

Date _____

Dear Family,

In Chapter 2, your child will study linear and absolute-value equations, inequalities, and functions.

An **equation** is a statement that two expressions are equal. The equation $5(1 - 2x) = -4x + 15$ is a **linear equation in one variable** because the variable x is not in a radical, not in a denominator, not used as an exponent, and not raised to an exponent other than 1.

A **solution** to an equation is a value of the variable that makes the equation true. To solve a linear equation, isolate the variable on one side of the equation.

Many equations have only one solution. For example, the only solution to $x + 2 = 7$ is $x = 5$. An equation that is always true is called an **identity**. An equation that is never true is called a **contradiction**.

Identity: $x + 2 = x + 2$ Any value of x is a solution.

Contradiction: $x + 2 = x + 3$ No value of x is a solution.

An **inequality** compares two expressions with $<$, \leq , $>$, \geq , or \neq . An inequality can be solved in the same way as an equation, except for one difference:

Solving Linear Inequalities	
When you multiply or divide both sides of an inequality by a negative number, the inequality sign reverses direction.	
original inequality: $10 > 3$	multiplied by -5: $-50 < -15$
↑ the inequality sign reverses direction ↑	

A **ratio** relates two quantities, such as 2 to 5, or $\frac{2}{5}$. A **proportion** states that two ratios are equal, such as $\frac{2}{5} = \frac{12}{30}$. When a proportion contains a variable, you can solve it by using **cross products**: if $\frac{a}{b} = \frac{c}{d}$, then $a \cdot d = b \cdot c$. Ratios and proportions have many useful applications, including percents.

Chapter 1 introduced **linear functions**. Chapter 2 shows how linear functions can be written in two useful forms:

Slope-intercept form: $y = mx + b$

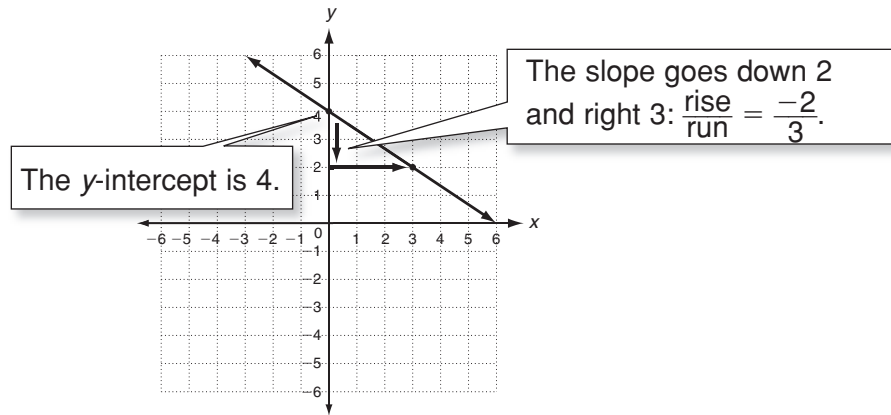
Point-slope form: $y - y_1 = m(x - x_1)$

Slope-intercept form highlights the slope (m) and the y -intercept (b), so it is helpful when graphing a linear function or writing the equation of a line.

$$y = mx + b$$

slope
y-int

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

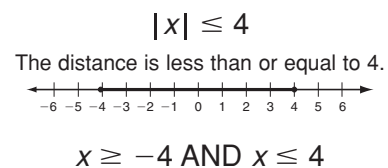
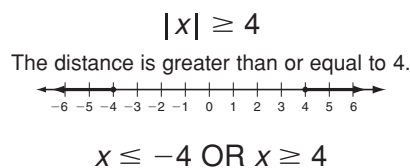
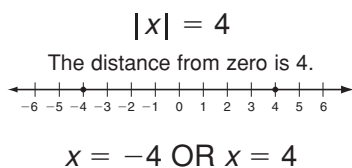


Linear inequalities in two variables, such as $y > 2x - 4$, are graphed by first drawing either a dashed line (for $<$ or $>$) or a solid line (for \leq or \geq). Then the region above or below that line is shaded to show which points satisfy the inequality.

Chapter 1 also introduced transformations. In Chapter 2, your child will further investigate transformations of linear functions and summarize the transformations algebraically.

Real-world data sometimes show a linear relationship. If you calculate a **line of best fit**, then you can use it to make predictions about the data. In general, the study of relationships between variables is called **regression**.

The **absolute value** of a number x , written $|x|$, represents its distance from zero on a number line. The value of x could be positive, negative, or zero, but its absolute value is always nonnegative. To solve an absolute value equation or inequality, you must consider each possibility.



Because an absolute value is never negative, the graph of the **absolute-value function** $f(x) = |x|$ has two linear pieces that form a V shape with a vertex at $(0, 0)$. As shown at right, a variety of absolute-value functions can be created by transforming $f(x) = |x|$.

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