# Algebra 2 Applied
# Unit 2 Review

**What to expect on the test**

## Quick Review

A **relation** is a set of ordered pairs. The **domain** of a relation is the set of $x$-coordinates. The **range** is the set of $y$-coordinates. When each element of the domain is paired with exactly one element of the range, the relation is a **function**.

## Example

**Determine whether the relation is a function. Find the domain and range.**

$$\{(5, 0), (8, 1), (1, 3), (5, 2), (3, 8)\}$$

In this relation, the $x$-coordinate 5 is paired with both 0 and 2. This relation is not a function.

The domain is the set of $x$-coordinates, which is $\{5, 8, 1, 3\}$.

The range is the set of $y$-coordinates, which is $\{0, 1, 3, 2, 8\}$.

## Quick Review

A linear equation of the form $y = kx$, $k \neq 0$, represents **direct variation**. The **constant of variation** is $k$. You can use proportions to solve direct variation problems.

# Example

**In the table, determine whether *y* varies directly with *x*. If so, what is the constant of variation and the function rule?**

| x | y |
|---|---|
| 2 | 6 |
| 3 | 9 |
| 8 | 24 |

$\frac{6}{2} = \frac{9}{3} = \frac{24}{8} = 3$, so $y$ varies directly with $x$, and the constant of variation is 3.

The function rule is $y = 3x$.

## Quick Review

The graph of a **linear function** is a line. You can represent a linear function with a **linear equation**. Given two points on a line, the **slope** of the line is the ratio of the change in the *y*-coordinates to the change in the corresponding *x*-coordinates. The slope is the coefficient of *x* when you write a linear equation in **slope-intercept form**.

## Example

**What is the slope of the line that passes through (3, 5) and (−1, −2)?**

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$ Find the difference between the coordinates.

$$= \frac{5 - (-2)}{3 - (-1)} = \frac{7}{4}$$ Simplify.

# Quick Review

You write the equation of a line in **point-slope form** when you have a point and the slope or when you have two points. The **standard form** of an equation has both variables and no constants on the left side.

When two lines have the same slope, they are **parallel**. When two lines have slopes that are negative reciprocals of each other, they are **perpendicular**.

## Example

**Write an equation in standard form for the line with a slope of 2, going through (1, 6).**

| | |
|---|---|
| $y - 6 = 2(x - 1)$ | Write the equation in point-slope form, substituting the given point and slope. |
| $y = 2x - 2 + 6$ | Simplify. |
| $-2x + y = 4$ | Write in standard form. |

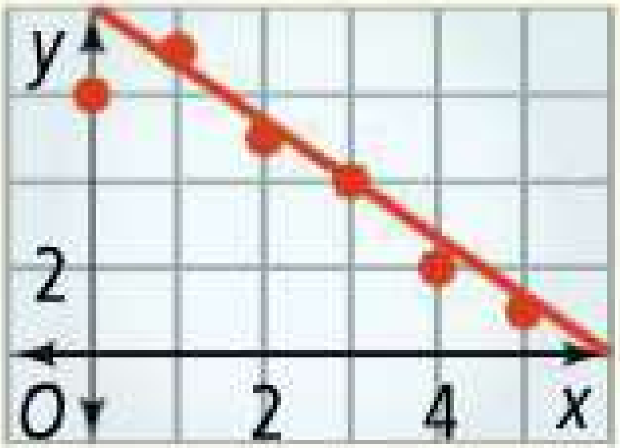
## Quick Review

You can use a **scatter plot** to show relationships between data sets. You can make predictions using a trend line, which approximates the relationship between two data sets. The most accurate trend line is a **line of best fit**.

## Example

**Draw a scatter plot of the data. Is a linear model reasonable? If so, predict the value of *y* when $x = 9$.**

$\{(0, 6), (1, 7), (2, 5), (3, 4), (4, 2), (5, 1)\}$




The points are close to the line $y = -\frac{4}{3}x + 8$, so a linear model is reasonable. When $x = 9$,

$$y = -\frac{4}{3}(9) + 8$$
$$= -4$$

# Quick Review

A **parent function** is the simplest form of a function in a family of functions. Each member is a **transformation** of the parent function.

**Translations** shift the graph horizontally, vertically, or both. A **reflection** flips the graph over a line of symmetry. **Vertical stretches** and **compressions** change the shape of the graph by a factor.

# Example

**Write the equation of the transformation of the graph of $f(x) = x^2$ translated 3 units up, vertically stretched by a factor of 6, and reflected across the *y*-axis.**

| | |
|---|---|
| $y = x^2 + 3$ | Translated 3 units up. |
| $y = 6(x^2 + 3)$ | Vertically stretched. |
| $y = 6(-x)^2 + 18$ | Reflected across the *y*-axis. |
| $y = 6x^2 + 18$ | |

