

NAME: _____

UNIT 3 • LINEAR AND EXPONENTIAL FUNCTIONS

Lesson 1: Graphs As Solution Sets and Function Notation

Practice 3.1.2: Intersecting Graphs

Use what you know about graphing functions to answer the questions.

1. Given the graphs $y = f(x)$ and $y = g(x)$, what is the value of $f(x) - g(x)$ where the two graphs intersect?
2. If you are using the graphs of $y = f(x)$ and $y = g(x)$ to estimate x where $f(x) = g(x)$, and you see that the graphs cross at two different points, how many values of x should you attempt to find?
3. If you are trying to estimate the value of x where $f(x) = g(x)$ using a table of values, and all the values for $f(x) - g(x)$ are positive, what does this imply?
4. While using a table of values to estimate the value of x where $f(x) = g(x)$, you see that there are 3 sign changes in the $f(x) - g(x)$ column. How many solutions for x can you estimate?

5. Estimate the solution(s) to the following system by graphing.

$$f(x) = 2x + 5$$

$$g(x) = -\frac{1}{2}x + 1$$

6. Estimate the solution(s) to the following system by graphing.

$$h(x) = 3^x$$

$$k(x) = x + 4$$

7. Use a table of values to estimate the solution(s) to the following system on the interval $-3 \leq x \leq 3$.

$$s(x) = 2^x + 1$$

$$r(x) = x + 3$$

continued

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8. Use a table of values to estimate the solution(s) to the following system on the interval $-3 \leq x \leq 3$.

$$f(x) = x$$

$$g(x) = \left(\frac{1}{2}\right)^x$$

9. Marisol and Amy go for a 5-mile run every Monday morning at 6:00 A.M. However, on one particular Monday, Amy was going to be 5 minutes late and asked Marisol if she would slow her pace so Amy would be able to catch up to her during the run. Marisol will run at 10 minutes per hour and Amy will start 5 minutes later running at 8 minutes per hour. The equations for the runners are given as follows, for which $M(x)$ = Marisol and $A(x)$ = Amy:

$$M(x) = \frac{1}{10}x \text{ and } A(x) = \frac{1}{8}(x-5), \text{ where } x \text{ is in minutes from when Marisol starts}$$

her run and $M(x)$ and $A(x)$ are in miles.

Use a graph to find how many minutes will have passed before Amy catches Marisol. How far will the girls have run when they meet?

10. Tickets for the school play cost \$10 for adults and \$5 for students. 120 tickets were sold in all for \$800. The equations for total profit and total tickets are as follows:

$5x + 10y = 800$ and $x + y = 120$ tickets, where x is the number of students and y is the number of adults.

Graph the two equations. At what point do the graphs intersect? What do the coordinates of the intersection tell us about the ticket sales at the school play?