Student Name: _____

Algebra 2 Packet

Day 1	Day 2	Day 3	Day 4	Day 5
Linear & Exponential Application Problems Algebra 2 School Closing Packet #1-10 A2.FLQE.1	Linear & Exponential Application Problems Algebra 2 School Closing Packet #11-20 A2.FLQE.1	Linear vs Exponential Card Match Match each problem to the correct function and graph. A2.FLQE.1	Linear vs Exponential Card Match Match each problem to the correct table and statement. A2.FLQE.1	Linear vs Exponential

Algebra 2

School Closing Work Packet

Attached you will find multiple choice problem sets, activities and projects that will be completed while school is not in session.

For each multiple-choice problem, you must justify your answer choices for every question by either:

- showing the mathematical calculation you used.
- writing a detailed explanation of your reasoning for the correct answer.
- writing a detailed explanation of why the other choices are wrong.

For Example:

1. Which expression is equivalent to: $2(3x - 4) + 9x + 7$?

A. $15x + 3$ B. $15x - 1$ C. $12x + 3$ D. $24x + 6$

Mathematical Calculation Example

2. Which of the following is a linear function?

A. $y = 15xy + 3$ B. $15x + y^2 = -1$ C. $y = 12x^2 + 3$ D. $24x + 6$

Explaining the correct answer choice

D is the answer. A linear function must have a 'y' and cannot include multiplying variables or have exponents

3. Which of the following is not a rational number?

A. 15 B. $\sqrt{3}$ C. $\frac{12}{13}$ D. $4.\overline{3}$

Name: _____   **Date:** _____

1. Thomas rented a van for $75 a day plus $0.25 for each mile that he would go over 3,000 miles. How can Thomas represent the cost, C, of renting the van for d days and driving for m miles

3. The total cost (c) in dollars of renting a sailboat for n days is given by the equation

    $$c = 120 + 60n.$$

    A. 2   B. 4   C. 6   D. 8

4. Keith uses this formula to calculate the monthly profit of his bicycle store.

    $$P = 400n - 7,200$$

    In the formula, P is the monthly profit and n is the number of bicycles sold in a month. How many bicycles must he sell to make a profit of exactly $2,000 in a month?

    A. 13 bicycles   B. 17 bicycles

    C. 23 bicycles   D. 25 bicycles

2.

School Supplies	
Notepads	$1.00
Binders	$5.49
Markers	$2.59
Pencils	$1.89
Pens	$2.29

The sign shows the prices of various school supplies. Hans bought some notepads and pencils and spent $9.57. Which equation represents this situation?

A. $3.88x = 9.57$

B. $9.57 - x = y$

5. Jason's part-time job pays him $155 a week. If he has already saved $375, what is the minimum

6. A radioactive substance has an initial mass of 100 grams and its mass halves every 4 years. Which expression shows the number of grams remaining after t years?

   A. $100(4)^{\frac{t}{4}}$ B. $100(4)^{-2t}$

7. Mr. Smith invested $2,500 in a savings account that earns 3% interest compounded annually.

   He made no additional deposits or withdrawals. Which expression can be used to determine the number of dollars in this account at the end of 4 years?

   A. $2500(1 + 0.03)^4$ B. $2500(1 + 0.3)^4$

   C. $2500(1 + 0.04)^3$ D. $2500(1 + 0.4)^3$

9. The current population of a town is 10,000. If the population, P, increases by 20% each year, which equation could be used to find the population after t years?

   A. $P = 10,000(0.2)^t$ B. $P = 10,000(0.8)^t$

   C. $P = 10,000(1.2)^t$ D. $P = 10,000(1.8)^t$

10. Kathy deposits $25 into an investment account with an annual rate of 5%, compounded annually. The amount in her account can be determined by the formula $A = P(1 + R)^t$, where P is the amount deposited, R is the annual interest rate, and t is the number of years the money is invested. If she makes no other deposits or withdrawals, how much money will be in her account at the end of 15 years?

11. An online music club has a one-time registration fee of $13.95 and charges $0.49 to buy each song. If Emma has $50.00 to join the club and buy songs, what is the maximum number of songs she can buy?

