

# Discovering Math: Exploring Algebra

## Teacher's Guide

**Grade Level:** 6–8

**Curriculum Focus:** Mathematics

**Lesson Duration:** Three class periods

### Program Description

*Discovering Math: Exploring Algebra* – From using expressions to represent relationships to solving simple inequalities, introduce students to more advanced properties of functions and algebra.

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### Lesson Plan

#### *Student Objectives*

- Represent descriptions of quantities as expressions and equations.
- Choose an appropriate chart, table, or graph to display a given data set.
- Identify maxima and minima within data sets.
- Identify, graph, and solve linear functions.
- Graph and solve systems of equations.

#### *Materials*

- *Discovering Math: Exploring Algebra* video
- Computer with Internet access
- Maps of the United States
- Travel magazines
- Grocery store circulars
- Calculator

#### *Procedures*

1. Display the words *equation* and *expression*. Ask students to define and compare the two words. Have them share and explain their ideas. Ask them to give examples of situations in everyday life that can be represented by expressions and equations and discuss the differences.
2. Tell students they will be planning a five-day trip. They will be calculating and graphing daily mileage, time, and gas usage.

- Provide maps, Internet resources, or travel magazines for students to use. Have them locate their hometown and a trip destination on a map, as well as four locations in between that they will visit during the journey. Students will need to think about car speed and time in order to choose appropriate locations.
  - Have students create a chart that lists the beginning and ending points for each travel day and calculate the distance they will travel each day. Then record how they would spend the time (use categories such as driving, sightseeing, eating, and resting).
    - Students should write one equation to calculate the distance traveled each day and a second equation to calculate the cumulative distance traveled after each day.
    - Have students create a line graph to display the distance traveled each day.
      - The x-axis should display the total time divided into 10-hour increments.
      - The y-axis should display the total distance.
  - Review the definition of a linear function and share examples with the class.
    - Ask students if their graphs are linear. Have them explain, using algebraic terms, why their graph is linear or nonlinear.
  - Review the definitions of maxima and minima. Have students find the maximum and minimum distance values on their graphs.
3. Students can use algebra and algebraic expressions and equations to calculate the following information:
- Express gas usage as a function.
  - Use function to calculate amount of gas used.
  - Calculate amount of money spent daily and for the whole trip on gas.
4. Ask students to describe a function. Have them share and explain their thoughts and ideas. A function is a change in one quantity that results in the change of another quantity.

Tell students they will be describing functions using grocery store advertisements.

- Distribute a grocery store circular to each student. Have them select five pricing schemes from the circular. Ask them to describe the prices as a function of amount (number or weight) of the item purchased. Then ask them to classify each pricing scheme as linear or nonlinear.
- Have students share their examples and explain the functions. They can pose questions to one another using the functions they identified.

### Assessment

Use the following three-point rubric to evaluate students' work during this lesson.

- **3 points:** Students clearly demonstrated the ability to represent phrases and sentences as expressions and equations; clearly understood and identified the maxima and minima in a

data set; demonstrated an understanding of what makes certain functions linear and what techniques can be used to graph and solve linear functions; and clearly defined and modeled functions.

- **2 points:** Students satisfactorily demonstrated the ability to represent phrases and sentences as expressions and equations at least 80% of the time; satisfactorily understood and identified the maxima and minima in a data set at least 80% of the time; satisfactorily demonstrated an understanding of what makes certain functions linear and what techniques can be used to graph and solve linear functions; and partially defined and modeled functions.
- **1 point:** Students did not demonstrate the ability to represent phrases and sentences as expressions and equations; did not demonstrate the ability to identify the maxima and minima in a data set; did not demonstrate an understanding of what makes certain functions linear and what techniques can be used to graph and solve linear functions; and did not define or model functions.

## Vocabulary

### equation

*Definition:* A mathematical statement that contains an equals sign

*Context:* Maria translated the phrase “there were 54 cars on the lot after the dealership received 18 new cars” to the equation  $c + 18 = 54$ .

