

## Optional Review for Quest #8 - Functions

Name: \_\_\_\_\_ Class: \_\_\_\_\_

Consider the relation  $f(x) = x^2 - 4x + 3$ .

1.) Find  $f(5)$

$$f(5) = 5^2 - 4(5) + 3 = 25 - 20 + 3 = 8 \quad \boxed{f(5) = 8}$$

3.) Find  $f(2a)$

$$f(2a) = (2a)^2 - 4(2a) + 3 = 4a^2 - 8a + 3 \quad \boxed{f(2a) = 4a^2 - 8a + 3}$$

5.) Graph the function using the table of values below.

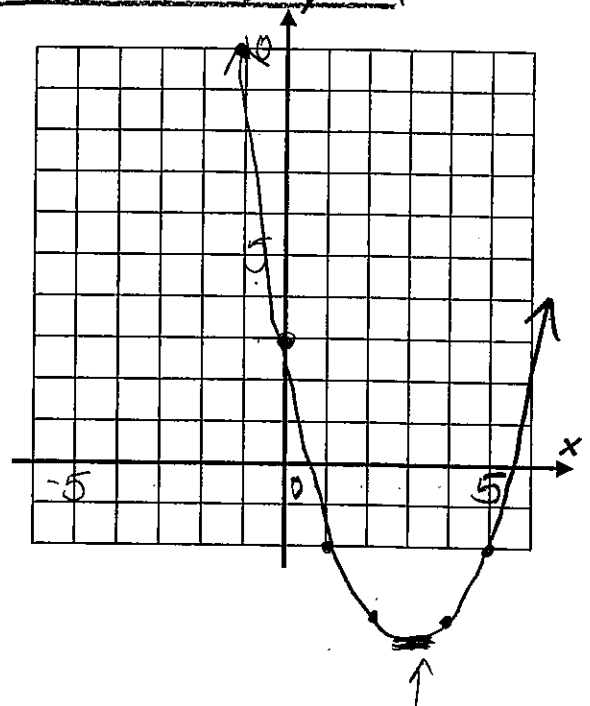
x	$x^2 - 6x + 3$	(x, y)
-1	$(-1)^2 - 6(-1) + 3 = 10$	(-1, 10)
0	$(0)^2 - 6(0) + 3 = 3$	(0, 3)
1	$(1)^2 - 6(1) + 3 = -2$	(1, -2)
2	$(2)^2 - 6(2) + 3 = -5$	(2, -5)
3	$(3)^2 - 6(3) + 3 = -6$	(3, -6)
4	$(4)^2 - 6(4) + 3 = -5$	(4, -5)
5	$(5)^2 - 6(5) + 3 = -2$	(5, -2)

2.) Find  $f(-7)$

$$f(-7) = (-7)^2 - 4(-7) + 3 = 49 + 28 + 3 = 80 \quad \boxed{f(-7) = 80}$$

4.) Find  $f(3x-4)$

$$f(3x-4) = (3x-4)^2 - 4(3x-4) + 3 = 9x^2 - 24x + 16 - 12x + 16 + 3 = 9x^2 - 36x + 35 \quad \boxed{f(3x-4) = 9x^2 - 36x + 35}$$



6.) Find the average rate of change from  $x = 2$  to  $x = 5$ .

$$\frac{f(5) - f(2)}{5 - 2} = \frac{-2 - (-5)}{5 - 2} = \frac{3}{3} = 1 \quad \boxed{1}$$

Smallest  
y-value

7.) Determine if the relation is a function. Explain your reasoning.

Yes it passes the VLT. Each input has only one output

8.) Determine the range of the function.

$$-6 \leq f(x)$$

or  
 $f(x) \geq -6$

or  $[-6, \infty)$

The table to the side shows the average yearly balance of a savings account where interest is compounded annually. The balance in dollars,  $f(t)$ , is a function of the time in years,  $t$ .

Year	Balance, in Dollars
0	380.00
10	562.49
20	832.63
30	1232.49
40	1824.39
50	2700.54

9.) Find  $f(30)$  and interpret this value.

At 30 yrs, the bank account has \$1232.49.

10.) Find  $t$  when  $f(t) = 1824.39$  and interpret this value.

$t = 40$  It takes 40 yrs. to get to \$1824.39.

11.) Find the average rate of change from 10 years to 40 years. Interpret this value.

$$\frac{f(40) - f(10)}{40 - 10} = \frac{1824.39 - 832.63}{40 - 20} = \frac{991.76}{20} = \$49.59/\text{yr.}$$

Consider the function  $h(x)$  to the side.

12.) Explain why this is a function.

\* It passes the VLT.

\* Each input has only one output.

13.) Find the following values.

$$f(-3) = -8$$

$$f(2) = 12$$

14.) Find all values of  $x$  for which  $f(x) = 0$ .

$$x = -2,$$

$$x = -1, x = 1$$

15.) Find the domain and range of the function.

$$D: [-3, 2.1]$$

$$R: [-10, 16]$$

16.) Find the intervals over which the graph is increasing.

$$[-3, -1.5) \text{ and } (0.4, 1.6]$$

17.) Find the intervals over which the graph is decreasing.

$$(-1.5, 0.4)$$

18.) Find the approximate coordinates of the relative minimum and the relative maximum of the graph (turning points).

$$\text{max: } (-1.5, 0.4)$$

$$\text{min: } (0.4, -1)$$

