

ALGEBRA TOPICS

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- 1.2 Solving Multi-Step Equations
- QUIZ
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AR.1.1	AR.1.2	AR.2.2	AR.9.6	6.2	AR.1.1	AR.3.6	AR.3.6	AR.3.7	DP.3.2 [H]
AR.2.6	AR.2.1	AR.2.5	5.3	NB.0.1.1	AR.1.3	Chapter 8	AR.3.7	AR.3.8	DP.3.3 [H]
2.6	AR.2.4	4.4	AR.2.1	7.2	8.1	AR.3.6	F.1.2	9.3	10.4
AR.2.6	AR.2.5	AR.2.2	AR.2.2	NB.0.1.2	AR.1.3	AR.3.7	F.2.1	AR.1.2	DP.1.4
AR.4.2 [H]	F.1.5	AR.2.3	AR.2.5	AR.1.4	AR.3.8	F.1.2	AR.3.1	AR.3.4	
		AR.2.5	AR.9.1	AR.9.6	F.2.1				

CHAPTER ONE

SOLVING LINEAR EQUATIONS

scale

Standards:

ARI.2 Solve literal equations for a specified variable
AR2.1 Write and solve one-variable multi-step linear equations
AR4.1 Write and solve one-variable absolute value equations

4

- Teach other students why there are always two possible solutions when an absolute value expression equals a non-zero real number.

3

- Solve the literal equation for x . $2x + 6y = 4$
- Solve the formula for v_0 . $a = \frac{v_1 - v_0}{t}$
- Solve the formula for y . $Ax + By = C$
- You purchase 4 tickets to a basketball game for a game total of \$216.80. In addition to the cost per ticket, there is an arena fee of \$3.50 per ticket and a flat fee of \$3.00 to access all the tickets on a mobile device. Write and solve an equation to find the cost of each ticket x .
- The average distance a car can travel using one gallon of gasoline is 28 miles. The actual distance the car can travel using one gallon of gasoline varies from the average by up to 3 miles. Write and solve an absolute value equation to find the minimum and maximum distances the car can travel using one gallon of gasoline.

2

- Solve the equation.
a. $11 = \frac{x}{3} + 8$ b. $-20 = 2x - 4$ c. $3(x - 2) = -27$
- Make a plan for how to write and solve the equation for this word problem. A plumber charges a customer \$89 for a service call and \$78 for parts. The plumber also charges the customer \$50 per hour he is at the house. The customer's final bill is \$292. Write and solve an equation to find the number of hours the plumber was at the house.
- Solve the equation.

1

- Solve the equation.
a. $|4x - 2| = 18$ b. $3|2x| = 60$ c. $6|2x - 5| + 10 = 34$
- Solve the equation.
a. $76 = 19x$ b. $x + 24 = -38$ c. $-16 = \frac{x}{4}$
d. $4(2-x) = 3 + 2x$ e. $9 - 6(x+1) = -5x$ f. $8 + x = 2x - 3(3-x)$
g. $4(x-3) = 2x+6$ h. $3(2-x) = 5x - 4x + 6$

CHAPTER TWO

SOLVING LINEAR INEQUALITIES

scale

Standards:

ARI.1 Identify and interpret parts of an expression
AR2.6 Write and solve one-variable linear inequalities, including compound inequalities

4

- A height (in feet) of a ball t seconds after bouncing off the ground is given by the expression $-16t^2 + 24t$. How long does the bounce last? What is the maximum height of the bounce?
- Create a word problem involving a linear inequality

3

- The value of a car that loses $r\%$ of its value (in dollars) in t years is represented by the expression $21,500(1 - r)^t$.
a. What does the value 21,500 represent in the expression?
- You save \$15 per week to purchase a bike. You already have \$45 saved up. Write and solve an inequality to find the number of weeks you need to save to purchase a bike if it costs at least \$120. Graph the solution.

2

- You are hiring a catering company to serve meals to guests at a wedding reception. The company charges a deposit and cost per guest. The total cost of the company you hired can be modeled by the function $y = 500 + 20x$. Explain what each term might represent.
- Twice the sum of a number and 2 is greater than 3 times the number minus 1. Write and solve an inequality. Graph the solution.