### expression

*Definition:* A mathematical statement that does not contain an equals sign

*Context:* Maria translated the phrase “18 more cars than before” to the mathematical expression  $c + 18$ .

### function

*Definition:* A change in one quantity that results in the change of another quantity

*Context:* The input-output table represents a function:

Input X	2	3	4
Output Y	10	15	20

### geometric progression

*Definition:* A sequence in which terms differ by a constant multiplicative factor

*Context:* John is given the sequence 1, 3, 9, 27... and finds the quotient of successive terms to deduce that this is a geometric progression. He can then find the next terms in the progression:  $27(3) = 81$ ;  $81(3) = 243$ ...

### **linear function**

*Definition:* A function whose graph produces a straight line

*Context:* Jose knows he should eat five servings of fruit every day and made a graph of the number of servings he should eat in  $n$  days:  $f = 5n$ . He recognizes this as a linear function because it produced a graph that is a straight line.

### **maxima**

*Definition:* The largest value attained by a graph or data set

*Context:* Gerald looked at his test scores (84, 96, 90, and 91) and saw that the maxima was 96.

### **minima**

*Definition:* The smallest value attained by a graph or data set

*Context:* Gerald looked at his test scores (84, 96, 90, and 91) and saw that the minima was 84.

### **system**

*Definition:* Two or more equations meant to be solved simultaneously

*Context:* Sarah knows that it takes George five minutes longer to get to school than it takes her, and she knows that driving from her home to school to George's home takes 55 minutes. She uses this information to write the system of equations  $x + y = 55$ ,  $x = y + 5$ .

## *Academic Standards*

### **Mid-continent Research for Education and Learning (McREL)**

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit <http://www.mcrel.org/compendium/browse.asp>.

This lesson plan addresses the following benchmarks:

- Knows that an expression is a mathematical statement using numbers and symbols to represent relationships and real-world situations (e.g., equations and inequalities with or without variables).
- Understands that a variable can be used in many ways (e.g., as a placeholder for a specific unknown, such as  $x + 8 = 13$ ; as a representative of a range of values, such as  $4t + 7$ ).
- Understands various representations (e.g., tables, graphs, verbal descriptions, algebraic expressions, Venn diagram) of patterns and functions and the relationships among them.
- Understands the basic concept of a function (i.e., functions describe how changes in one quantity or variable result in changes in another).
- Solves linear equations using concrete, informal, and formal methods (e.g., using properties, graphing ordered pairs, using slope-intercept form).
- Solves simple inequalities and non-linear equations with rational number solutions, using concrete and informal methods.
- Understands special values (e.g., minimum and maximum values,  $x$ - and  $y$ -intercepts, slope, constant ratio or difference) of patterns, relationships, and functions.

- Understands basic operations (e.g., combining like terms, expanding, substituting for unknowns) on algebraic expressions.
- Uses the rectangular coordinate system to model and to solve problems
- Solves simple systems of equations graphically.
- Understands the properties of arithmetic and geometric sequences (i.e., linear and exponential patterns).

### **National Council of Teachers of Mathematics (NCTM)**

The National Council of Teachers of Mathematics (NCTM) has developed national standards to provide guidelines for teaching mathematics. To view the standards online, go to <http://standards.nctm.org>.

This lesson plan addresses the following standards:

- Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules.
- Relate and compare different forms of representation for a relationship.
- Identify functions as linear or nonlinear and contrast their properties from tables, graphs, or equations.
- Develop an initial conceptual understanding of different uses of variables.
- Explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope.
- Use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships.
- Recognize and generate equivalent forms for simple algebraic expressions and solve linear equations.
- Model and solve contextualized problems using various representations, such as graphs, tables, and equations.
- Use graphs to analyze the nature of changes in quantities in linear relationships.
- Recognize and use connections among mathematical ideas.
- Select, apply, and translate among mathematical representations to solve problems.

