

Date: _____

Factoring Shortcuts (4.3, 4.5)

Microsoft Teams Notebook
or One Note.


Handout Summary (Handouts are posted for you - please try them, try to summarize your findings, and then check your answers on the completed versions of the notes and handouts!)

1) What happens when a = 1? ex/ $x^2 - x - 6$
 $a = -6 \quad (-3)(2) = -6$
 $b = -1 \quad (-3) + 2 = -1$ ← $= (x - 3)(x + 2)$
 The #'s here go into the factors.

2) How can you identify and factor a difference of squares?
 subtraction of perfect square terms, $b = 0$

ex/ $4x^2 - 9$ General: $ax^2 - c$
 $= (2x + 3)(2x - 3)$ $= (\sqrt{a}x + \sqrt{c})(\sqrt{a}x - \sqrt{c})$

3) Why can't we factor a sum of squares?

ex/ $x^2 + 4$ $a = 4$ ← two #'s w/ same sign, but can't
 $b = 0$ add to zero. 

4) How can you identify and factor a perfect square trinomial?

middle term = $2(\sqrt{a})(\sqrt{c})$ ex/ $x^2 + 2x + 1$ General:
 $= (x + 1)^2$ $ax^2 \pm bx + c$
 $= (\sqrt{a}x \pm \sqrt{c})^2$

More Practice:

1) Factor each of the following completely. (CF first)
 a) $x^2 - 4x - 21$ $(-7)(3) = -21$ $(-7) + 3 = -4$
 $= (x - 7)(x + 3)$
 b) $12x^2 - 27$ $(3)(9) = 27$ $(3)(4x^2 - 9)$
 $= 3(2x + 3)(2x - 3)$
 c) $9x^2 + 6x + 1$ $(3x + 1)^2$
 $\sqrt{9x^2} = 3x$
 $\sqrt{1} = 1$

2) For parts a and c, state the zeros, equation of the axis of symmetry, and the coordinates of the vertex.

a) $y = (x - 7)(x + 3)$

$x - 7 = 0$ $x + 3 = 0$
 $x = 7$ $x = -3$

A of S: $x = \frac{7 - 3}{2}$
 $= 2$

Vertex: $y = (2 - 7)(2 + 3)$
 $= (-5)(5)$ Vertex $(2, -25)$
 $= -25$

c) $y = (3x + 1)^2$

Zero: $3x + 1 = 0$
 $3x = -1$
 $x = -\frac{1}{3}$

Vertex: $(-\frac{1}{3}, 0)$