1

- You buy g pounds of grapes and a pounds of apples for a fruit salad. Grapes cost \$2.50 per pound, and apples cost \$3 per pound. Write an expression that represents the total amount you spend on grapes and apples.
- Graph the inequality.
a. $a < 4$ b. $b \geq -3$ c. $-2 \leq c < 5$

CHAPTER THREE

GRAPHING LINEAR FUNCTIONS

AR2.4 Given a table,

scale

Standards:
equation, or description of a function, determine and interpret its key features
AR2.5 Solve and graph math problems that are modeled with linear functions. Interpret key features and determine domain constraints
F2.1 Identify the effects on a graph by comparing the equations

4

- What is the domain and range of every linear function?
- Create a real-life problem that can be modeled by a linear function and has a domain constraint.

3

- Use the graphs of f and g to describe the transformation from the graph of f to the graph of g .

a. $f(x) = |x|$; $g(x) = f(x) - 2$ b. $f(x) = \frac{1}{3}x$; $g(x) = 3f(x)$

- The cost of using a ride-sharing service can be represented by the function $C(x) = 1.25x + 6.75$, where $C(x)$ represents the total cost of riding x miles using the service. You want to spend no more than \$100 for a ride.

- Graph the function in terms of the context.
- Find and interpret the domain in this context.
- Find and interpret the range in this context.
- Identify and interpret the y -intercept of the graph.
- Identify and interpret the rate of change of the graph.

x	-2	-1	1	2
y	4	1.5	-3.5	-6

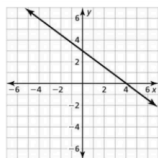
- Graph the linear function represented by the table. Find the domain and range of the function. Then identify the intercepts and slope of the function.

- What type of transformation of $f(x) = x^2$ results in each function below.

a. $g(x) = x^2 - 3$ b. $h(x) = \frac{1}{2}x^2$

- Consider the linear function $y = 4x + 2$.

- Graph the function.
- Find the domain.
- Find the range.
- Identify the intercepts of the graph.
- Identify the rate of change of the graph.



- The graph of a linear function is shown. Identify the intercepts and rate of change of the function.

2

- Graph $y = -\frac{3}{2}x + 4$.

- Graph the linear function $2x + 3y = 3$.

- Graph the function.

a. $y = 2x$

b. $y = x^2 + 1$

c. $y = |x - 2|$

CHAPTER FOUR

WRITING LINEAR FUNCTIONS

AR2.2 Write a linear

scale

equation to represent a relationship between two quantities
AR2.4 Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features
DP2.4 Fit a linear function to bivariate numerical data that suggests a linear association and interpret the slope and y -intercept

4

- Create a word problem that involves writing a linear two variable equation to represent the relationship between two quantities.
- What is the domain and range of every linear function?



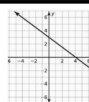
- A recording studio charges musicians an initial fee of \$100 to record an album. Studio time costs an additional \$60 per hour. Write an equation that represents the total cost y of recording an album for x hours.

- Graph the linear function represented by the table, equation, or written description. Find the domain and range of the function. Then identify the intercepts and slope of the function.

b. $y = \frac{1}{2}x - 3$

- The table shows the weekly sales of a movie and the number of weeks since its release. a. Write an equation that models the movie sales as a function of the number of weeks since its release. b. Interpret the slope and y -intercept of the line of fit. c. Predict the sales of the movie 9 weeks after its release.

Week, x	1	2	3	4	5	6	7
Sales (millions of dollars), y	31	28	26	23	20	18	15



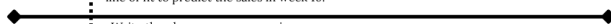
- Write an equation in standard form of the line that passes through the points in the table.

x	-8	-4	0	4	8
y	9	6	3	0	-3

- The graph of a linear function is shown. Identify the intercepts and rate of change of the function.



- The scatter plot shows the sales y (in millions of dollars) each week x of a new style release at a popular retail store. The equation $y = -2x + 30$ is a line of fit for the data set. Use the line of fit to predict the sales in week 10.



- Write the phrase as an expression.
 - the sum of a number x and 2
 - the product of -3 and a number y

- Graph $y = -\frac{3}{2}x + 4$.

