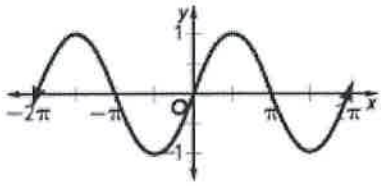
Name _____ Period _____

Algebra 2 Semester Exam REVIEW

1. The graph of a function is shown.
What is the domain and range of this function?



D: ℝ
R: [-1, 1]

2. Which of the following define y as a function of x?

I & III DEFINE y AS A FUNCTION OF x BECAUSE EACH x IS DEFINED FOR ONLY 1 UNIQUE y-VALUE.

I

x	y
-1	5
-2	2
-3	1
-4	2
-5	5

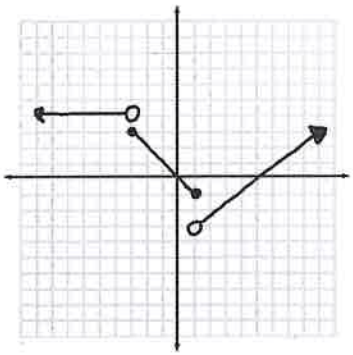
VERTICAL LINE TEST IS A GOOD WAY TO TEST FOR A FUNCTION.

II

$x^2 - 4 = y^2$

NOT A FUNCTION
EXAMPLE WHY...
$(3, \sqrt{5})$, $(3, -\sqrt{5})$
ARE BOTH SOLUTIONS.
THE x-VALUE OF 3 DEFINES 2 DIFFERENT y-VALUES.

III



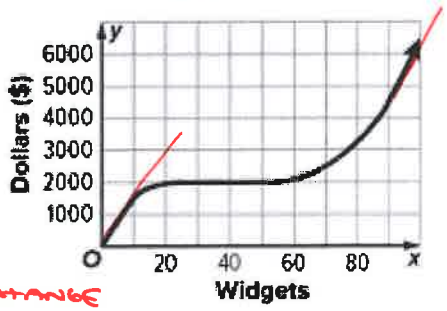
3. Choose the **even** function. Show work/explain.

a. $f(x) = 4x^3 - 2x^2$ b. $f(x) = x^3 + 2x$ c. $f(x) = 3x^2 + 2x$ d. $f(x) = -x^2 - 2$

4. Complete the sentence about the end behavior of $f(x) = x^2 + 3x + 2$. As x approaches positive or negative infinity, f(x) approaches _____.

a. $-\infty$ b. 0 c. 5 d. ∞

5. The graph shows the **revenue ($)** function for widgets at the Columbus Widget Factory.



a. Estimate the number of widgets produced when revenue is $2500. ABOUT 72 WIDGETS

b. Over what interval of widgets produced does the Average Rate of Change of the function appear to be the **greatest**. Explain.

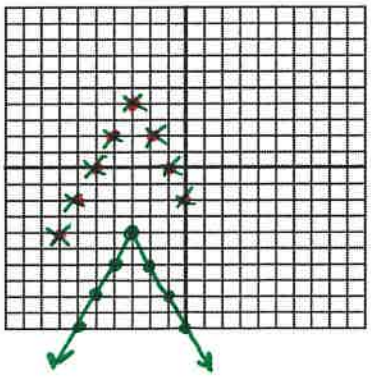
EITHER INTERVAL [0, 10] OR [90, ∞) WOULD SHOW GREATEST AVERAGE RATE OF CHANGE

6. ~~Describe~~ using PRSS: $y = -2|x + 3| + 4$

Identify the type of function ABSOLUTE VALUE FUNCTION

7. Now, **Graph each step** of the transformation:

$-2|x + 3| - 4$



23. **3.5/3.6** The zeros of a quadratic functions are $-4-\sqrt{11}$ and $-4+\sqrt{11}$. The y-intercept is 5. What is the equation of the quadratic function?

a. $y = x^2 - 8x + 5$ b. $y = x^2 - 4x - 11$ c. $y = x^2 - 4x + 11$ d. $y = x^2 + 8x + 5$