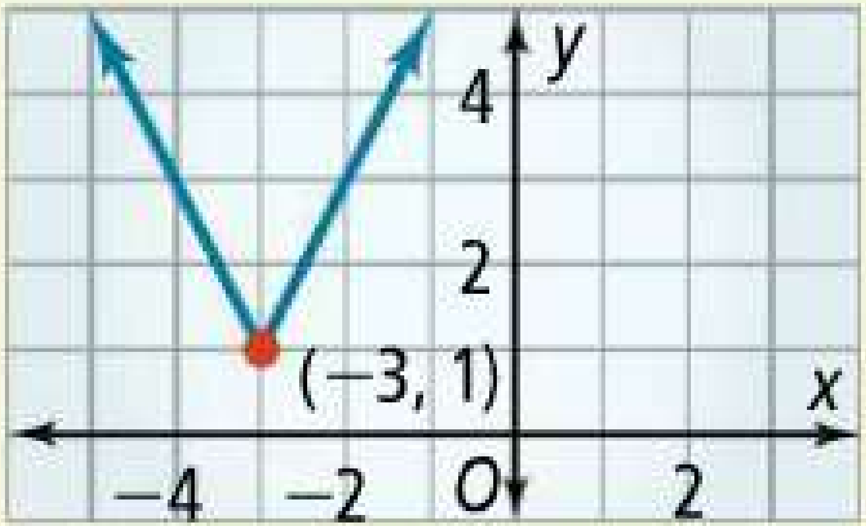
# Quick Review

The **absolute value function** $y = |x|$ is the **parent function** for the family of functions of the form $y = a|x - h| + k$. The maximum or minimum point of the graph is the vertex of the graph.

$y = 2|x + 3| + 1$

$a = 2, h = -3, k = 1$

- Vertex is at $(-3, 1)$
- Translated left 3 units
- Stretched by a factor of 2
- Translated up 1 unit



## Example

**Write an equation for the translation of the graph $y = |x|$ up 5 units.**

Because the graph is translated up, $k$ is positive, so the equation of the translated graph is $y = |x| + 5$.

## Quick Review

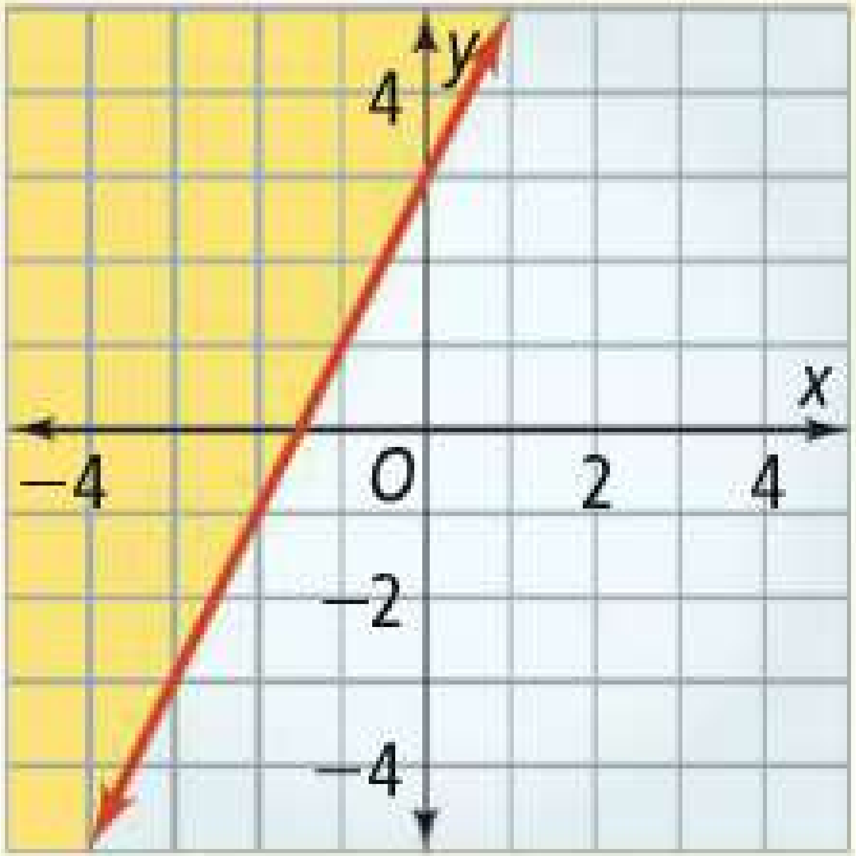
An inequality describes a region of the coordinate plane that has a **boundary**. To graph an inequality involving two variables, first graph the boundary. Then determine which side of the boundary contains the solutions. Points on a dashed boundary are not solutions. Points on a solid boundary are solutions.

## Example

**Graph the inequality $y \geq 2x + 3$.**

Graph the solid boundary line $y = 2x + 3$.

Since $y$ is *greater than* $2x + 3$, shade above the boundary.



**Review Practice Pearson Algebra 2  pages 123 to 126**

#3-5 pick 1#7 or 8

| | | |
|---|---|---|
| #9-11 pick 1 | #12-15 pick 1 | |
| #16-19 pick 1 | #20 or 21 | #22-25 pick 1 |
| #26-29 pick 1 | #30 | |
| #31-33 pick 1 | | |
| #34-36 pick 1 | #37-39 pick 1 | |
| #40-43 pick 1 | #44-47 pick 1 | #48 or 49 |
| #50-53 pick 1 | #54 & 55 | |