

Name _____

8A, Algebra 1

Date _____

Period _____

Functions II Test

****Extra Review****

1) Determine whether the following relation is linear, quadratic, cubic or neither. Why? Show all work!

x	y
0	2
1	4
2	6
3	8
4	10

2) What is the range of the following: $y = (x + 2)^2 - 5$

3) Nick's Print Shop purchased a new printer for \$25,000. Each year it depreciates at a rate of 4%. What will its approximate value be at the end of the fifth year?

4) A bank advertised a rate of 5% interest compounded annually on one of its CD's. If a 10 year old CD is now worth \$3,257.79, find its original price.

5) What is the y-intercept of the following function, which two quadrants does the function lie in, and does the function show growth or decay?

$$y = 5^x$$

6) Describe how the following graph would change in relation to its parents graph.:

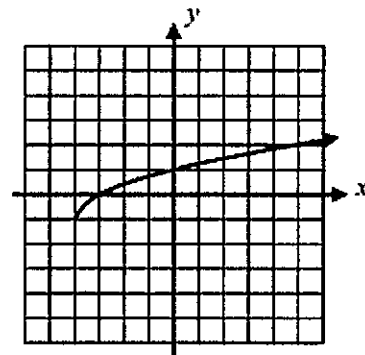
$$p(x) = -3\sqrt{x+3} + 5$$

7) Consider the function given by $f(x) = x^2 + 3$. Find its average rate of change from $x = -1$ to $x = 3$. Show all work.

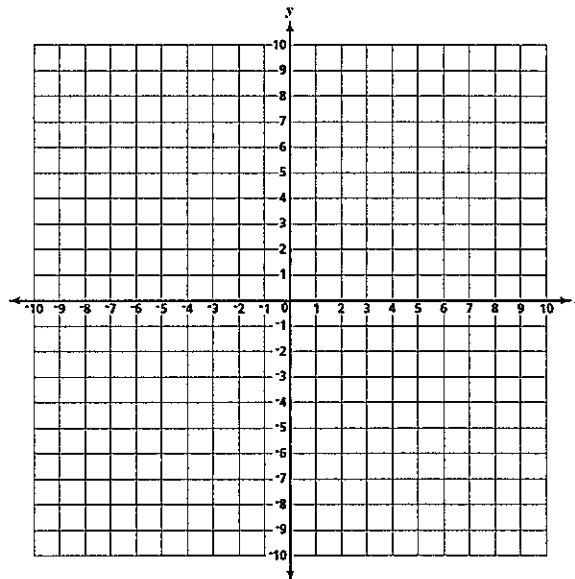
8) The graph of a parabola is created by transforming the graph $y = x^2$. What is the equation of the new function if the original is shifted four units to the right and three units up?

9) What is the vertex of : $y = (x + 4)^2 - 6$

10) What is the equation for the following function?



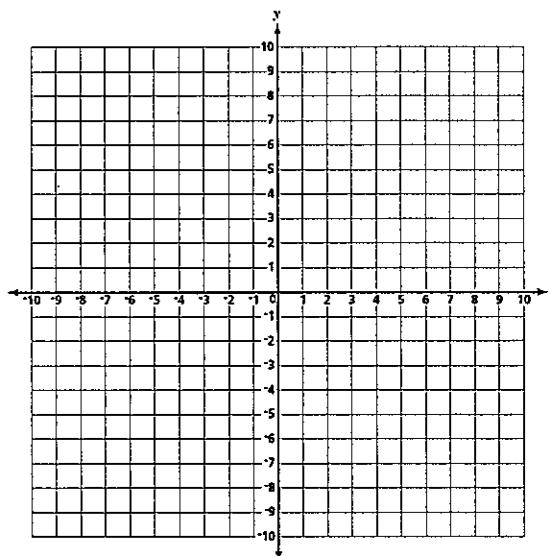
11) Graph the function $f(x) = -\sqrt{x-2} - 3$ on the grid below. Then state its domain and range.