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### **Support Materials**

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the [Discoveryschool.com](http://school.discovery.com) Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- <http://school.discovery.com/teachingtools/teachingtools.html>
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## DVD Content

This program is available in an interactive DVD format. The following information and activities are specific to the DVD version.

### How to Use the DVD

The DVD starting screen has the following options:

**Play Video** – This plays the video from start to finish. There are no programmed stops, except by using a remote control. With a computer, depending on the particular software player, a pause button is included with the other video controls.

**Video Index** – Here the video is divided into chapters indicated by title. Each chapter is then divided into four sections indicated by video thumbnail icons; brief descriptions are noted for each section. To play a particular segment, press Enter on the remote for TV playback; on a computer, click once to highlight a thumbnail and read the accompanying text description and click again to start the video.

**Quiz** – Each chapter has four interactive quiz questions correlated to each of the chapter's four sections.

**Standards Link** – Selecting this option displays a single screen that lists the national academic standards the video addresses.

**Teacher Resources** – This screen gives the technical support number and Web site address.

### Video Index

#### I. Expressions and Statements (9 min.)

##### **Expressions and Statements: Introduction**

Explore equations and expressions and see how single numbers, variables, operations, and relationship symbols are used in mathematical statements.

##### **Example 1: Expressions and Equations**

Take a closer look at equations and expressions and see how they are used to represent the change in the number of London taxis from 1986 to 2005.

##### **Example 2: Equations Using Variables**

Investigate how variables are used in equations and how they can represent an unknown quantity.

##### **Example 3: Inequalities**

Take a look at inequality statements and see how they are used to calculate and represent the number of cars that can safely drive over the Brooklyn Bridge at one time.

## II. Uses of Variables (10 min.)

### Uses of Variables: Introduction

Explore variables, symbol that represents a number or an unknown value, and see how they can represent a single number or a range of numbers.

### Example 1: Variables for Unknown Quantities

Examine how variables can represent unknown quantities and learn how to solve an equation with a variable.

### Example 2: Variables for Ranges of Values

See how variables can represent a range of values and learn how to write and solve equations with a variable that represents a range of values.

### Example 3: Variables for Ranges

Take a closer look at variables and see how the area of rainforests are compared using equations containing variables.

## III. Patterns and Functions (8 min.)

### Patterns and Functions: Introduction

Explore functions, relationship between two numbers, and see how they can be represented in tables, graphs, and equations.

### Example 1: A Function Expressed in a Table

Learn how to express a function in a table and take a closer look at a function as a relationship between numbers where the value of one number depends on one or more other values.

### Example 2: A Function Expressed in a Graph

See how a function can be represented on a graph.

### Example 3: Algebraic Equations Expressing a Function

Investigate how an equation can represent a function by determining the number of centimeters the city of Venice has sunk using an algebraic equation to represent the function between distance and time.

## IV. Defining Functions (8 min.)

### Defining Functions: Introduction

Explore functions as a change in one quantity that results in the change of another quantity.

### Example 1: One Variable in Terms of Another

Take a closer look at functions by determining the total distance of a race in a velodrome using an equation that represents the function between laps and distance.

### Example 2: Independent and Dependent Variables

Examine independent and dependent variables. In a function the independent variable can vary and is not determined by another value, but the dependent variable depends on the value of another variable.

**Example 3: Graphing a Function**

Represent a function in a graph using a coordinate plane to graph the function of the number of laps and distance a person swam.

**V. Solving Linear Equations (10 min.)**

**Solving Linear Equations: Introduction**

Explore a variety of strategies for evaluating an equation, including guess-and-check and isolating the variable using inverse operations.

**Example 1: Balance Model and Guess-and-Check**

Take a closer look at the guess-and-check strategy and balance model method to evaluate an equation.

**Example 2: Inverse Operations for Isolating Variables**

Learn how to solve an equation using inverse operations.

**Example 3: Graphing to Solve Equations**

Learn how to solve an equation by graphing coordinate pairs.

