M4 U7 L1 I1 Practice ANSWERS

1.) $f(-1) = (-1)^2 + 12 = 13$; $f(4) = 4^2 + 12 = 28$

$(-1, 13)$ $(4, 28)$

$$\frac{\Delta y}{\Delta x} = \frac{f(4) - f(-1)}{4 - -1} = \frac{28 - 13}{4 - -1} = \frac{15}{5} = \boxed{3}$$

2.) $$\frac{g(2) - g(-2)}{2 - -2} = \frac{21 - -27}{4} = \frac{48}{4} = \boxed{12}$$

$g(2) = 21$; $g(-2) = -27$

3.) a) $$\frac{f(x + \Delta x) - f(x)}{\Delta x} = \frac{2(x + \Delta x)^2 + 3(x + \Delta x) - (2x^2 + 3x)}{\Delta x}$$

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

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

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

$$= \boxed{4x + 2\Delta x + 3}$$

$x = 2$; $\Delta x = 0.1$

b) $4(2) + 2(0.1) + 3 = \boxed{11.2}$

c) $x = 2$; $\Delta x = 0.01$

$4(2) + 2(0.01) + 3 = \boxed{11.02}$

→

4.) a) $\frac{h(1+\Delta t)-h(1)}{(1+\Delta t)-1} = \frac{-4.9(1+\Delta t)^2+8(1+\Delta t)+2-\left[-4.9(1)^2+8(1)+2\right]}{\Delta t}$

$= \frac{-4.9(1+2\Delta t+\Delta t^2)+8+8\Delta t+2+4.9-8-2}{\Delta t}$

$= \frac{-4.9-9.8\Delta t-4.9\Delta t^2+8+8\Delta t+2+4.9-8-2}{\Delta t}$

$= \frac{-1.8\Delta t-4.9\Delta t^2}{\Delta t}$

$= \boxed{-1.8-4.9\Delta t}$

b) $\Delta t = 3.5-1 = 2.5$

$-1.8-4.9(2.5) = \boxed{-14.05 \text{ m/s}}$

5.) a) C (20,10) ; E (30, 60)

$\frac{f(x_2)-f(x_1)}{x_2-x_1} = \frac{60-10}{30-20} = \frac{50}{10} = \boxed{5}$

b) $\frac{f(x_2)-f(x_1)}{x_2-x_1} = \frac{50-40}{35-0} = \frac{10}{35} = \boxed{\frac{2}{7}}$

c) B to D

e) A to C

6.) a) $\frac{a-7}{1-3} = -\frac{5}{3}$

6. $\frac{a-7}{6} = -\frac{5}{3}$ ·6

$a-7 = -10$

$\boxed{a = -3}$