Domain: _____

Range: _____

12) Graph the function: $f(x) = \sqrt[3]{x+2} - 4$ over the interval $[-10, 6]$ then state its domain and range



Domain: _____

Range: _____

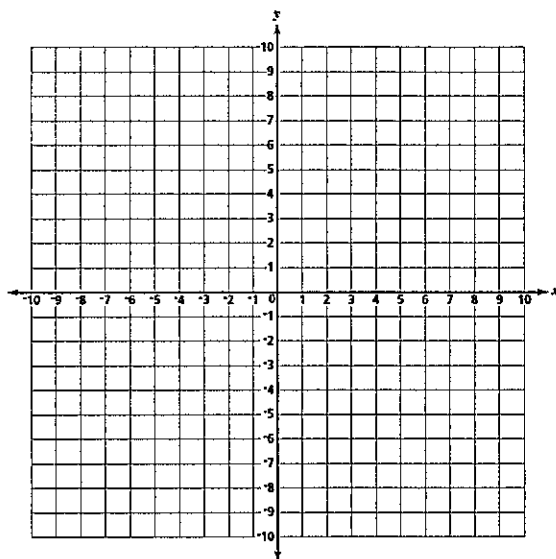
13) Using question #12 what is the average rate of change of $f(x)$ from $-2 \leq x \leq 6$?

14) Graph:

$$f(x) = \begin{cases} x^2 - 3, & x \leq 2 \\ x - 1, & x > 2 \end{cases}$$

a) What is the domain of the function?

b) What is the range of the function?

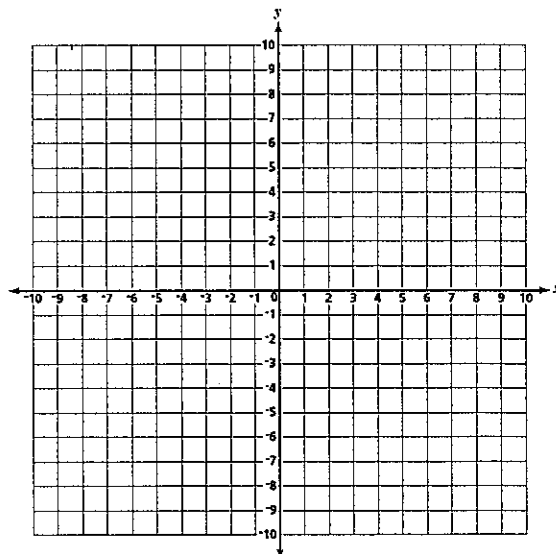


15) Graph: $y = |x + 3| - 4$

a) What is the domain? _____

b) What is the range? _____

c) What is the vertex? _____

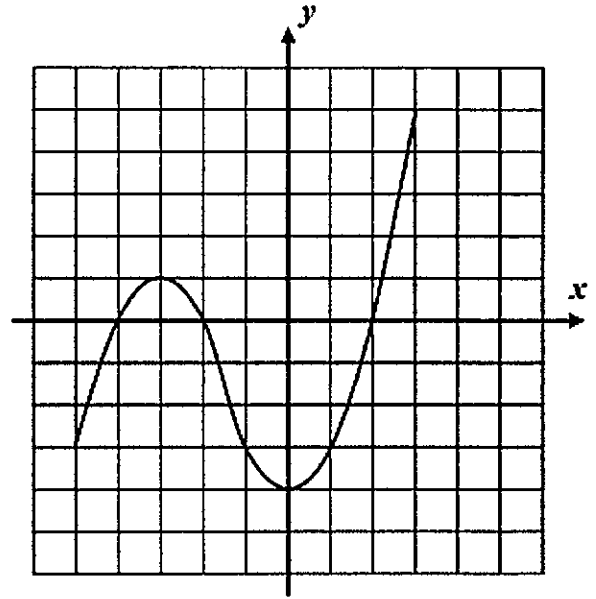


16) The function $y = f(x)$ is shown graphed below over the interval $-5 \leq x \leq 3$.