A. 73   B. 74   C. 130   D. 131

14. Paula currently has x pencils. She determines that buying 8 more pencils will give her the same number of pencils as if she bought 2 more and then doubled the amount of pencils she has. The equation shown represents this situation.

$$x + 8 = 2(x + 2)$$

How many pencils does Paula currently have?

A. 2 pencils   B. 4 pencils

C. 6 pencils   D. 14 pencils

12. Dan went to a craft fair where he spent a total of $16.00. He spent $6.00 on admission and went to 8 tables. He spent the same amount of money (m) at each table. The following number sentence can be used to find how much money he spent at each table.

$$16 = 6 + 8m$$

How much money did Dan spend at each table?

A. $0.50   B. $0.80   C. $1.25   D. $2.00

15. A group of four friends each mowed lawns after school and on the weekends for a month. The total number of lawns mowed can be represented by the equation below.

$$x + \tfrac{1}{3}x + \tfrac{1}{2}x + 16 = 49$$

Each friend is represented by a term in the

13. Matthew cleaned the garage in 2.5 hours. He was paid x dollars per hour. He then spent $3 and had $12 remaining. The following equation represents this situation.

$$2.5x - 3 = 12$$

16. If $5000 is invested at a rate of 3% interest compounded quarterly, what is the value of the investment in 5 years? (Use the formula $A = P\left(1 + \tfrac{r}{n}\right)^{nt}$ where A is the amount accrued, P

is the principal, r is the interest rate, n is

17. The following exponential function describes the

19. The growth of bacteria in a dish is modeled by

A. 12   B. 18   C. 24   D. 36

20. Alan won \$2,000 in an essay contest. He invested the money in a savings account which pays 6% interest compounded annually. Consider the

formula:

$$A(t) = A_0(1 + r)^t, \text{ where}$$

Match each problem with the appropriate function, graph, table and statement. Provide any values, functions or statements that are missing from the given cards. Glue the cards in the appropriate spot in the given table.

	Problem	Function	Graph	Table	Statement
P1	Investment: $400 Simple Interest Rate: 16%				
P2	Investment: $400 Compound Interest Rate: 2%				
P3	Investment: $400 Simple Interest Rate: 8%				

P4

Investment: $200
Compound Interest
Rate: 2%

P5

Investment: $400
Compound Interest
Rate: 8%

P6

Investment: $400
Simple Interest Rate:
2%

$6.\sqrt{3}$

Years	Value
0	400.00
1	432.00
2	466.56
3	
4	544.20
5	587.73

Years	Value
0	200.00
1	204.00
2	
3	212.24
4	216.49
5	220.82

T4

Years	Value
0	400.00
1	408.00
2	
3	424.00
4	432.00
5	440.00

Years	Value
0	400.00
1	408.00
2	
3	424.48
4	432.97
5	441.63

T5   G5

Years	Value
0	400.00
1	432.00
2	464.00
3	
4	528.00
5	560.00

Years	Value
0	400.00
1	464.00
2	
3	592.00
4	656.00
5	720.00

D. $4.\overline{3}$

C. $\frac{12}{13}$
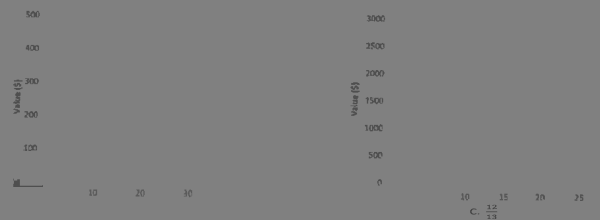
aking   oney?

Mary is going to invest some money. She sees two advertisements.

1. Mary invests $200 in each bank.
   Use a calculator to figure how much she will have in each bank at the end of each year.

0	200.00	200.00
1	220.00	
2		
3		
4		
5		

2. Which of the graphs below best shows how Mary's money will grow in each bank?

Graph A   Graph B   Graph C

Value of
Mary's
money

Value of
Mary's
money

Value of
Mary's
money

Years after Mary invests $200   Years after Mary invests $200   Years after Mary invests $200

(a) The growth of her money at Simply Savings is best shown by graph

The Quadratic Caper

"Quadratic Fanatic, we need your help!" declared the voice on the answering machine.

