

Name: \_\_\_\_\_

Date: \_\_\_\_\_

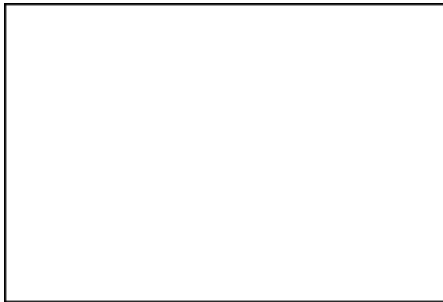
## Lesson 9 Practice Problems

### Section 9.1: Quadratic Equations in Standard Form

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1. Use your graphing calculator to help you determine the number and type of solutions to each of the quadratic equations below.
- Draw an accurate sketch of the graphs indicating the window you used. The vertex and any intercepts or intersection points must appear on the screen.
  - IF your solutions are real number solutions, use the graphing INTERSECT method to find them.
  - Use proper notation to write the solutions and the intercepts.
  - Label the intercepts on your graph.

a)  $x^2 - 6x + 9 = 0$



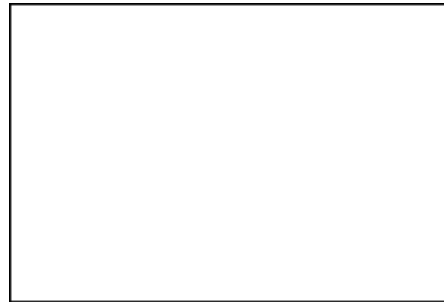
Xmin = \_\_\_\_\_ Ymin = \_\_\_\_\_

Xmax = \_\_\_\_\_ Ymax = \_\_\_\_\_

Number of Real Solutions: \_\_\_\_\_

Real Solutions: \_\_\_\_\_

b)  $5x^2 + 4x - 5 = 0$



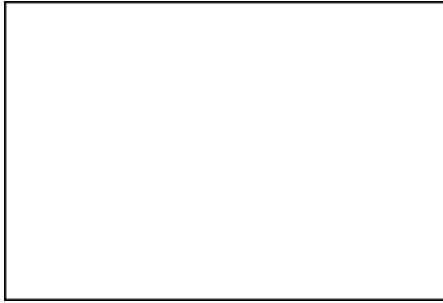
Xmin = \_\_\_\_\_ Ymin = \_\_\_\_\_

Xmax = \_\_\_\_\_ Ymax = \_\_\_\_\_

Number of Real Solutions: \_\_\_\_\_

Real Solutions: \_\_\_\_\_

c)  $2x^2 - 4x = 3$



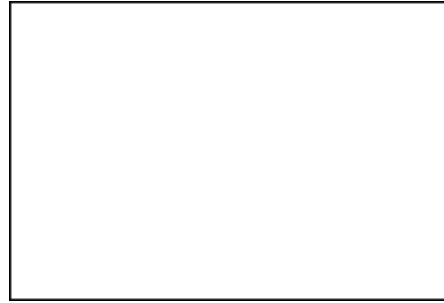
Xmin = \_\_\_\_\_ Ymin = \_\_\_\_\_

Xmax = \_\_\_\_\_ Ymax = \_\_\_\_\_

Number of Real Solutions: \_\_\_\_\_

Real Solutions: \_\_\_\_\_

d)  $3x^2 + 6x + 4 = 0$



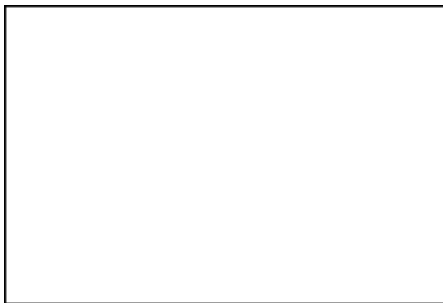
Xmin = \_\_\_\_\_ Ymin = \_\_\_\_\_

Xmax = \_\_\_\_\_ Ymax = \_\_\_\_\_

Number of Real Solutions: \_\_\_\_\_

Real Solutions: \_\_\_\_\_

e)  $3x^2 + 5 = 6x$



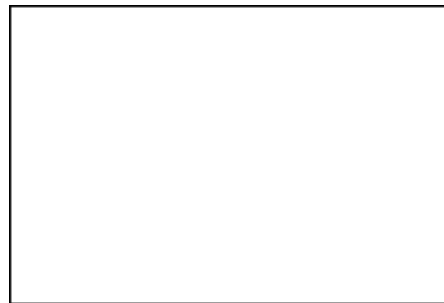
Xmin = \_\_\_\_\_ Ymin = \_\_\_\_\_

Xmax = \_\_\_\_\_ Ymax = \_\_\_\_\_

Number of Real Solutions: \_\_\_\_\_

Real Solutions: \_\_\_\_\_

f)  $-7x^2 = 12x - 4$



Xmin = \_\_\_\_\_ Ymin = \_\_\_\_\_

Xmax = \_\_\_\_\_ Ymax = \_\_\_\_\_

Number of Real Solutions: \_\_\_\_\_

Real Solutions: \_\_\_\_\_

**Section 9.2: Factoring Quadratic Expressions**

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2. Factor each of the following quadratic expressions. Write your answers in completely factored form.