(a) Evaluate each of the following:

$$f(1) = \underline{\hspace{2cm}}$$

$$f(-2) = \underline{\hspace{2cm}}$$



(b) What are the absolute maximum and absolute minimum value of the function?

Absolute maximum

Absolute minimum

(c) What are the x and y-intercepts of the function?

x-intercept(s): y-intercept(s):

(d) Give one interval over which the function is increasing and one interval over which it is decreasing.

Increasing: Decreasing:

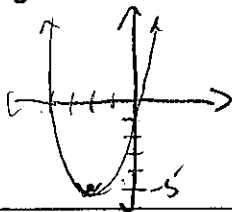
Functions II Test
Extra Review

1) Determine whether the following relation is linear, quadratic, cubic or neither. Why? Show all work!

x	y
0	2
1	4
2	6
3	8
4	10

- Linear B/c the rates of change are constant on the 1st try or 1st common difference

2) What is the range of the following: $y = (x + 2)^2 - 5$



V: (-2, -5)

$y \geq -5$ or $[-5, \infty)$

3) Nick's Print Shop purchased a new printer for \$25,000. Each year it depreciates at a rate of 4%. What will its approximate value be at the end of the fifth year?

$$A = P(1 - r)^n$$

$$A = 25,000(1 - 4\%)^5$$

$$A = 25,000(1 - .04)^5$$

$$A = 25,000(.96)^5$$

$$A = 20,384.32$$

* Round to the nearest hundredth

$\$20,384.32$

4) A bank advertised a rate of 5% interest compounded annually on one of its CD's. If a 10 year old CD is now worth \$3,257.79, find its original price.

$$A = P(1 + r)^n$$

$$3,257.79 = P(1 + 5\%)^{10}$$

$$3,257.79 = P(1 + .05)^{10}$$

$$3,257.79 = P(1.05)^{10}$$

$$\frac{3,257.79}{(1.05)^{10}} = \frac{P(1.05)^{10}}{(1.05)^{10}}$$

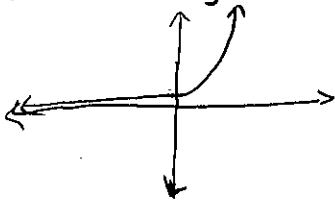
* Round to the nearest hundredth

$\$2,000.00$

$P = 2000.00$

5) What is the y-intercept of the following function, which two quadrants does the function lie in, and does the function show growth or decay?

$$y = 5^x$$



- y-intercept: (0, 1)
 - Quadrants: I + II
 - Growth

Decay: Base is decimal
 $0 < b < 1$
 b^x

6) Describe how the following graph would change in relation to its parents graph:

$$p(x) = -3\sqrt{x+3} + 5$$

① ② ③

- ① Reflection in the x-axis
- ② narrower (stretched vertically) by a scale factor of 3
- ③ Translated (shifted) 3 units left + 5 units up from (0, 0)

7) Consider the function given by $f(x) = x^2 + 3$. Find its average rate of change from $x = -1$ to $x = 3$. Show all work.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

