

### ELG HS.A.11: Represent and solve equations and inequalities graphically.

#### Vertical Progression:

<b>8<sup>th</sup> Grade</b>	<p><b>8.EE.C Analyze and solve pairs of simultaneous linear equations.</b></p> <ul style="list-style-type: none"> <li>○ <b>8.EE.C.8a</b> Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.</li> <li>○ <b>8.EE.C.8b</b> Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</i></li> </ul>
<b>Algebra 1</b>	<p><b>ELG.MA.HS.A.11 Represent and solve equations and inequalities graphically.</b></p> <ul style="list-style-type: none"> <li>○ <b>A-REI.10</b> Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</li> <li>○ <b>A-REI.11</b> Explain why the <math>x</math>-coordinates of the points where the graphs of the equations <math>y = f(x)</math> and <math>y = g(x)</math> intersect are the solutions of the equation <math>f(x) = g(x)</math>; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where <math>f(x)</math> and/or <math>g(x)</math> are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.* [all function types listed except for exponential and logarithmic]</li> <li>○ <b>A-REI.12</b> Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.</li> </ul>
<b>Algebra 2</b>	<p><b>ELG.MA.HS.A.11 Represent and solve equations and inequalities graphically.</b></p> <ul style="list-style-type: none"> <li>○ <b>A-REI.11</b> Explain why the <math>x</math>-coordinates of the points where the graphs of the equations <math>y = f(x)</math> and <math>y = g(x)</math> intersect are the solutions of the equation <math>f(x) = g(x)</math>; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where <math>f(x)</math> and/or <math>g(x)</math> are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.* [all function types listed]</li> </ul>

#### Students will demonstrate command of the ELG by:

- Finding the coordinates of the points where the graphs of two functions intersect by graphing the two functions.
- Finding the coordinates of the points where the graphs of two functions intersect by making tables of values for the two functions.
- Finding the coordinates of the points where the graphs of two functions intersect by successive approximations of the two functions.

#### Vocabulary:

- absolute value function
- logarithmic function
- polynomial function
- rational function

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**Sample Instructional/Assessment Tasks:**

**1) Standard(s): A-REI.11**

Source: PARCC Algebra 2 PBA Practice Test

Item Prompt:

Functions  $f$  and  $g$  are defined below.

$$\begin{cases} f(x) = \frac{1}{2x} \\ g(x) = x^2 \end{cases}$$

The graphs of  $y = f(x)$  and  $y = g(x)$  intersect at point  $P$ .

Determine the  $x$ -coordinate of  $P$ . Round your answer to the nearest tenth.

Correct Answer:

$$x = 0.8$$

**2) Standard(s): A-REI.11**

Source: PARCC Algebra 2 EOY Practice Test

Item Prompt:

Given the functions  $h(x) = |x - 4| + 1$  and  $k(x) = x^2 + 3$ , which intervals contain a value of  $x$  for which  $h(x) = k(x)$ ?

Select **all** that apply.

- Ⓐ  $-4.5 < x < -3$
- Ⓑ  $-3 < x < -1.5$
- Ⓒ  $-1.5 < x < 1.5$
- Ⓓ  $1.5 < x < 3$
- Ⓔ  $3 < x < 4.5$

Correct Answer:

B and C are correct.