Y-INT NOT 5 HERE

$x^2 - 8x = -5$
$(x-4)^2 = 11$
$x = 4 \pm \sqrt{11}$

$x^2 + 8x = -5$
$(x+4)^2 = 11$
$x = -4 \pm \sqrt{11}$

24. **3.5** Convert the equation $y = -2x^2 + 8x - 17$ to graphing/vertex form:

$y = -2(x-2)^2 - 9$ V(2, −9)

25. **3.3** Solve $x^2 - 2x + 4 = 0$

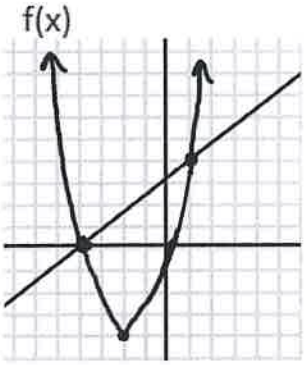
QUADFORM

$x = \frac{2 \pm \sqrt{4-16}}{2}$

$x = \frac{2 \pm \sqrt{-12}}{2}$ NO REAL SOLUTION

26. The quadratic equation $ax^2 + bx + c = 0$ has real solutions if $b^2 - 4ac$ IS POSITIVE OR ~~ZERO~~, and has imaginary solutions if $b^2 - 4ac$ IS NEGATIVE.

27. Using the graphs at the right, suppose $f(x) = x(x + 4)$ and $g(x) = x + 3$. What is the interval when $f(x) > g(x)$?



$f(x) > g(x)$ WHEN

$x < -4$ OR $x > 1$

28. Solve the systems of equations. Identify your method.

$y = 2x^2 - 3x + 8$

$y = -4x^2 + 11$

I USED INTERSECTIONS OF THE GRAPHS.

$(-\frac{1}{2}, 10)$, $(1, 7)$

29. A cannonball is shot into the air. Its height can be described by the equation $h = -3(t - 1)(t - 9)$, where h is the height of the cannonball in feet and t is the time in seconds.

Graph the function on your calculator and use the graph and/or table to describe what happens to the cannonball at certain values or intervals along its flight path. *Drawing may help you!*

Things to consider: At what time does the cannonball hit the ground? When is the cannonball at its highest point? How high is the highest point? When is the cannonball moving upward? downward?

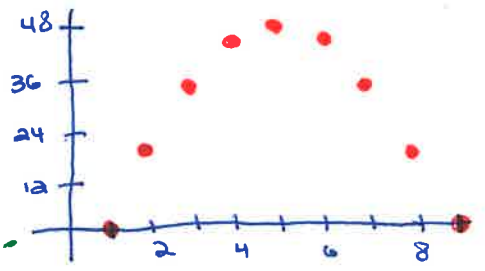
HITS GROUND AT $t = 9$ SECONDS

HIGHEST POINT AT $t = 5$ SECONDS

AT A HEIGHT OF 48 FEET.

MOVING UP ON INTERVAL (1, 5)

AND DOWN ON INTERVAL (5, 9).

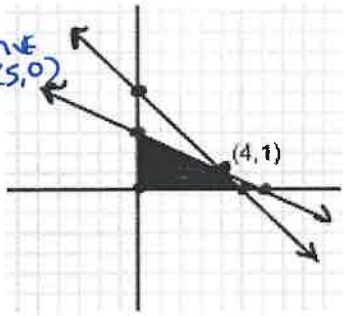


14. The graph is given. The feasible region based upon certain constraints is shown in the graph for the objective function f (x, y) = 7x + 6y .