$$\frac{f(3) - f(-1)}{3 - (-1)}$$

$$\frac{12 - 4}{3 - (-1)}$$

$$\frac{12 - 4}{3 + 1}$$

$$\frac{8}{4} = \boxed{2}$$

x	f(x)
-1	4
0	3
1	4
2	7
3	12

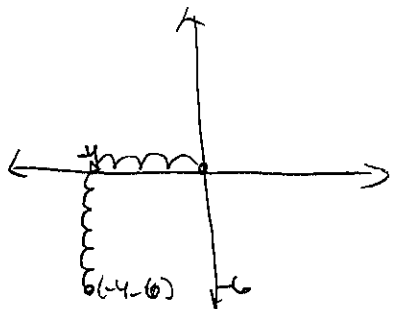
$$\left. \begin{array}{l} f(x) = x^2 + 3 \\ f(-1) = (-1)^2 + 3 \\ f(-1) = 1 + 3 \\ f(-1) = 4 \end{array} \right\} \begin{array}{l} x_1 \uparrow \\ x_2 \uparrow \\ f(x) = x^2 + 3 \\ f(3) = (3)^2 + 3 \\ f(3) = 9 + 3 \\ f(3) = 12 \end{array}$$

8) The graph of a parabola is created by transforming the graph $y = x^2$. What is the equation of the new function if the original is shifted four units to the right and three units up?

$$y = (x - 4)^2 + 3$$

↑
↑
 Right Up
 4 3

9) What is the vertex of: $y = (x + 4)^2 - 6$

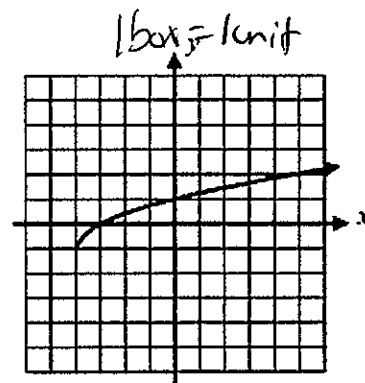


left 4 down 6 from (0, 0)

$$V: (-4, -6)$$

10) What is the equation for the following function?

$y = \sqrt{(x+4)} - 1$ starting point: $(-4, -1)$
 4 left 1 down



11) Graph the function $f(x) = -\sqrt{x-2} - 3$ on the grid below. Then state its domain and range.

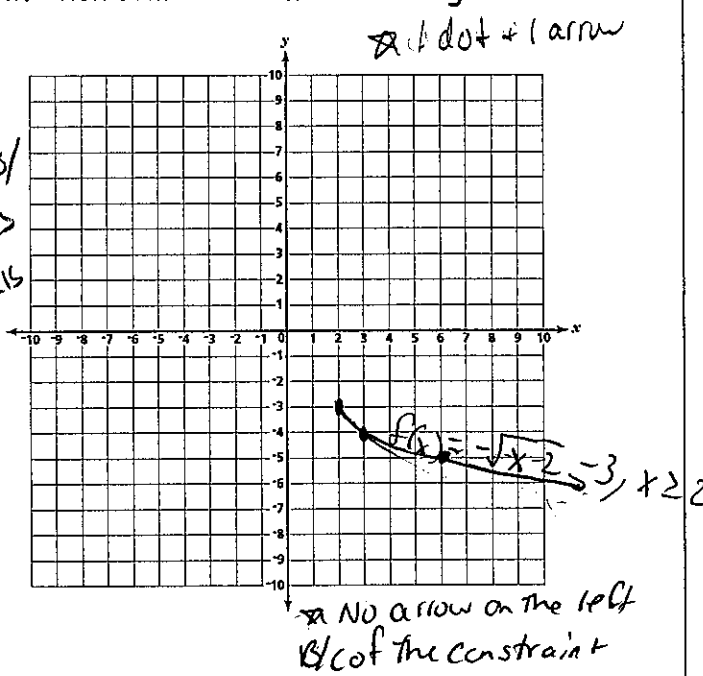
$x-2 \geq 0$ NO negative radicands
 $+2 \quad +2$
 $x \geq 2$
 Constraint

x	f(x)
2	-3
3	-4
6	-5

only copy whole #s / Integers & NO decimals

set builder
 Domain: $\{x | x \geq 2\}$ or $[2, \infty)$
 Interval Notation

Range: $\{y | y \leq -3\}$ or $(-\infty, -3]$
 Numerical order



12) Graph the function: $f(x) = \sqrt[3]{x+2} - 4$ over the interval $[-10, 6]$ then state its domain and range