- Describe the correlation in the scatter plot.



CHAPTER FIVE

SOLVING SYSTEMS OF LINEAR EQUATIONS

scale

Standards:

- AR2.2 Write a linear equation to represent a relationship between two quantities
AR9.1 Given a situation write and solve a system of linear equations algebraically or graphically
AR9.6 Given a situation represent constraints as a system of linear equations or inequalities

4

- Create a word problem that involves writing a linear two variable equation to represent the relationship between two quantities.
- Create a system of linear equations with a solution of (6, 3).

3

- A recording studio charges musicians an initial fee of \$100 to record an album. Studio time costs an additional \$60 per hour. Write an equation that represents the total cost y of recording an album for x hours.
- Adult tickets are \$10 each and child tickets are \$5 each for a concert. Eight hundred people attended the concert and the concert collected \$5000 in ticket sales. Write and solve a system of equations to find how many of each type of ticket were sold?
- Game laws limit the number of fish you catch each day. The maximum number of perch you can catch each day is 25, and the maximum number of bass you can catch each day is 15. The total maximum number of fish you can catch each day is 30. Write a system of inequalities that represents the situation. Give an example of the numbers of perch and bass you can catch in a day.

2

- Write an equation in standard form of the line that passes through the points in the table.

x	-8	-4	0	4	8
y	9	6	3	0	-3
- Solve the system by graphing.
 $y = x - 7$
 $-6x + y = -1$
- Solve the system by substitution.
 $x + y = 21$
 $5x - 2y = -56$
- You have \$8.20 in nickels and dimes. You have 100 coins in total. Write a system of equations that represents the problem. How many of each coin do you have?

1

- Write the phrase as an expression.
 a. the sum of a number x and 2
 b. the product of -3 and a number y
- Add $5x + 3y = 10$ and $2x - 3y = 17$.
- Multiply $3x - 8 = \frac{1}{2}y$ by 4.
- Tell whether the ordered pair is a solution of the linear inequality or system of linear inequalities.
 a. $(-4, 2); 2x + y < -3$
 b. $(0, 10); y < 2x$
 $y \geq x + 1$

CHAPTER SIX

EXPONENTIAL FUNCTIONS

scale

Standards:

- AR5.4 Write an exponential function to represent a relationship from a graph, written description or a table
AR5.3 Classify an exponential function as growth or decay
AR5.6 Given a table, equation, or written description of an exponential function, graph that function and determine its key features

4

- Teach other students how to find the initial value and the growth factor of an exponential function when given a graph, written description, or a table of values for the exponential function.
- Teach someone how to classify an exponential function as an exponential growth or decay function.

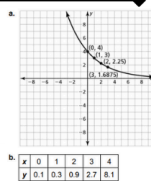
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- You deposit \$600 in an account that earns 9% annual interest compounded monthly. Write a function m that represents the balance (in dollars) of the account after t years.
- The table shows the bacteria population in a petri dish after t hours. Write an exponential function that models the data.

t	0	1	2	3	4
$P(t)$	4	8	16	32	64
- a. The function $f(x) = 25,000(0.985)^x$ represents the estimated population of a town x years after 2020. Determine whether the function represents exponential growth or exponential decay.
- Graph the exponential function represented by the table, equation, or written description. Identify characteristics of the exponential function and its graph.
 $f(x) = 3(2)^x$

2

- Write an exponential function that models the data to the right.
- Determine whether the function represents exponential growth or exponential decay
 a. $f(x) = 4(1 + 0.05)^x$ b. $g(x) = 3(0.975)^x$ c. $h(x) = \frac{1}{2}\left(\frac{3}{2}\right)^x$
 Graph $y = 8\left(\frac{1}{4}\right)^x$. Find the domain and range of the function.



