ALBERT

Name _____ Date _____

Solving Equations by Graphing Worksheet

Algebra 1 · Common Core HSA-REI.D.11

> Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

Practice

Builds the skill step by step.

1. The graphs of y = f(x) and y = g(x) cross at (2, 5). What is the solution of f(x) = g(x)?

   A. x = 2

   B. x = 5

   C. x = 2 and x = 5

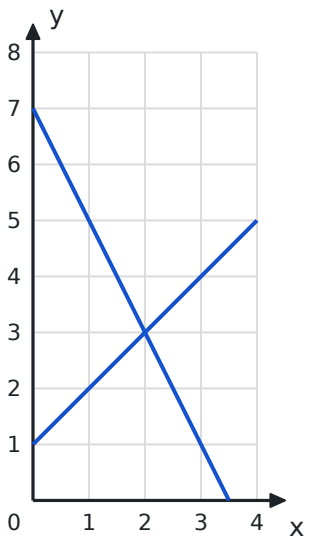
   D. x = 7

2. Solve 2x + 1 = −x + 7 by finding where y = 2x + 1 and y = −x + 7 meet.

3. Use the table. For what value of x is f(x) = g(x)?

x	f(x)	g(x)
0	1	9
1	3	7
2	5	5
3	7	3
4	9	1

4. The graph shows $y = x + 1$ and $y = -2x + 7$. Use it to solve $x + 1 = -2x + 7$.



5. The graphs of $y = f(x)$ and $y = g(x)$ cross at $(2, 5)$. What does the 5 tell you?

   A. 5 is a second solution of $f(x) = g(x)$.

   B. Both $f(2)$ and $g(2)$ equal 5.

   C. The graphs cross at $x = 5$.

   D. The slope of both graphs is 5.

6. The graphs of $y = x^2$ and $y = 2x + 3$ cross at two points. Find the x-values that solve $x^2 = 2x + 3$, from least to greatest.

7. Use the table. For which x-values in the table is $2^x = x + 1$? List them from least to greatest.

x	2^x	x + 1
−1	0.5	0
0	1	1
1	2	2
2	4	3
3	8	4

8. Solve $|x| = 3$. List the solutions from least to greatest.

9. To solve $3x - 2 = 4$ with graphs, you graph $y = 3x - 2$ and $y = 4$. Where do they meet?

   A. They never meet.

   B. At $x = 4$

   C. At $x = 2$

   D. At $x = -2$

10. Use the table. For what value of x is $f(x) = g(x)$?

x	f(x)	g(x)
1	10	2
2	8	4
3	6	6
4	4	8
5	2	10

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On Level

Grade-level practice.

1. The equation $2^x = 5$ has a solution between 2 and 3. Find it to the nearest tenth by trying values.

2. Solve $|x - 2| = x$.

3. Solve $x^2 - 4 = -x + 2$ by finding where the graphs meet. List the solutions from least to greatest.

4. The graphs of $y = 2^x$ and $y = x + 2$ cross at about $(-1.7, 0.3)$ and at $(2, 4)$. What are the solutions of $2^x = x + 2$?

   A. $(-1.7, 0.3)$ and $(2, 4)$ are both x-values.

   B. $x \approx 0.3$ and $x = 4$

   C. $x = 2$ only

   D. $x \approx -1.7$ and $x = 2$

5. Use a table of values to solve $x^2 = 10$ for the positive solution, to the nearest tenth.

6. Solve $\frac{6}{x} = x + 1$ by finding where the graphs meet. List the solutions from least to greatest.

7. Why are the x-coordinates of the points where $y = f(x)$ and $y = g(x)$ cross the solutions of $f(x) = g(x)$?

   A. At those x-values, f and g give the same output.

   B. Because every graph crosses the x-axis there.

   C. Because the y-coordinates are always 0 there.

   D. Because f and g have the same slope there.

8. Solve $|2x - 1| = 5$. List the solutions from least to greatest.

9. Use the table. For which x-values is $2^x = 2x$? List them from least to greatest.

x	2^x	2x
0	1	0
1	2	2
2	4	4
3	8	6

10. The graphs of $y = x^3$ and $y = 4x$ cross at three points. Find the x-values, from least to greatest.

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Challenge

Multi-step and word problems that stretch it.

1. Find the solution of $2^x = 10 - x$ to the nearest tenth.

2. Solve $\frac{1}{x} = \frac{x}{4}$. List the solutions from least to greatest.

3. Ana graphs $y = x^2$ and $y = 2x + 3$. They cross at $(-1, 1)$ and $(3, 9)$. She says the solutions of $x^2 = 2x + 3$ are 1 and 9. What is her mistake?

   A. There is no mistake.

   B. She read the graph wrong; the points are (1, 1) and (9, 9).

   C. She gave the y-coordinates; the solutions are $x = -1$ and $x = 3$.

   D. The equation has no real solutions.

4. Solve $|x + 1| = 2x - 4$.

5. Solve $x^3 = x + 6$.

6. When does $f(x) = g(x)$ have no solution?

   A. When the graphs cross at the origin

   B. When both graphs are lines

   C. When the graphs cross twice

   D. When the graphs of $y = f(x)$ and $y = g(x)$ never cross

7. Solve $\frac{4}{x - 1} = x + 2$. List the solutions from least to greatest.

8. The graphs of $y = 2^x$ and $y = x^2$ cross at two points with positive x. Find those x-values, from least to greatest.

9. How many solutions does $x^2 = -x^2 + 8$ have?

   A. Four

   B. Two

   C. One

   D. None

10. Solve $|x| = 0.5x + 3$. List the solutions from least to greatest.