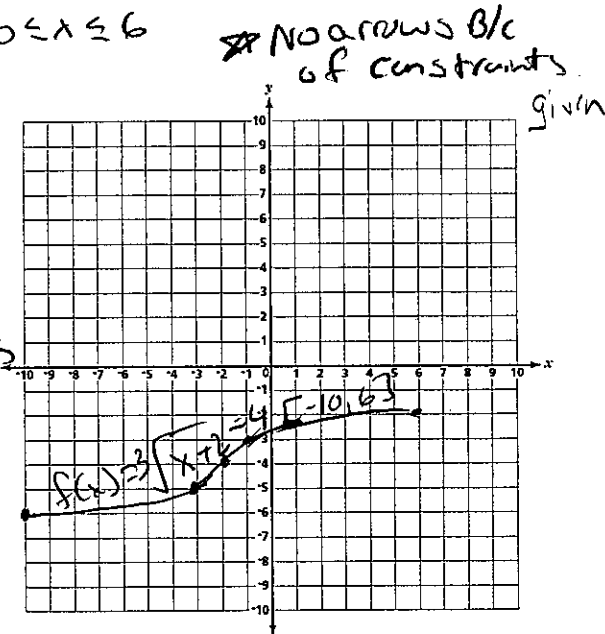
MATH #4

x	f(x)
-10	-6
-3	-5
-2	-4
-1	-3
6	-2

only copy whole #s / Integers & NO decimals

S.B.
 Domain: $\{x | -10 \leq x \leq 6\}$ or $[-10, 6]$
 J.N.

Range: $\{y | -6 \leq y \leq -2\}$ or $[-6, -2]$



13) Using question #12 what is the average rate of change of $f(x)$ from $-2 \leq x \leq 6$?

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{-2 - (-4)}{6 - (-2)} = \frac{-2 + 4}{6 + 2} = \frac{2}{8} = \frac{1}{4}$$

14) Graph:

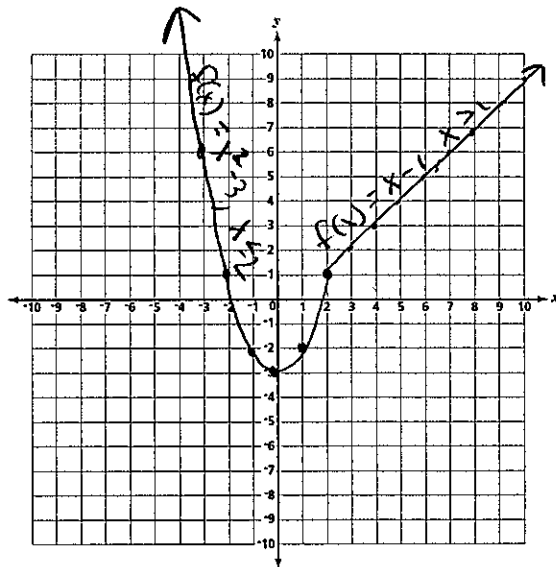
$$f(x) = \begin{cases} x^2 - 3, & x \leq 2 \\ x - 1, & x > 2 \end{cases}$$

* If the domain is open & closed at the same time, the domain value is closed!

x	f(x)
-3	6
-2	1
-1	-2
0	-3
1	-2
2	1

$$f(x) = x - 1, \quad x > 2$$

m: 1
B: -1



a) What is the domain of the function?

all reals or $\{x | x \in \mathbb{R}\}$ or $(-\infty, \infty)$

↑ S.B. ↑ I.N.

b) What is the range of the function?