**VI. Solving Inequalities and Non-Linear Equations (11 min.)**

**Solving Inequalities and Non-Linear Equations: Introduction**

Explore non-linear equations. When graphed they do not produce straight lines and they can contain more than one variable in a term or variables raised to more than the first power.

**Example 1: Inequality on a Number Line**

Examine how statements of inequality identify one value as less than or greater than another value.

**Example 2: Concrete Solution to a Quadratic Equation**

Solve a quadratic equation – an equation in which the highest power of an unknown quantity is squared.

**Example 3: Guess-and-Check**

See how the guess-and-check strategy is useful when evaluating equations with large numbers by estimating the size of the Earth.

**VII. Special Values of Patterns, Relationships, and Functions (10 min.)**

**Special Values of Patterns, Relationships, and Functions: Introduction**

Explore linear functions. They contain one variable that is entirely dependent on the other variable and produce a straight line on a graph.

**Example 1: Patterns and Functions with Minimum and Maximum Values**

Learn how to describe the minimum value, lowest number, and maximum value in a data set.

**Example 2: Linear Functions, Slope, and Intercepts**

Examine linear functions, slope, and intercepts by determining the timing of a fireworks launch.

**Example 3: Non-Linear Functions, Maxima and Minima**

Take a look at non-linear functions and see how graphing the function of a bouncing ball produces one maximum, several local maxima, and one minimum.

**VIII. Basic Operations on Algebraic Expressions (11 min.)**

**Basic Operations on Algebraic Expressions: Introduction**

Explore algebraic expressions and see how they consist of numbers, variables, and operations.

**Example 1: Substituting for Variables**

Investigate how variables are used in algebraic expressions to represent unknown, undetermined, or changing values.

**Example 2: Expanding Expressions and Combining Like Terms**

See how the distributive property is used to expand an expression and how an expression can be simplified by combining like terms.

**Example 3: Expanding, Combining and Substituting**

Take a closer look at how the distributive property and combining like terms are used to simplify an algebraic expression and learn how to substitute the values for the variables.

**IX. Rectangular Coordinate System for Problems (9 min.)**

**Rectangular Coordinate System for Problems: Introduction**

Latitude and longitude lines create a rectangular coordinate grid on the Earth that is used to identify and determine distances between locations.

**Example 1: Plotting to Model and Solve Problems**

Plot numerical values on a grid to solve a problem and see how a rectangular coordinate system can identify a goal and solve a problem.

**Example 2: Distance Between Two Points**

See how scientists use a rectangular coordinate system to plot and study the movement of ants.

**Example 3: Solving for Values With Defined Relationships**

Use a grid to solve a problem involving two variables with a defined ratio and see how the intersecting point identifies the solution.

**X. Graphic Solutions of Simple Systems of Equations (11 min.)**

**Graphic Solutions of Simple Systems of Equations: Introduction**

Explore systems of equations, groups of equations that show relationships among the same variables.

**Example 1: Pair of Linear Equations**

Learn how to graph two linear equations to identify the relationship between the variables and discover how graphing two equations shows the value at which both equations are true.

**Example 2: Linear and Quadratic Equations**

Learn how to graph linear and quadratic equations with the same variables and see how the point where the lines intersect identifies the variable values that satisfy both equations.

**Example 3: Multiple Equations**

Examine how to graph a system of quadratic equations to identify the variable values that satisfy both equations.

**XI. Properties of Arithmetic and Geometric Sequences (9 min.)**

**Properties of Arithmetic and Geometric Sequences: Introduction**

Explore arithmetic and geometric sequences and see how they increase or decrease by the same number or ratio.

**Example 1: Arithmetic Sequence**

Take a closer look at an arithmetic sequence and discover that there is a constant difference between the terms in the sequence.

**Example 2: Increasing Geometric Sequence**

Investigate geometric sequences that increase or decrease by a constant ratio of one term to the previous term.