a)  $x^2 + 7x + 6$

b)  $3x^2 + 12x$

c)  $x^2 + x - 20$

d)  $x^2 - 12x + 11$

e)  $x^2 + 7x + 6$

f)  $3x^2 + 12x$

g)  $20x^2 - 5x$

h)  $x^2 + 8x$

i)  $x^2 - 36$

j)  $3x^2 - 6x + 24$

**Section 9.3: Solving Quadratic Equations by Factoring**

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3. Solve each of the following Quadratic Equations by Factoring (GCF). Be sure to write your final solutions using proper notation. Verify your answer by graphing. Sketch the graph on a good viewing window (the vertex, vertical intercept, and any horizontal intercepts should appear on the screen). **Mark and label** the solutions on your graph.

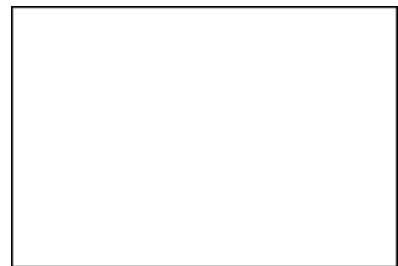
a)  $4x^2 - 8x = 0$



b)  $9x^2 - 6x = 0$



c)  $2x^2 = 4x$



4. Use the Trial and Error Factoring Method to solve each of the quadratic equations below. Be sure to write your final solutions using proper notation. Verify your answer by graphing. Sketch the graph on a good viewing window (the vertex, vertical intercept, and any horizontal intercepts should appear on the screen). **Mark and label** the solutions on your graph.

a)  $x^2 + 8x + 12 = 0$



b)  $x^2 + 42 = x$



c)  $x^2 - 4x = 5$

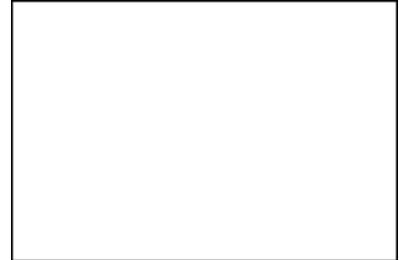


d)  $x^2 - 36 = 0$



5. Use an appropriate factoring method to solve each of the quadratic equations below. Be sure to write your final solutions using proper notation. Verify your answer by graphing. Sketch the graph on a good viewing window (the vertex, vertical intercept, and any horizontal intercepts should appear on the screen). **Mark and label** the solutions on your graph.

a)  $9x^2 + 15x = 0$



b)  $x^2 + 10x - 24 = 0$



c)  $2x^2 - 4x - 30 = 0$



Section 9.3: The Quadratic Formula

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$$\text{Quadratic Formula: } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

6. Solve each quadratic equation by using the Quadratic Formula.
- Place your given quadratic equation in standard form.
  - Identify the coefficients  $a, b, c$
  - Substitute these values into the quadratic formula
  - Simplify your result completely then check your solution graphically
  - Mark and label the solutions on your graph.

a) Solve  $2x^2 - 2x - 4 = 0$  (This one is a fill in the blank)

$$a = \underline{\hspace{2cm}}, \quad b = \underline{\hspace{2cm}}, \quad c = \underline{\hspace{2cm}}$$

$$x = \frac{-(\ ) \pm \sqrt{(\ )^2 - 4(\ )(\ )}}{2(\ )}$$

$$x = \frac{(\ ) \pm \sqrt{(\ ) - (\ )}}{(\ )}$$

$$x = \frac{(\ ) \pm \sqrt{(\ )}}{(\ )}$$

$$x_1 = \frac{(\ ) + \sqrt{(\ )}}{(\ )} \quad \text{and} \quad x_2 = \frac{(\ ) - \sqrt{(\ )}}{(\ )}$$

$$x_1 = \frac{(\ ) + (\ )}{(\ )} \quad \text{and} \quad x_2 = \frac{(\ ) - (\ )}{(\ )}$$

$$x_1 = \frac{(\ )}{(\ )} \quad \text{and} \quad x_2 = \frac{(\ )}{(\ )}$$

$$x_1 = 2 \quad \text{and} \quad x_2 = -1$$

Sketch the graph on a good viewing window (the vertex, vertical intercept, and any horizontal intercepts should appear on the screen). **Mark and label** any real solutions on the graph.



