LEARNING TARGET:

"I can idenfy the equaon of a quadrac in standard form and vertex form".

"I can expand binomials into trinomials of the form $ax^2 + bx + c$, where $a \neq 1$".

"I can convert a quadrac equaon from vertex form into standard form by expanding".

Warm-up:

Common factor:

a) $-3x^2y^8 + 18xy$

$= -3xy(xy^7 - 6)$

b) $25x^3y^2 + 40y^2$

$= 5y^2(5x^3 + 8)$

c) $11p^5r^9 - 7pr^3$

$= pr^3(11p^4r^6 - 7)$

Expand:

a) $2(x - 9)$

$= 2x - 18$

b) $(x - 5)(x + 6)$

$= x^2 + 6x - 5x - 30$

$= x^2 + x - 30$

c) $(x + 2)(x + 7)$

$= x^2 + 7x + 2x + 14$

$= x^2 + 9x + 14$

$= x^2 + x - 30$ $= x^2 + 9x + 14$

In b) and c), we get an equation in the form **$y = ax^2 + bx + c$**. This is known as STANDARD FORM.
$a \neq 0$, but b and c can, so the equation does not have to have 3 terms.

It can look like:

$y = x^2 + 2x + 1$	$y = 2x^2 - 7$	$y = x^2 + 4x$
a = 1	a = 2	a = 1
b = 2	b = 0	b = 4
c = 1	c = -7	c = 0

FOIL

Expand the following to produce a quadratic equation in standard form:

a) $y = (2x - 3)(x + 5)$

$= 2x^2 + 10x - 3x - 15$

$= 2x^2 + 7x - 15$

b) $y = (3z + 7)(4z + 1)$

$= 12z^2 + 3z + 28z + 7$

$= 12z^2 + 31z + 7$

c) $y = 2(x - 2)(x - 6)$

$= 2(x^2 - 6x - 2x + 12)$

$= 2(x^2 - 8x + 12)$

$= 2x^2 - 16x + 24$

d) $y = (x - 2)^2$

$= (x - 2)(x - 2)$

$= x^2 - 2x - 2x + 4$

$= x^2 - 4x + 4$

A quadratic equation can also be expressed in VERTEX FORM: **$y = a(x - h)^2 + k$**, where the vertex is at (h, k), and $a \neq 0$.

State the vertex for each of the following:

a) $y = (x - 3)^2 + 9$ $h=3$ $k=9$

vertex: (3 , 9)

b) $y = 2(x + 7)^2 + 5$ $y=2(x-(-7))^2+5$ $h=-7$ $k=5$

vertex: (-7 , 5)

c) $y = 3x^2 - 7$ $=3(x-0)^2-7$

vertex: (0 , -7)

We can convert from vertex form to standard form by expanding.

For example: a) $y = (x - 3)^2 + 9$

$=(x-3)(x-3)+9$

$=x^2-3x-3x+9+9$

$=x^2-6x+18$

$a = 1$
$b = -6$
$c = 18$

b) $y = 2(x + 7)^2 + 5$

$=2(x+7)(x+7)+5$

$=2(x^2+7x+7x+49)+5$

$=2(x^2+14x+49)+5$

$=2x^2+28x+98+5$

$=2x^2+28x+103$

$a = 2$
$b = 28$
$c = 103$

Today's entertainment: p. 239 #4, 5
p. 245 #1ace, 2ace, 3ace, 4ace