**Example 3: Decreasing Geometric Sequences**

Discover how carbon dating is an example of a geometric sequence where the numbers in the sequence continue to decrease in a constant ratio.

*Quiz*

**I. Expressions and Statements**

1. Bob is two years older than Sue. Which equation represents this statement if Bob's age =  $x$  and Sue's age =  $y$ ?
  - A.  $x = y$
  - B.  $x + 2 = y$
  - C.  $x = y + 2$
  - D.  $x = y - 2$

*Answer: C*

2. If  $m = 4,000 + 2,5000$ , then  $m =$  \_\_\_\_
  - A. 1,500
  - B. 2,500
  - C. 6,000
  - D. 6,500

*Answer: D*

3. What is the value of  $x$  in the equation?  $63 = x - 24$
- A. 39
  - B. 41
  - C. 87
  - D. 91

*Answer: C*

4. An elevator can hold 2,000 pounds and the average weight of a person is about 175 pounds. If  $w$  = the number of people that can safely ride the elevator at one time, which inequality statement is true?
- A.  $w < 12$
  - B.  $w < 175$
  - C.  $w > 12$
  - D.  $w > 175$

*Answer: A*

## II. Uses of Variables

1. Alice had 24 comic books in her collection and her mom bought her some more. Now Alice has a total of 43 comic books in her collection. Which equation could you use to find out how many comic books Alice's mom bought?
- A.  $24 - c = 43$
  - B.  $43 + 24 = c$
  - C.  $24 + c = 43$
  - D.  $43 + c = 24$

*Answer: C*

2. If  $r > 84$  and  $r < 120$ , what could be the value of  $r$ ?
- A. 62
  - B. 74
  - C. 101
  - D. 136

*Answer: C*

3. Five years ago David planted a garden that was 7 feet long and 10 feet wide. Now the garden is 8 feet wide and 9 feet long. What do you know about the area of the garden?
- A. The area of the garden has increased.
  - B. The area of the garden has decreased.
  - C. The length of the garden has decreased.
  - D. The area of the garden has remained the same.

*Answer: A*

### III. Patterns and Functions

1. Identify the number that completes the function table.

- A. 4
- B. 14.5
- C. 152
- D. 232

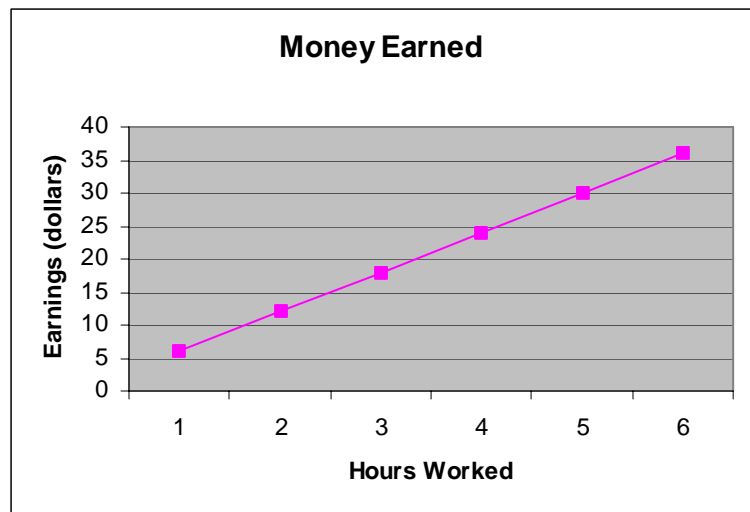
*Answer: D*

Input	Output
25	100
36	144
47	188
58	?

2. The graph shows the function between the number of hours Hank works and the money he earns. How much money would he earn if he worked nine hours?

- A. \$6
- B. \$15
- C. \$42
- D. \$54

*Answer: D*



3. Sam determined that the height of the tree is a function of its age – the height is two times the age (in feet). If a tree's age is  $a$  and its height is  $h$ , which equation correctly represents the function?