While he was out helping solve the town's problems, a crime had occurred at the Function Factory. It was now up to the Quadratic Fanatic to straighten things out.
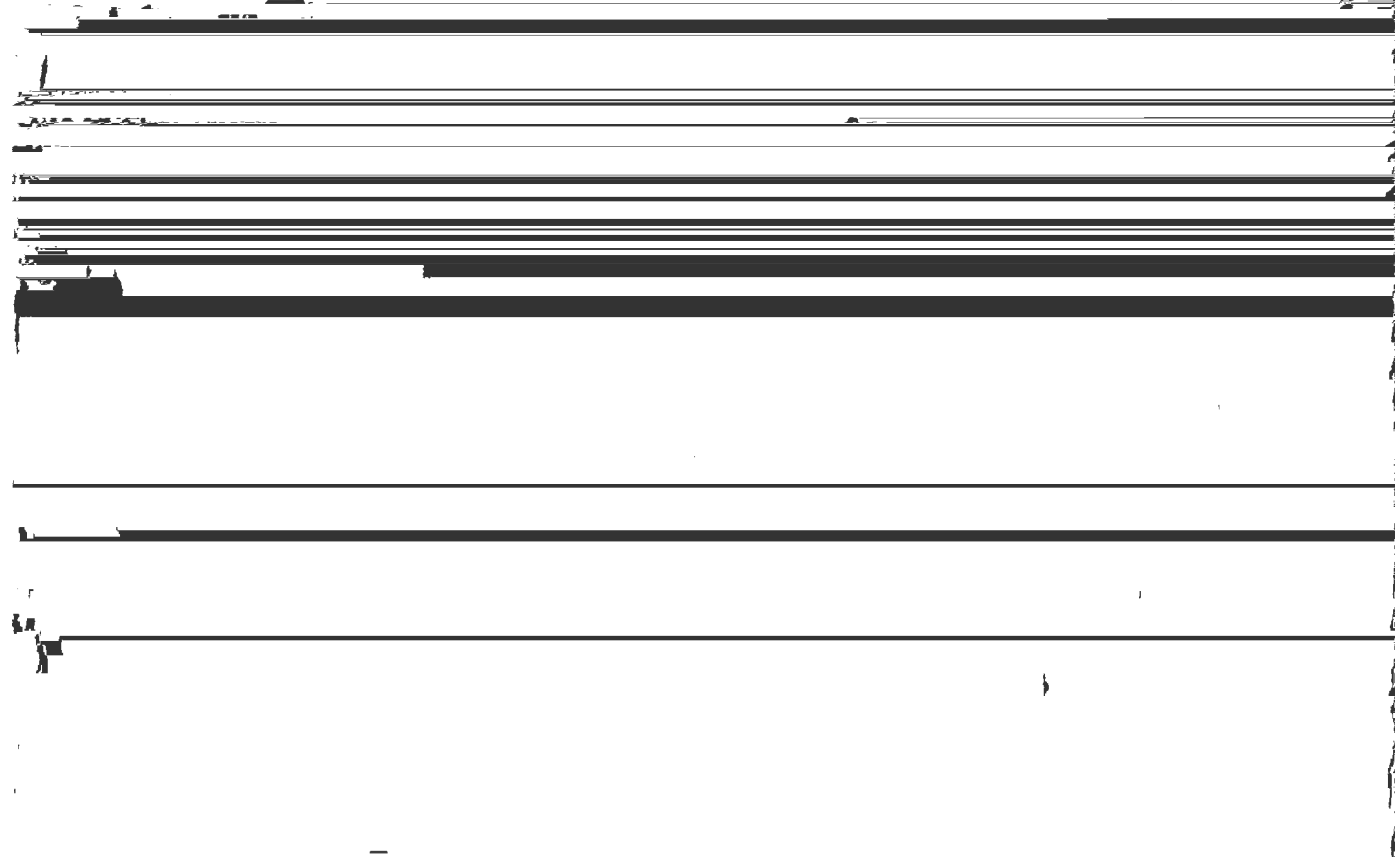
According to several witnesses, the following information about the suspect was gathered:

"He was shifted up three." Which of the employees above could be suspects?

