<u>Roots Graphing Worksheet 2</u>

Name ______________________________

Purpose: By the end of this activity, you will understand the connection (relationship) between factors, roots, and x-intercepts for a quadratic equation.

Directions: Answer the following using a graphing calculator when needed.

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 Xmin = -10 to **Xmin = -9** or
On TI82's and TI83's press [WINDOW] and change the Xmin = -10 to **Xmin = -8.8**

I. Aswer the following given:

1) $5x^2 - 1x - 4$

A) Solve $5x^2 - 1x - 4 = 0$ by factoring
(5x + 4) (x -1) = 0
5x + 4 = 0 or ________ = 0
$x = \frac{-4}{5}$ or -0.8 or x = ________

B) Find the roots (x-intercepts) by graphing the related equation $y = 5x^2 - 1x - 4$ and tracing over to the x-intercept
Recall: Press [Y=] and after the $Y_1 =$ enter: $5x^2 - 1x - 4$ by entering
on TI81's: [5] [x | T] [x^2] [-] [1] [x | T] [-] [4] or *Note: Use a *minus* sign NOT the negative (-) sign
on TI82's and TI83's : [5] [x , T ,θ] [x^2] [-] [1] [x , T ,θ] [-] [4]
Press [GRAPH]
Press [TRACE]
a) To find the first root (i.e. an x-intercept) press the left blue arrow until Y = ✍Answer: X = ______ when Y = 0

b) To find the other root (x-intercept) press [TRACE] and press the right blue arrow until Y = 0
✍Answer: X = ______ when Y = 0

2) $x^2 + 1x - 6$

A) Solve $x^2 + 1x - 6 = 0$ by factoring

(x +____) (____- 2) = 0

________ = 0 or ________ = 0

x = ________ or x = ________

B) Find the roots (x-intercepts) by graphing the related equation $y = x^2 + 1x - 6$ and tracing over to the x-intercept

a) First root (i.e. an x-intercept) ✍ Answer: X = ______ when Y = 0

b) Other root (x-intercept) ✍ Answer: X = ______ when Y = 0

3) $x^2 - 16$

A) Solve $x^2 - 16 = 0$ by factoring

(x +____) (x -____) = 0

________ = 0 or ________ = 0

x = ________ or x = ________

B) Find the roots (x-intercepts) by graphing the related equation $y = x^2 - 16$ and tracing over to the x-intercept

a) First root (i.e. an x-intercept) ✍ Answer: X = ______ when Y = 0

b) Other root (x-intercept) ✍ Answer: X = ______ 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 Xmin = -9 to **Xmin = -4.75** and the Xmax = 10 to **Xmax = 4.75** or
On TI82's and TI83's press [WINDOW] and change the
Xmin = -8.8 to **Xmin = -4.7** and the Xmax = 10 to **Xmax = 4.7**

4) $x^2 + 4x + 2$

A) Can $x^2 + 4x + 2 = 0$ be factored? (yes or no) Answer: ______
Therefore, we can <u>not</u> solve this by the factoring method.

B) Find the roots (x-intercepts) by graphing the related equation $y = x^2 + 4x + 2$ and tracing over to the x-intercept

This problem has two x-intercepts but are they <u>exact</u> (nice) roots? Answer: ______
Therefore, we know that there are roots to this problem since there are x-intercepts which are

between ______ and ______ or between ______ and ______
but it is too hard to find the exact values by graphing and tracing.

Conclusion: To solve a quadratic equation we can *factor* it or *graph* the related equation but as we have just seen not all quadratics factor and some problems when graphed are too hard to find the exact x-intercepts. There is an *algebraic* method that we can use to solve all quadratic equations. It is called completing the square and is discussed later in Algebra.