Name:

Date:

Activity 7: Factoring and Solving Equations Involving

Expressions with Radicals

*Note to student*: The primary objective of this activity is that you come to view and employ factoring (taking out a common factor) as a tool for solving equations, particularly when used in conjunction with the “zero product theorem.”

*Here are some secondary objectives*:

* + To understand that factoring (taking out a common factor) can be applied not only to constants and variables, but also to algebraic expressions that can be taken as objects to operate upon;
	+ To be able to reactivate, at a moment’s notice, the methods learned for solving linear and quadratic equations. You should be able to employ these methods when solving equations that are neither linear nor quadratic, per se;
* To understand that simplifying an equation by dividing both sides by some factor may lead to a loss of solutions. In equations in which such simplifications are possible, the strategy of isolating terms on one side of the equation and using the zero product theorem is generally a more effective solving method;
* To understand the necessity of verifying one’s solution to equations involving variables under the radical sign.

1. Suppose you were asked to solve this equation:

 (\*)

a) How would you proceed when faced with such a “monster”? (Don’t actually solve the equation, just state your general approach.)

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1.b) Using paper and pencil, see whether you can first solve the following equation that is somewhat analogous to the above monster:

(y-2)3 –10(y-2) = y(y-2) (\*\*)

*Hint*: Factoring (taking out a common factor) might be useful here.

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1.c) Compare your solution to equation (\*\*) with that obtained using the calculator’s SOLVE command. If the solutions obtained are different, verify your paper and pencil algebraic work. If the calculator produced an additional solution to the ones you found, determine which among the paper and pencil algebraic manipulations you used led to the loss of this additional solution. Please show all your work in the space below.

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#### Classroom discussion of Questions 1a, b, & c

2. a) On the basis of the strategies employed in solving the previous equation (\*\*), use paper and pencil to find the solution set of the following equation:

 (\*\*\*).

Show all your work in the space provided below.

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2. b) Substitute the values you obtained as solutions for equation (\*\*\*) using your calculator’s “with operator” (“**|**”). What does the calculator display as a result? Are there any solutions that you would discard? Why or why not?

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##### Classroom discussion of Question 2

3. Continuing with paper and pencil, now try to solve the original equation (\*):

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Determine first the condition under which the solutions are admissible, given the radicals. Then, compare your solution with that produced by the calculator and discuss the validity of each value displayed. Show your work in the space provided below:

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##### Classroom discussion of Question 3

4. Challenge Problem

a) Solve the following equation using paper and pencil:

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b) What solutions does the calculator display for this equation? Discuss the validity of these solutions.