- A.  $h = a + 2$
- B.  $a = 2h$
- C.  $h = 2a$
- D.  $a = 2 + h$

*Answer: C*

#### IV. Defining Functions

1. The distance of a go-cart race can be represented as  $d = f(l) = 0.5 \text{ miles} \times l$ , where distance is a function of the number of laps ( $l$ ). How long is a 30-lap go-cart race?
  - A. 15 miles
  - B. 30 miles
  - C. 45 miles
  - D. 150 miles

*Answer: A*

2. The distance of a race in a velodrome be represented as  $d = f(l) = 300 \text{ meters} \times l$ , where distance is a function of the number of laps ( $l$ ). How long is a 25-lap race?
  - A. 12 meters
  - B. 275 meters
  - C. 7,200 meters
  - D. 7,500 meters

*Answer: D*

3. The distance a swimmer swims can be expressed as a function where  $d = f(l) = 100 \text{ meters} \times l$ . A swimmer swims 10 laps ( $l$ ) for a total of 1,000 meters. Identify the independent variable.
  - A. 1,000 meters
  - B. 100 meters
  - C. 10 laps
  - D. 1 swimmer

*Answer: C*

#### V. Solving Linear Equations

1. Solve for  $s$ .
$$630 = s + 236$$
  - A. 394
  - B. 404
  - C. 494
  - D. 866

*Answer: A*

2. Solve for  $v$   
 $300 + 5v = 20v$   
A. 14  
B. 20  
C. 64  
D. 285

**Answer: B**

3. Olivia decides to use a graph to solve an equation by plotting two sets of points and connecting them with two lines. What does she know about the lines?  
A. The lines will intersect at only one point.  
B. The slope of the two lines will be less than zero.  
C. The lines will intersect at several points within the grid.  
D. The points will have no order and she won't be able to connect them.

**Answer: A**

## VI. Solving Inequalities and Non-Linear Equations

1. Ian wrote the following equation:  $KE = \frac{1}{2}mv^2$ . What type of equation did he write?  
A. linear equation  
B. slope equation  
C. non-linear equation  
D. mono-variable equation

**Answer: C**

2. Bob has \$5, Jake has \$9, and Ken has \$8. They want to spend their money on snacks at the fair. Which inequality statement correctly represents the amount of money they can spend at the fair?  
A.  $s \leq \$22$   
B.  $s \geq \$22$   
C.  $\$22 \leq s$   
D.  $s = \$22 + s$

**Answer: A**

3. Identify the quadratic equation.  
A.  $y = 32 - 8x$   
B.  $y = 24 + 12x^3$   
C.  $y = 68 + 14x$   
D.  $y = 48 - 10x^2$

**Answer: D**

4. Use the guess-and-check strategy to solve for  $m$ .

$$m^2 = 2,500 + 204$$

- A. 45
- B. 50
- C. 52
- D. 58

*Answer: C*

## VII. Special Values of Patterns, Relationships, and Functions

1. Oliver wants to graph a linear function. What will he notice on his graph?
- A. It is not possible to graph the linear function.
  - B. The function will be represented by a curved line.
  - C. The function will be represented by a straight line.
  - D. The function will be represented by random plots on the graph.

*Answer: C*

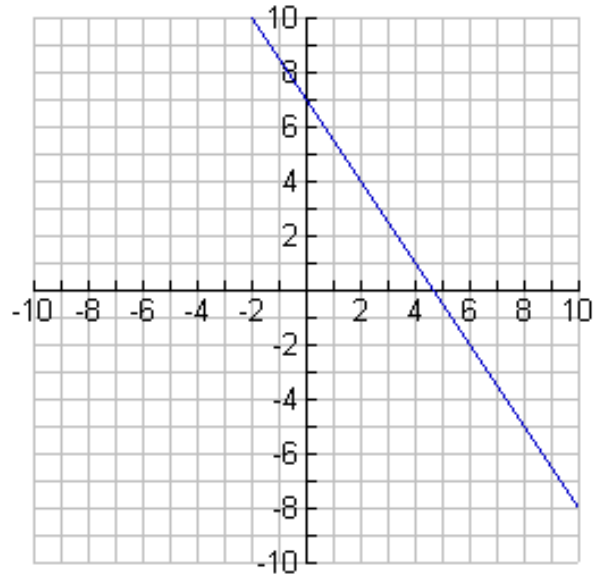
2. The amount of calories burned on a treadmill is a function of the time spent on the treadmill. What is the maximum value?
- A. 15
  - B. 30
  - C. 150
  - D. 300

