Lesson 7 Extraneous Events

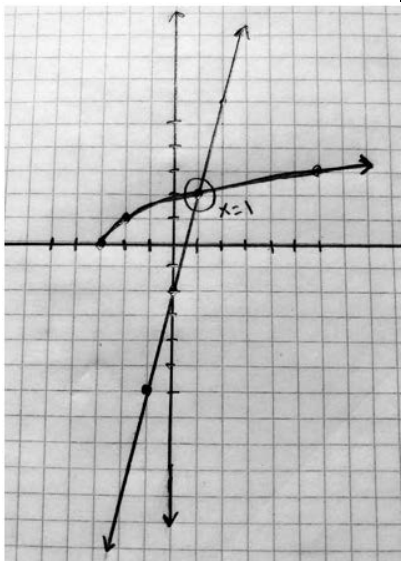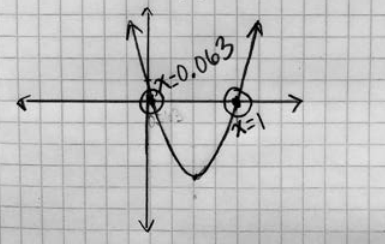*A Developing Understanding Task*

Jasmine, Kevin and Francisco were working in a group that was asked to solve the equation $\frac{2}{x} = 2x - 3$. Jasmine used a graph to solve the equation, Kevin used algebraic methods to solve, and Francisco combined the two methods together to solve the problem. Below are pictures of their work. Explain the steps that each student took to get their answer.

Image Source: https://pixabay.com/en/check-mark-check-list-tick-of1-16900/

Jasmine's Method	Kevin's Method	Francisco's Method

The next equation that the group was given to solve was $4x - 2 = \sqrt{x + 3}.$ Each student still had their own preferred way of solving so Jasmine used a graph, Kevin solved with algebra, and Francisco solved with a combination of algebra and graphing. However, this time Jasmine's answer was slightly different. Explain each step of each student's work.

Jasmine's Method	Kevin's Method	Francisco's Method

Why is Jasmine's answer different? Is Jasmine's answer correct, or are Kevin and Francisco's answers correct? Explain your reasoning.

Apply the methods that Jasmine, Kevin, and Francisco used to solve the following problems. Identify any extraneous solutions and justify why they are extraneous.

1. $0.5x + 1.5 = \sqrt{2x + 3}$

2. $3x + 4.5 = \dfrac{3}{x}$

3. $\sqrt{x + 7} = x + 5$

4. $0.5x + 1 = \dfrac{4}{x}$

5. $\sqrt{3x + 1} = x + 1$

6. $3x - 2 = \sqrt{2x - 5}$

Lesson 7

READY, SET, GO!   Name _____

Period _____
Date _____

READY

Topic: Determine if a given value or point is a solution to an equation.

For each of the equations below, determine if x = -2 is a solution. Justify your answer.

1. $5 = \sqrt{x+6} + 3$

2. $x^2 - 9x - 22 = 0$

3. $6x - 10 = 5x + 15$

4. $4 = \frac{x^2}{x+2}$

5. $\sqrt{x-7} = -3$

6. $x^2 + 5 = 9$
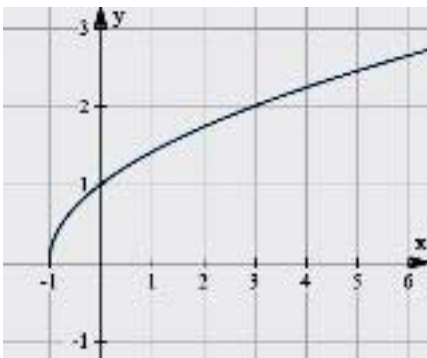
For each of the functions below, determine if the point (3, 4) is a solution. Justify your answer.

7. $y = (x-1)(x-5)$

8. $y = \frac{1}{2}x + \frac{5}{2}$

9. $y = \sqrt{x+5}$

10.

11.

x	g(x)
-1	-6
0	-5
1	-3
2	0

12. $y = 2^x$

Lesson 7

SET

Topic: Solve square root and inverse variation equations.

Solve each equation. Remember to look for extraneous solutions.

13. $-x = \frac{1}{x}$

14. $\sqrt{-10 + 7x} = x$

15. $\sqrt{2x - 7} = x - 3$

16. $\frac{2}{x} = x + 1$

17. $\sqrt{9x - 5} = x + 1$

18. $\sqrt{x - 1} = 3$

GO!

Topic: Solve problems involving direct and inverse variation relationships.

19. If y varies inversely as x, and y = 32 when x = 3, find x when y = 15.

20. If y varies directly as x, and y = 8 when x = 2, find y when x = 5.

Lesson 7

21. The frequency of vibration of a guitar string varies inversely with the length of the guitar string. Suppose a guitar string is 0.65 meters long, and vibrates 4.3 times per second. At what frequency would a string that is 0.5 meters long vibrate?

22. The amount of calories a person burns varies directly with the amount of miles that they run. Sonya ran 2 miles on a treadmill. The display reported that she burned 220 calories. She wants to treat herself with a hot fudge sundae after her workout. A hot fudge sundae has 380 calories. How far does Sonya have to run to burn off that many calories?

23. The current in a simple electrical circuit is inversely proportional to the resistance. If the current is 80 amps when the resistance is 50 ohms, find the current when the resistance is 22 ohms.

24. The amount of money you earn varies directly with amount of time that you work. If you work 6.5 hours, you will make $66.95. If you made $97.85, how many hours did you work?