

Purpose: By the end of this activity, you will be able to find the roots (x-intercepts) to a quadratic equation by graphing.

Directions: Use a graphing calculator to answer the following.

Preliminary Setup:

Turn [ON] the calculator (located on the bottom left of the calculator)  
 Press [Y=] and after the  $Y_1 =$  press [CLEAR] (which is found under the down blue arrow)  
 Press [ZOOM], and then press [6] (for standard)  
 On TI81's press [RANGE] and change the  $X_{min} = -10$  to  **$X_{min} = -9$**  or  
 On TI82's and TI83's press [WINDOW] and change the  $X_{min} = -10$  to  **$X_{min} = -8.8$**

I. Find the *exact* integer roots to the following problems by graphing and tracing over to the x-intercept

- 1) Press [Y=] and after the  $Y_1 =$  enter:  $x^2 - 1x - 6$  by entering  
 on TI81's: [x | T] [x<sup>2</sup>] [-] [1] [x | T] [-] [6] or \*Note: Use a *minus* sign NOT the negative (-) sign  
 on TI82's and TI83's: [x , T ,θ] [x<sup>2</sup>] [-] [1] [x , T ,θ] [-] [6]  
 Press [GRAPH]  
 Press [TRACE]
  - a) To find the first root (i.e. an x-intercept) press the left blue arrow until  $Y = 0$  ✍ Answer:  $X = \underline{\hspace{2cm}}$  when  $Y = 0$
  - b) To find the other root (x-intercept) press [TRACE] and press the right blue arrow until  $Y = 0$   
 ✍ Answer:  $X = \underline{\hspace{2cm}}$  when  $Y = 0$
- 2) Press [Y=] and after the  $Y_1 =$  enter:  $x^2 + 4x - 5$  then press [GRAPH], then press [TRACE]
  - a) To find the first root (i.e. an x-intercept) press the left blue arrow until  $Y = 0$  ✍ Answer:  $X = \underline{\hspace{2cm}}$  when  $Y = 0$
  - b) To find the other root (x-intercept) press [TRACE] and press the right blue arrow until  $Y = 0$   
 ✍ Answer:  $X = \underline{\hspace{2cm}}$  when  $Y = 0$
- 3) Find a root of  $Y_1 = x^2 - 8x + 16$  ✍ Answer:  $X = \underline{\hspace{2cm}}$  when  $Y = 0$
- 4) Find a root of  $Y_1 = x^2 + 2x + 4$  ✍ Answer:  $X = \underline{\hspace{2cm}}$  when  $Y = 0$

New setup:

Press [Y=] and after the  $Y_1 =$  press [CLEAR] (which is found under the down blue arrow)  
 On TI81's press [RANGE] and change the  $X_{min} = -9$  to  **$X_{min} = -5$**  and the  $X_{max} = 10$  to  **$X_{max} = 5$**  or  
 On TI82's and TI83's press [WINDOW] and change the  $X_{min} = -8.8$  to  **$X_{min} = -5$**  and the  $X_{max} = 10$  to  **$X_{max} = 5$**

II. Find the consecutive integers between which the roots to the following problems are located

- 1) Let  $Y_1 = 4x^2 - 9$  then press [GRAPH] Note: There are no integer roots.
  - a) One root is between the two negative integers of \_\_\_\_\_ and \_\_\_\_\_ ✍
  - b) The other root is between the two positive integers of \_\_\_\_\_ and \_\_\_\_\_ ✍
- 2) Let  $Y_1 = 3x^2 + 2x - 10$ 
  - a) One root is between the two negative integers of \_\_\_\_\_ and \_\_\_\_\_ ✍
  - b) The other root is between the two positive integers of \_\_\_\_\_ and \_\_\_\_\_ ✍

Press [Y=] and after the  $Y_1 =$  press [CLEAR] (which is found under the down blue arrow)  
 Turn [OFF] the calculator by pressing [2nd] (blue button - top left) and then [ON]