*Answer: D*

Time Spent Running (in minutes)	Calories Burned
15	150
20	200
25	250
30	300

3. Identify the y-intercept.
- A. 7
  - B. 5
  - C. -2
  - D. -8

*Answer: A*



4. The path a soccer ball follows is a non-linear function where the height is a function of the ball's horizontal location. When this function is graphed, the height of the ball at its peak is the maximum value. What is the slope at this point on the graph?
- A. -1
  - B. 0
  - C. 1
  - D. 10

*Answer: B*

### VIII. Basic Operations on Algebraic Expressions

1. Identify the term in the following algebraic expression:
- $$4a + c - d^2 \geq 125$$
- A.  $c$
  - B.  $d^2$
  - C. 125
  - D.  $4a$

*Answer: D*

2. Evaluate the expression.

- A. 207
- B. 314
- C. 902
- D. 1,015

$$\begin{aligned} r &= 34 \\ s &= 73 \\ t &= 87 \\ (5r) + (8s) + (3t) \end{aligned}$$

**Answer: D**

3. Simplify the expression.

$$9(r + s) + 6(5r + 3s)$$

- A.  $66rs$
- B.  $39r + 27s$
- C.  $21r + 19s$
- D.  $9r + 9s + 30r + 18s$

**Answer: B**

4. Simplify and evaluate the expression.

- A. 124
- B. 470
- C. 813
- D. 2,323

$$\begin{aligned} a &= 6 \\ b &= 8 \\ c &= 9 \\ 7(a + b + c) + 8(a + 5c) + 4(2a + 5b + c) \end{aligned}$$

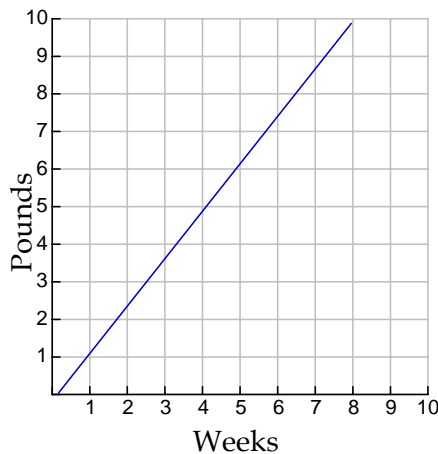
**Answer: C**

### IX. Rectangular Coordinate System for Problems

1. Chris wants to gain 10 pounds of muscle in 8 weeks and he plots his goal on the grid. If Chris meets each weekly goal, how much weight will he have gained after 5 weeks?

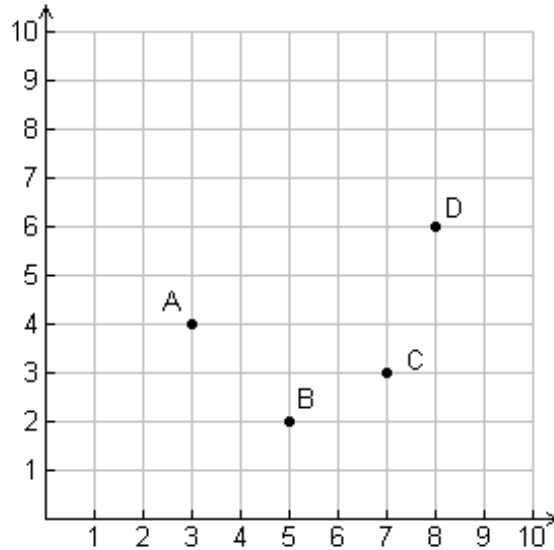
- A. 6 pounds
- B. 5 pounds
- C. 4 pounds
- D. 0 pounds

