

# Factored Form of a Quadratic Relation



# Learning Goal

- Relate the factors of a quadratic relation to the key features of its graph.



# Minds on ...

- Let's watch a GIZMO!



# Big Ideas

- A second way of writing the equation of a quadratic relation is called FACTORED FORM.
- It is  $y = a(x - r)(x - s)$ .
- You can find the key features of the parabola from this equation. ( You may have to perform some calculations.)



# Big Ideas (continued)

- The zeros (x-intercepts) are the values of  $r$  and  $s$ .
- The equation of the axis of symmetry is the vertical line halfway between any two symmetric points on the parabola (such as the zeros).
- This is also the x-coordinate of the vertex.

$$x = \frac{(r + s)}{2}$$



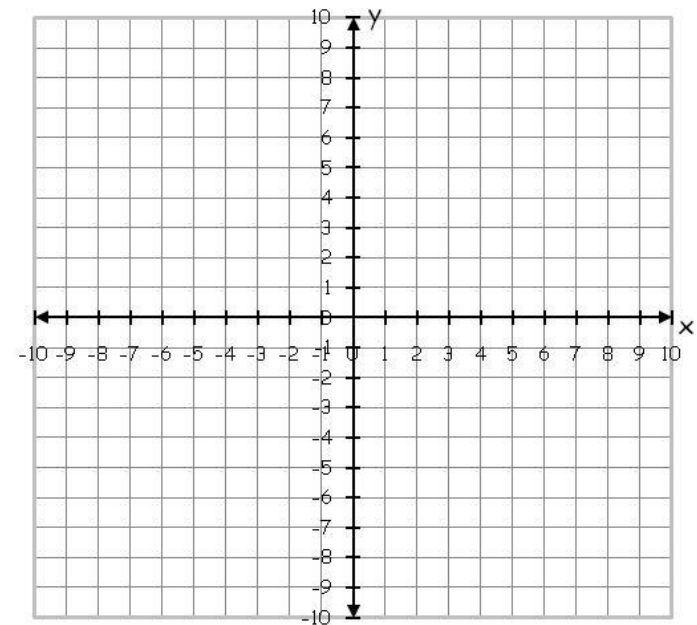
# Big Ideas (continued again)

- The y-coordinate of the vertex is found by substituting the x-coordinate of the vertex into the equation and evaluating.
- The y-intercept is found by substituting a value of  $x=0$  into the equation and evaluating or using the relationship  $c = a \times r \times s$ .



# Example #1

- Identify the key features for the parabola with the equation  $y = 2(x - 1)(x + 2)$  and sketch the graph.



# Example #2

- A quadratic relation has an equation of the form  $y = a(x - r)(x - s)$ , determine the value of  $a$  when the parabola has  $x$ -intercepts at  $(5, 0)$  and  $(-3, 0)$  and a maximum value of 6.





# Consolidation

- Let's try #2 on page 155 together!



# Reinforcement

- Pages 156 – 157
  - #4, 5, 6abc, 7c, 11, 14(table)

