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Name:____________________

Period: A1 A2 A3 B1 B3

3.1.2 How can I use a graph to solve an equation?

Solving Equations Graphically

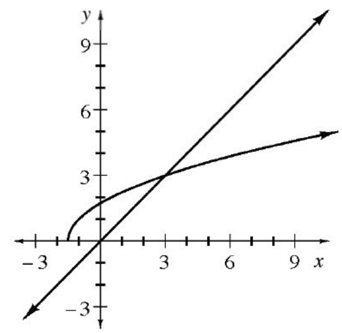
Textbook pg. 120

#24 In problem 3-1, you used a graph to solve an equation. In what other ways can a graph be a useful solution tool? Consider this question as you solve the equation by completing parts (a) through (d).

a.Use algebraic strategies to solve the equation below. How many solutions did you come up with? Which strategies did you use? $\sqrt{2x+3}$ = *x*.	b. In thinking about , Miranda writes down the two equations below. How many solutions does each of these equations have? $y = \sqrt{2x+3}$ $y = x$
c. Miranda says, "I'll graph both the functions and to check the solutions from part (a)." How will graphing help her determine the solution? Be sure everyone on your team can answer this before moving on.	d. Miranda looks at the graph on her graphing calculator and says, "I think something is wrong." Graph the system on your graphing calculator and locate the intersection point(s) of the graphs. How many intersection points are there? Does this confirm your solution from part (a)? Explain your results.

#25 When a result from a correctly-solved equation does not make the original equation true, it is called an **extraneous solution**. It is not a solution of the equation, even though it is a result when solving algebraically. If you have not already done so, check your solutions from part (a) of problem 3-24 algebraically.

#26 But why does the extraneous solution appear in this problem? Examine the graph of the system of equations $y = \sqrt{2x+3}$ and $y = x$, shown at right. Where would an extraneous solution $x = -1$ appear on the graph? Why do the graphs not intersect at that point? Explain.



#27 After solving the equation $2x^2 + 5x - 3 = x^2 + 4x + 3$, Gustav gets called to the office and leaves his team. When his teammates examine his graphing calculator to figure out how he found his solution, they only see the graph of $y = x^2 + x - 6$. Consider this situation as you complete the parts below.

a. Solve $2x^2 + 5x - 3 = x^2 + 4x + 3$ algebraically.

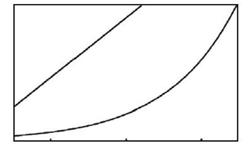
b. Where does Gustav get the equation $y = x^2 + x - 6$?

c. How many solutions will $y = x^2 + x - 6$ have?

d. How can you see the solutions to $2x^2 + 5x - 3 = x^2 + 4x + 3$ in the graph of $y = x^2 + x - 6$? Explain why this makes sense.

e. Maiya solves $2x^2 + 5x - 3 = x^2 + 4x + 3$ by graphing a system of equations and looking for the points of intersection. What equations do you think she uses? Explain where the solutions to the equation exist on the graph.

#28 Yajaira cannot figure out how to solve $20x + 1 = 3^x$ algebraically, so she decides to use her graphing calculator. However, when she graphs the equations $y = 20x + 1$ and $y = 3^x$, she gets the graph shown at right. After studying the graph, Yajaira thinks there are no solutions to $20x + 1 = 3^x$.



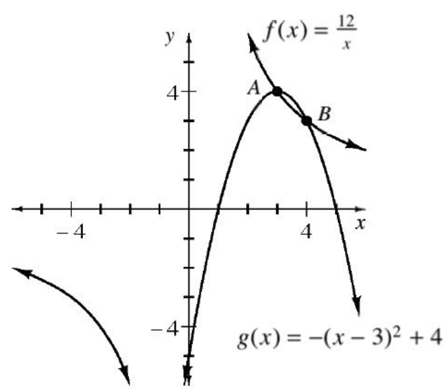
a. What do you think? If there are solutions, what are they? If there are no solutions, demonstrate that there cannot be a solution.

b. What should solutions to the equation $20x + 1 = 3^x$ look like? In other words, will solutions be a single number, or will they be the coordinates of a point? Explain.

c. Discuss with your team why Yajaira cannot solve the system algebraically. What do you think?

#29 Jack was working on solving an equation and he graphed the functions

$f(x) = \frac{12}{x}$ and $g(x) = -(x - 3)^2 + 4$, as shown at right.



a. What equation was Jack solving?

b. Use points *A* and *B* on the graph to solve the equation you wrote in part (a).

c. Are there any other solutions to the equation you wrote in part (a)? If so, show that these other solutions make your equation true.