**Answer: A**



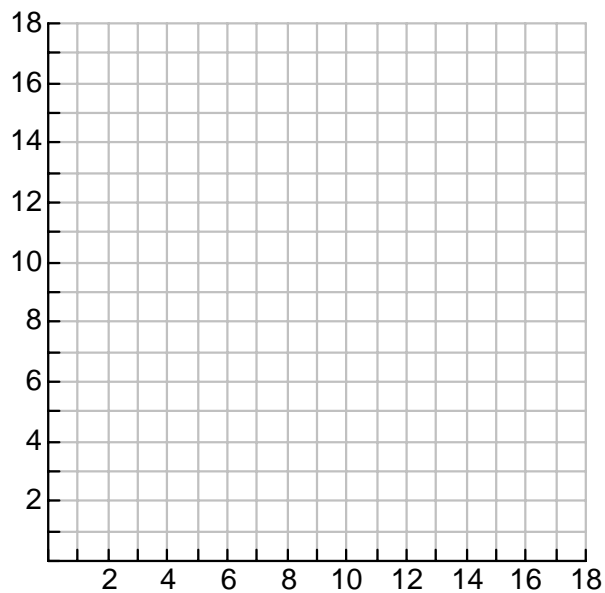
2. A scientist plots the movement of ants on a grid. Determine the distance from  $(0, 0)$  to point A if each unit equals 2 feet.
- A. 5 feet
  - B. 10 feet
  - C. 25 feet
  - D. 50 feet

**Answer: B**



3. A carpenter is building a rectangular frame using 18 feet of wood. The ratio of the width to the length is 4:5. Identify the length of the frame. Write equations and use the grid below to solve the problem (remember to use two equations: one relating sides to the total length and one relating sides to each other).
- A. 4 feet
  - B. 6 feet
  - C. 8 feet
  - D. 10 feet

**Answer: C**



## X. Graphic Solutions of Simple Systems of Equations

1. Jack is graphing a system of equations and he wants to identify the variable values that will satisfy both equations. What should he look for on the graph?
  - A. the slope
  - B. the x-intercept
  - C. the y-intercept
  - D. the intersecting points

*Answer: D*

2. At the beginning of her hike Jamie is 1,000 feet above sea level. Every hour she hikes another 300 feet up hill. If Jamie graphed her height above sea level relative to the time she spent hiking, what would the y-intercept represent?
  - A. how fast she was hiking
  - B. the total distance of her hike
  - C. how far above sea level she was at the end of the day
  - D. how far above sea level she was at the beginning of the hike

*Answer: D*

3. Identify the true statement.
  - A. A linear equation produces a curved line on a graph.
  - B. A quadratic equation produces a straight line on a graph.
  - C. A quadratic equation produces a curved line on a graph.
  - D. Two quadratic equations will intersect in three points on a graph.

*Answer: C*

## XI. Properties of Arithmetic and Geometric Sequences

1. Paula records her earnings in the chart. Identify the arithmetic sequence in her earnings.
  - A. increase by 8
  - B. increase by 7
  - C. multiply by 6
  - D. decrease by 8

Hours Worked	Earnings
12	\$72
13	\$78
14	\$84

*Answer: A*

2. Identify the arithmetic sequence that decreases by seven.
- A. 37, 27, 17, 7
  - B. 42, 36, 30, 24
  - C. 10, 3, -4, -11
  - D. -7, 0, 7, 14

*Answer: C*

3. Walter puts \$100 in a savings account that earns two percent yearly interest. If Walter never makes another deposit into his account, how much money will he have at the end of three years?
- A. \$102
  - B. \$104.04
  - C. \$106.12
  - D. \$108.24

*Answer: C*