Show your work to determine the Min and Max.

a. Max: 35
b. Min: 0

TEST CORNER POINTS IN OBJECTIVE (0,0), (0,3), (4,1), (5,0)



f(0,0) = 0
f(0,3) = 18
f(4,1) = 34
f(5,0) = 35

15. Solve the system. **SHOW OR EXPLAIN YOUR METHOD TO SOLVE.**

x + y + z = 3

x - 3y + z = -5

x + y - z = 9

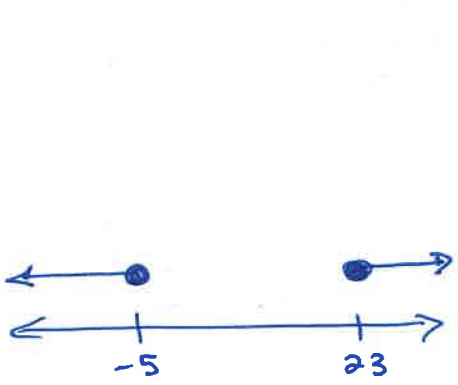
(4, 2, -3)

16. What is the average rate of change of f(x) over the interval [-3,2].
SHOW WORK TO JUSTIFY YOUR ANSWER.

x	f(x)
-3	-3
-2	-5
-1	-3
0	3
2	13
3	27

$\frac{16}{5}$

17. Solve and Graph |9 - x | ≥ 14 ?

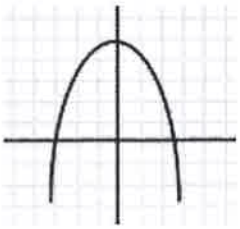


x ≤ -5
OR
x ≥ 23

18. Given the function f(x) = x^2 + 5x + 3 state:
Equation for Axis of symmetry x = -2.5, Vertex (-2.5, -3.25)

19. Given the graph at the right, what are the apparent roots of the equation related to the function graphed on the coordinate grid?

(-3,0), (2.5,0)



20. Simplify i^{266}

-1

21. Multiply binomials (4 + 3i)(- 6 - 4i)

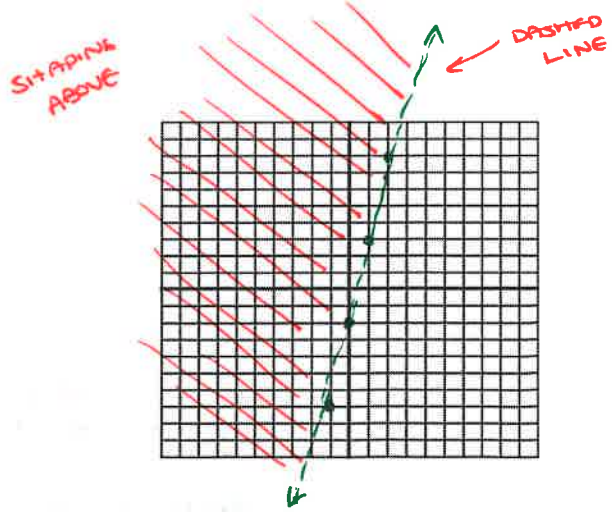
-12 - 34i

22. Factor $8x^2$ - 10x - 18

2(4x - 9)(x + 1)

8. Graph of the inequality $5x - y < 2$.

Remember dashed/solid, shading, etc.



9. Solve $5x + 2 = -(4x + 3)$

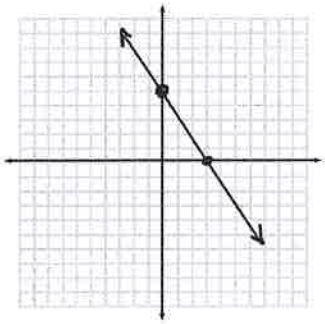
$x = \frac{-5}{9}$

10. This graph best represents the solution of which inequality?

2 CORRECTION

a. $x < \frac{2}{3}$ b. $x \leq -\frac{2}{3}$ c. $x > -\frac{2}{3}$ d. $x \leq -\frac{2}{3}$

11. The graph of the line is shown at the right.



Find m = $\frac{-5}{3}$

Find b = 5

Find mb = $(\frac{-5}{3})(5) = -\frac{25}{3}$

12. What is the solution to the system of equations?
SHOW OR EXPLAIN YOUR METHOD TO SOLVE.

$2x + 6y = 18$

$2x + 8y = 4$

(30, −7)

13. Identify the solution **region** represented by the system of inequalities:

Show work.

REGION B IS SOLUTION REGION.

$7x - 5y < -4$

$3x + 4y \leq 8$