$\{y | y \geq -3\}$ or $[-3, \infty)$

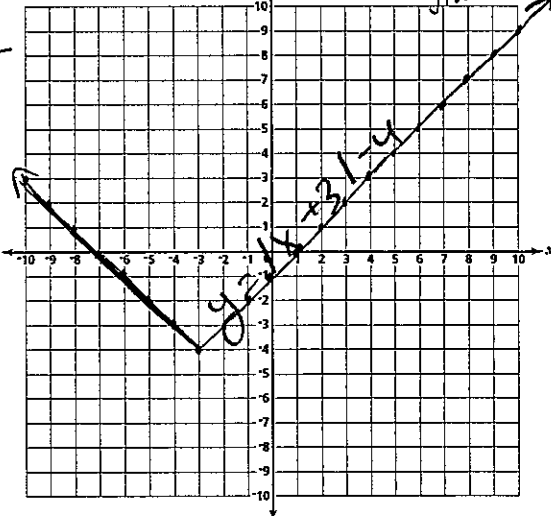
15) Graph: $y = |x + 3| - 4$

(Math) → (Num)

* small values from -10 to +10

x	y
-10	3
-9	2
-8	1
-7	0
-6	-1
-5	-2
-4	-3
-3	-4
-2	-3
-1	-2
0	-1
1	0
2	1
3	2

RAMOS (NO constraints given)



a) What is the domain? All reals or $\{x | x \in \mathbb{R}\}$ or $(-\infty, \infty)$

b) What is the range? $\{y | y \geq -4\}$ or $[-4, \infty)$

c) What is the vertex? $(-3, -4)$

16) The function $y = f(x)$ is shown graphed below over the interval $-5 \leq x \leq 3$.

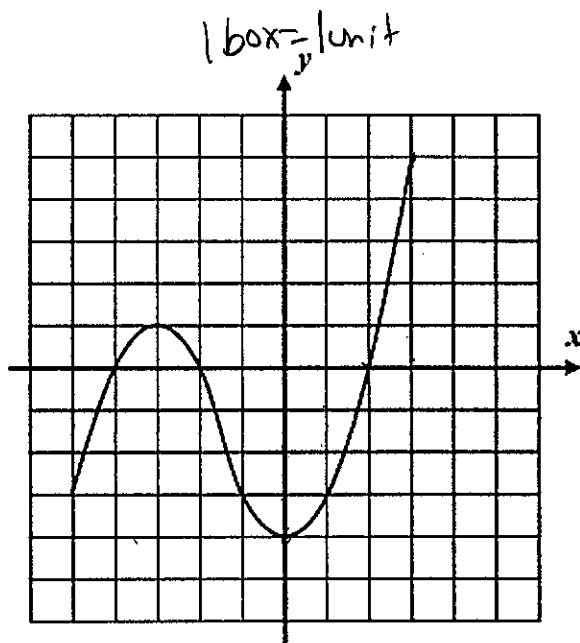
(a) Evaluate each of the following:

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

\downarrow \uparrow
 x y

$$f(-2) = \frac{\quad}{\quad}$$

\uparrow \uparrow
 x y



(b) What are the absolute maximum and absolute minimum value of the function?

\uparrow highest point
Absolute maximum $y = 5$ or $(3, 5)$

\uparrow lowest point
Absolute minimum $y = -4$ or $(-1, -4)$

} Describe using the y-value or give the coordinate

(c) What are the x and y-intercepts of the function?

x-intercept(s): $x = -4, x = -2, x = 2$ or $\{-4, -2, 2\}$
 \uparrow where $y = 0$

y-intercept(s): $y = -4$ or $\{-4\}$
 \downarrow where $x = 0$

(d) Give one interval over which the function is increasing and one interval over which it is decreasing.
 USE x -values

Increasing: $(-5, -3) \cup (0, 3)$
 $\{x \mid -5 < x < -3 \text{ or } 0 < x < 3\}$
 - between $x = -5$ + -3 or
 between $x = 0$ + $x = 3$

Decreasing: $(-3, 0)$ or $\{x \mid -3 < x < 0\}$
 or between $x = -3$ + $x = 0$