$$X_{\min} = \underline{\hspace{2cm}}$$

$$X_{\max} = \underline{\hspace{2cm}}$$

$$Y_{\min} = \underline{\hspace{2cm}}$$

$$Y_{\max} = \underline{\hspace{2cm}}$$

Final solution  $x = -1, 2$  (Be sure to verify graphically)

b)  $2x^2 - 5x = 4$

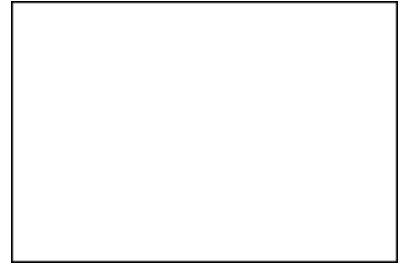


c)  $4x^2 - 2x = 6$





d)  $6x^2 - 4x = 1$



e)  $-2x^2 = 3x + 12$



**Section 9.5: Complex Numbers**

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7. Simplify each of the following and write in the form  $a + bi$ . To work with  $i$  on your calculator, press MODE then change REAL to  $a+bi$  by using your arrow keys. The  $i$  button is on the bottom row.

a)  $\sqrt{-81} =$

b)  $\sqrt{-11} =$

c)  $(4 - 2i) - (6 + 8i) =$

d)  $3i(2 - 4i) =$

e)  $(3 - i)(2 + i) =$

f)  $(4 - 8i) - 3(4 + 4i) =$

g)  $(2 + i)^2 =$

h)  $\frac{4 - \sqrt{-8}}{6} =$

i)  $\frac{1 + \sqrt{-36}}{3} =$

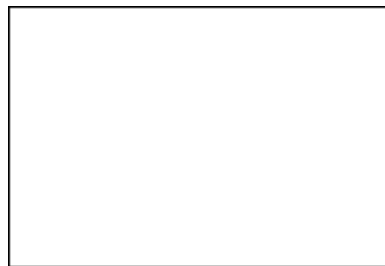
j)  $\frac{2 - \sqrt{4 - 4(2)(5)}}{4} =$

**Section 9.6: Complex Solutions to Quadratic Equations**

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8. Solve the quadratic equations in the complex number system. Leave your final solution in the complex form,  $a \pm bi$ . Sketch the graph on a good viewing window (the vertex, vertical intercept, and any horizontal intercepts should appear on the screen). Mark and label any real solutions.

a)  $\frac{1}{2}x^2 + 5x + 17 = 0$



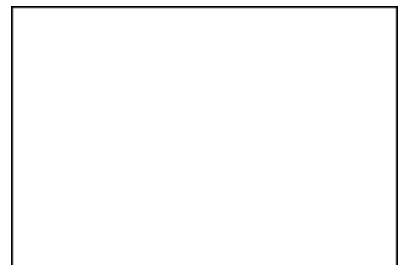
b)  $x^2 + 2x + 5 = 0$



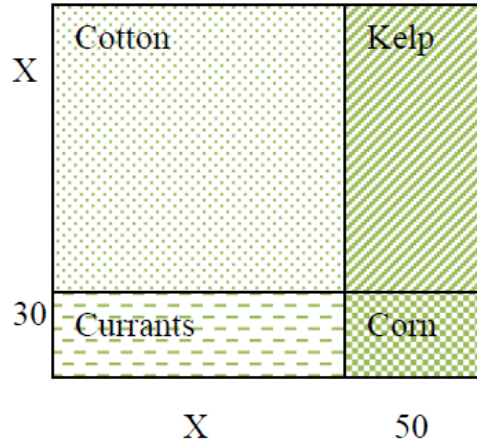
c)  $4x^2 = -9$



d)  $-3x^2 + 4x - 7 = 0$



9. Farmer Treeman wants to plant four crops on his land, Cotton, Corn, Kelp and Currants. He has 40,000 square feet for planting. He needs the length and width of the property to be as shown in the picture below (measured in feet). He determines the equation for the area of his property is  $x^2 + 80x + 1500 = 40000$



- a) What will the length and width of the property need to be? Show your work.

- b) Determine the area of each section of the land. Include units in your answers.

Cotton: \_\_\_\_\_

Kelp: \_\_\_\_\_

Currants: \_\_\_\_\_

Corn: \_\_\_\_\_

