Finding Extraneous Solutions

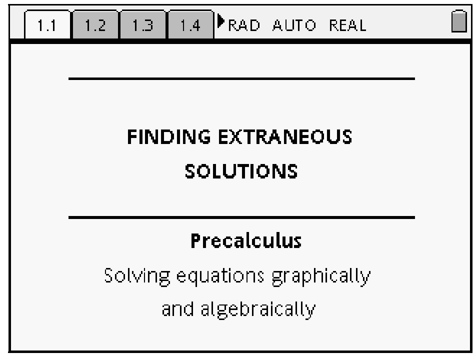
ID: 8109

Name ______________________

Class ______________________

In this activity, you will explore:

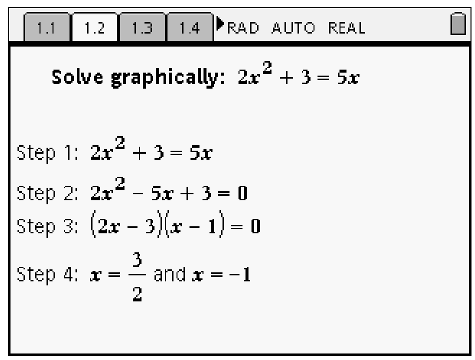
- *extraneous solutions that are sometimes introduced into equations when multiplying both sides of an equation by a variable.*



Open the file *PreCalcAct1_ExtraneousSolutions_EN.tns* on your handheld and follow along with your teacher to work through the activity. Use this document as a reference and to record your answers.

Problem 1 – Solving a quadratic equation

On page 1.2, the equation $2x^2 + 3 = 5x$ is solved step by step. Your task is to solve the equation in each step graphically on the using the *Graphs & Geometry* application provided on page 1.3. Simply enter the expression on the left-hand side of the equation into the text box defining **f1(*x*)** and the expression on the right-hand side into the text box defining **f2(*x*)**.



Repeat the same process for each step of the equation and record the solution(s)—the point(s) of intersection—on the appropriate lines below.

Step 1: x = ______________ Step 3: x = ______________

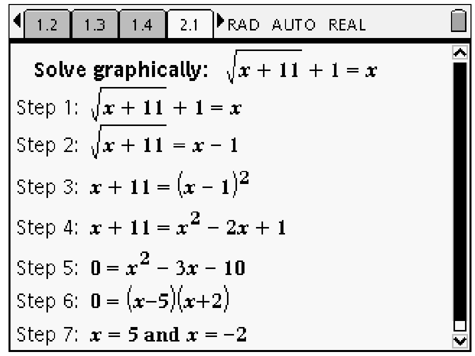
Step 2: x = ______________ Step 4: x = ______________

- Do the solution(s) to each step that you found graphically equal the solution(s) found algebraically in Step 4?

Re-enter the functions graphed for Step 1 as **f1** and **f2**, that is, define $\mathbf{f1}(x) = x^2 + 3$ and **f2**(x) = 5x. On page 1.4, verify the solutions you found above by using the function table shown on the right, and by substituting the values back into the equation for x. The first solution is done for you.

- Do both of the solutions satisfy the original equation?

Problem 2 – Solving a radical equation



Page 2.1 shows the step-by-step solution to the equation $\sqrt{x+11}+1=x$. Solve this equation graphically in the same manner as in Problem 1: graphing both sides of the equation in each step (on page 2.2) and record the solutions below. When you are finished, reset functions **f1** and **f2** as they were in Step 1, and check your solution(s) in the function table and algebraically (on page 2.3)

Step 1: $x =$ ____________

Step 2: $x =$ ____________ Step 5: $x =$ ____________

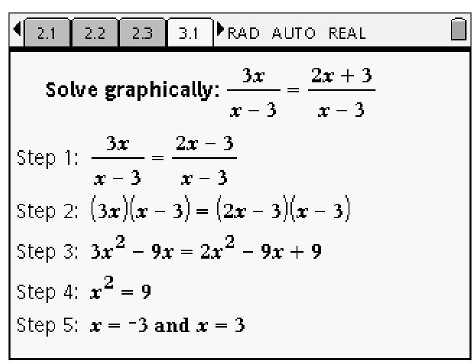
Step 3: $x =$ ____________ Step 6: $x =$ ____________

Step 4: $x =$ ____________ Step 7: $x =$ ____________

- Do all of your solutions make the original equation true?

- In which step do you find the extraneous solution? Why do you think it appeared in that particular step?

Extension – Solving a rational equation



The steps to solving the equation $\frac{3x}{x-3}=\frac{2x-3}{x-3}$ are shown on page 3.1. Once again, use the *Graphs & Geometry* page and function table provided to solve the equation in each step and verify your solutions.

- Which, if any, of the solution(s) are *true* solutions?

- In which step does the extraneous solution (or solutions) appear? Explain why you think this occurs.