1

- Determine whether the function represents a linear or an exponential function.
 a. $f(x) = 4x + 8$ b. $g(x) = 2(1.25)^x$ c. $h(x) = \frac{1}{2}\left(\frac{3}{4}\right)^x$
- Determine whether the function is an exponential function.
 a. $f(x) = 4(3)^x$ b. $g(x) = 5x^2 + 4$ c. $h(x) = 3x - 6$
- Identify the percent rate of change of the function.
 a. $y = 5(0.6)^x$ b. $f(x) = 0.2(1.8)^x$

CHAPTER SEVEN

scale

POLYNOMIAL EQUATIONS FACTORING

Standards:

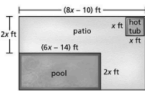
- AR1.3 Add, subtract, and multiply polynomial expressions
AR1.4 Divide polynomial expressions by a monomial expression
AR1.7 Rewrite a polynomial expression as a product of polynomials

4

A hotel installs a new swimming pool and a new hot tub. Write a polynomial in standard form that represents how much more area the pool covers than the hot tub.

- The volume of a rectangular prism is $\frac{1}{2}x^2 + 4x^2 - 9x$ cubic units. The product of the length and the width of the prism is $\frac{3}{2}x$.

- The area of a square backyard is $x^2 - 36x + 324$ square feet. a. What is a side length of the backyard? b. What is the perimeter of the backyard?



3

- Find the sum, difference, or product.

a. $\left(\frac{1}{2}x - \frac{2}{3}\right)\left(\frac{1}{4}x + \frac{1}{3}\right)$ b. $\left(\frac{2}{3}x^2 + 4x\right) + \left(-\frac{1}{4}x^2 + x + \frac{1}{2}\right)$

- Find the quotient.

a. $\frac{64a^4 + 32a^3 - 16a^2}{-8a^2}$ b. $\frac{c^3 - 8c^2 + 7c}{-\frac{1}{3}c}$ c. $\frac{-6z^5 + 2z^4 - 4z^3}{\frac{1}{2}z^3}$

- Factor the polynomial.

a. $16a^2 - 1$ b. $20b^2 + 22b + 6$ c. $12c^2 + 13c - 35$

2

- Find the sum, difference, or product.

a. $(x + 1)(5x + 2)$ b. $(5x^2 + 4x^2) + (-x^2 - 2x + 19)$ c. $(3x^2 + 7x - 15) - (2x^2 - 3x + 20)$

- Find the product.

a. $(3x + 2)(2x - 1)$ b. $(4x + 3y)(3x + 4y)$ c. $(-2ab + 5c)(10ab - 3c)$

- Find the quotient.

a. $\frac{5x^2 + 25x + 30}{5}$ b. $\frac{-4y^2 - 8y + 28}{4}$ c. $\frac{6x^2 - 12x + 27}{-3}$

1

- Determine if each term can be combined with $-9x^2$.

a. -9 b. $7x$ c. $\frac{9}{13}x^2$

- List all the factor pairs of the number.

a. 9 b. 20 c. 36 d. 63

- Find the quotient.

a. $522 / 9$ b. $1064 / 14$ c. $3475 / 25$

CHAPTER EIGHT

scale

Standards:

- AR3.6 Given an quadratic expression or equation determine & interpret the vertex and zeros
AR3.7 Graph a quadratic function given a table, equation, or description
AR3.8 Solve, graph, and interpret key features of quadratic functions

4

- A quadratic function opens downward and has a vertex of (a, b). Find the domain and range of the function. Then identify the intervals when the function is increasing and decreasing, the end behavior of the function, and the axis of symmetry.

3

- A person sitting in the top row of the bleachers at a concert drops a hat. The function $h = -4x^2 + 36$ represents the height h (in feet) of the hat after x seconds. a. Find and interpret the vertex of the graph of the function. b. Find and interpret the zeros of the graph of the function.

- Graph the quadratic function represented by the table, equation, or written description. Identify the characteristics of the quadratic function and its graph.

a.

x	-1	0	1	2	3
y	0	3	4	3	0

- The profit (in millions of dollars) of a company x years after starting the company is represented by the function $p(x) = 0.01x^2 - 0.5x + 10$. a. Graph the function. b. Identify and interpret characteristics of the function and its graph.

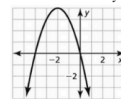
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- Make a plan for how you would find the vertex and the zeros of the function. The path of a golf ball can be modeled by the function $h(t) = -4t^2 + 40t$, where h(t) is the height (in feet) of the ball t seconds after it is hit.