"His axis of symmetry was $x = -4$." Which of the employees above could be suspects?
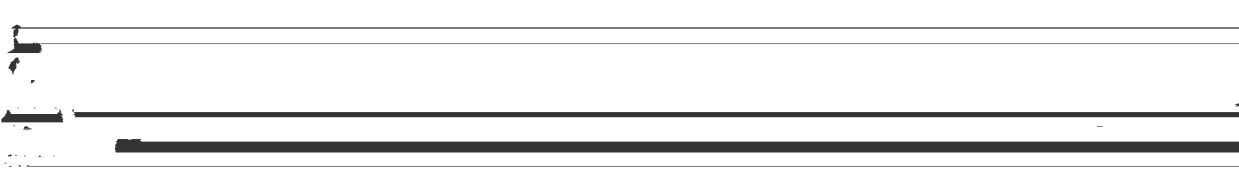
The employees from the **second** shift were all quadratic functions in standard form. "They always follow standard procedure," said the manager.

The list of suspects from the **second** shift is below. For each suspect, factor and find its solutions.

Function	Factors	First Solution	Second Solution
H. $g(x) = 3x^2 - 10x + 3$			
I. $g(x) = 3x^2 - 21x + 30$			
J. $g(x) = 2x^2 - 2x - 4$			
K. $g(x) = x^2 - x - 12$			
L. $g(x) = x^2 + 3x - 18$			
M. $g(x) = x^2 - 12x + 35$			
N. $g(x) = 5(x - 4)^2 - 125$			

According to a several witnesses, the following information about the suspect was gathered:

"Both solutions were integers." Which of the employees above could be suspects?

"One of the solutions was negative." Which of the employees above could be suspects?

"One of the solutions was two." Which of the employees above could be suspects?

"One of the solutions was negative one." Which of the employees above could be suspects?

Based on the above information, which employee from **second** shift is guilty? Justify your answer.

The employees from the **third** shift were also quadratic functions in standard form. "Most of them seem complex, but it could just be my imagination," said the manager.

The list of suspects from the **third** shift is below. For each suspect, use the quadratic formula to find its solutions.

Function	Values of a, b, and c	Quadratic Formula	Solutions
O. $h(x) = 2x^2 + 3x - 2$			
P. $h(x) = x^2 - 2x - 1$			
Q. $h(x) = 2x^2 - 2x + 1$			
R. $h(x) = 2x^2 - 5x - 3$			
S. $h(x) = \frac{1}{2}x^2 - 3x + 2$			
T. $h(x) = x^2 - 6x + 10$			
U. $h(x) = x^2 + 4x - 1$			

According to a several witnesses, the following information about the suspect was gathered:

"The solutions were imaginary." Which of the employees above could be suspects?

"The solutions were not radical." Which of the employees above could be suspects?

"The solutions did not involve fractions." Which of the employees above could be suspects?

Based on the above information, which employee from **third** shift is guilty? Justify your answer.

What three functions committed the crime?

BONUS: What mode of transportation did they use to make their getaway?

Part 4:

The police have asked you to list any aliases the suspects go by and which gang (axis) they belong to:

- o Second shift Standard form: _____

- o Second shift Factored form: _____

- o Second shift Vertex form: _____

- o First shift Axis of Symmetry: _____

  - ▪ Third shift Standard form: _____

  - ▪ Third shift Factored form:

  - ▪ Third shift Vertex form:

  - ▪ First shift Axis of Symmetry·

The police have asked you to create a sketch of each subject.

- First shift should be graphed in RED
- Second shift should be graphed in BLUE
- Third shift should be graphed in GREEN

Make sure you label:

- The vertex of each suspect
- The roots of each suspect (if they are imaginary write them next to the graph in the appropriate color)
- The axis of symmetry for each suspect
- The y-intercept for each suspect

15

10

-10   -8   -6   -4   -2   0   2   4   6   8

-5

-10

-15

-20

25

-30

-35