

## Exploring Quadratics in Factored Form: Student Worksheet

The quadratics we have explored so far have all been in the form  $y = ax^2 + bx + c$ . Recall what an equation in this form tells us about its graph.

$y = ax^2 + bx + c$
The "a" value determines:
The "c" value determines:

- Using this information fill in the chart below. Use your TI-Nspire calculator to check your conclusions.

Equation	Direction of the Opening of the parabola	Point where the parabola crosses the y axis
a) $y = x^2 - 8x + 15$		
b) $y = x^2 + x - 6$		
c) $y = -x^2 + 4x$		
d) $y = 2x^2 + 4x + 2$		
e) $y = -3x^2 + 3$		
f) $y = 2x^2 + 12x + 10$		

- You will be filling in the table below with information you have collected on your calculator. Work through the first example with your teacher and then repeat the same steps for the remainder of the examples.

Equation in form $y = x^2 + bx + c$	Equation in the form $y = (x - r)(x - s)$	x-intercepts	Vertex
a) $y = x^2 - 8x + 15$			
b) $y = x^2 + x - 6$			
c) $y = x^2 - 4x - 5$			
d) $y = x^2 - 3x$			
e) $y = x^2 - 9$			
f) $y = x^2 + 6x + 9$			
g) $y = x^2 + 7x + 12$			

3. Can you draw a conclusion about the relationship between the factored form of a quadratic and its x-intercepts? Record it in the box below. Include an example.

$y = (x - r)(x - s)$

4. a) From your chart in #2, can you see a relationship between the x-intercepts and the x-value of the vertex of the parabola?

b) How could the x-value of the vertex be used to find the y-value of the vertex?

c) Use  $y = x^2 - 8x + 15$  as an example. The x-intercepts are 3 and 5. How can we use this information to find the vertex of the parabola.

## Checking For Understanding: Quadratics in Factored Form

Once you have completed the activity sheet Exploring Quadratics in Factored Form, answer the following questions. You may use your TI-Nspire handheld to help you.

- Given the quadratic  $y = x^2 - 11x + 10$ . Answer the following questions and provide an explanation.
  - Does the relation have a maximum or minimum value?
  - What is the y-intercept?
  - What are the zeroes(x-intercepts) for the relation?
- Describe how you could find the zeroes(x-intercepts) of the quadratic relation  $y = x^2 + 2x - 15$  without graphing the relation.
- The vertex of a quadratic relation is at  $(-2,5)$ . Does the relation have a maximum or minimum value? Explain.
- Which of the following equations does the parabola shown represent?

- $y = (x + 1)(x + 4)$
- $y = (x + 2)(x - 3)$
- $y = (x - 2)(x + 3)$
- $y = (x - 2)(x - 3)$