- The graph of a quadratic function is shown. Identify the intervals where the function is increasing, decreasing, positive, and negative. Then identify the end behavior of the function.

- Graph the function $y = -x^2 + 4x - 3$.

Identify characteristics of the function and its graph.

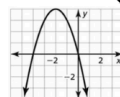


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- Find the vertex and zeros of the graph of the function.

- Graph $y = -2x^2 - 4x$.

- Identify the intercepts and vertex of the quadratic function $f(x) = 4x^2 - 10x - 6$.



CHAPTER NINE

SOLVING QUADRATIC EQUATIONS

scale

Standards:

- AR3.1 Write and Solve quadratic equations
AR3.6 Given an quadratic expression or equation determine & interpret the vertex and zero
AR3.8 Solve, graph, and interpret key features of quadratic functions

4

- Write a real-life word problem that involves writing and solving a quadratic equation.

3

- A person sitting in the top row of the bleachers at a concert drops a hat. The function $h = -4x^2 + 36$ represents the height h (in feet) of the hat after x seconds. a. Find and interpret the vertex of the graph of the function. b. Find and interpret the zeros of the graph of the function.
- The profit (in millions of dollars) of a company x years after starting the company is represented by the function $p(x) = 0.01x^2 - 0.5x + 10$. a. Graph the function. b. Identify and interpret characteristics of the function and its graph.
- A rectangular picture has a height that is 4 times its width. The picture is enlarged so the area of the picture is 196 square inches. Write and solve an equation to find the dimensions of the large picture.

2

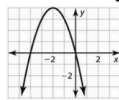
- Make a plan for how you would find the vertex and the zeros of the function. The path of a golf ball can be modeled by the function $h(t) = -4t^2 + 40t$, where $h(t)$ is the height (in feet) of the ball t seconds after it is hit.
- Graph the function $y = -x^2 + 4x - 3$. Identify characteristics of the function and its graph.
- Solve the quadratic equation.

a. $-3x^2 + 2x = -6$ b. $2x^2 + 16x = 0$
c. $2x^2 - 2x - 4 = 0$

1

- Find the vertex and zeros of the graph of the function.

- Identify the intercepts and vertex of the quadratic function $f(x) = 4x^2 - 10x - 6$.



- Factor the polynomial.

a. $x^2 + 18x + 81$ b. $x^2 - 5x - 6$ c. $2x^2 - 11x + 12$

CHAPTER TEN

DATA ANALYSIS & DISPLAYS

Standards:

- DPI.1 Given a set of data, select an appropriate method to represent the data
DPI.2 Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate
DP3.1 Construct a two-way frequency table summarizing bivariate categorical data

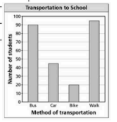
4

- Measure the heights of students in two different classes. Create an appropriate data display that best represents the data. Explain your reasoning.
- Create a word problem that involves constructing a two-way table

3

- Analyze the data and then create a display that appropriately represents the data. Explain your reasoning.
- The bar graph shows the various ways that students in your grade get to school. Tell whether the data is numerical or categorical and whether it is univariate or bivariate
- You conduct a survey that asks 996 freshmen and seniors about whether they participate in sports. Four hundred nine-two freshmen respond, with 142 of them responding "yes." Five hundred four seniors respond, with 402 responding "no." a. Organize the results in a two-way table. Include marginal frequencies.

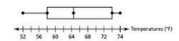
Test Scores	
Score	Frequency
60-69	2
70-79	8
80-89	12
90-99	5



2

- The table shows the number of pencils each student in a class brought to school. Create a dot plot to represent the data.

Number of Pencils									
1	3	2	2	1	4	2	3	2	1



- Tell whether this data display represents numerical or categorical data and whether the data is univariate or bivariate.

- Complete the two-way table that shows survey results.

Play Sports	Play Instruments		
	Yes	No	Total
Yes	22		
No		65	
Total		71	100

1

- Which box-and-whisker plot represents the given data? 6, 8, 8, 10, 11, 13, 14, 16, 18



- Tell whether the data are numerical or categorical. a. colors of shirts worn by students in a class b. heights of buildings in a town
- Define each term. a. marginal frequency b. joint frequency