4.2   I can translate quadratic equations from factored and vertex forms INTO standard form.

<u>Level 1</u>
Multiply

1. $8(7x - 3)$

    $8(7x)$ $8(-3)$

    $\boxed{56x - 24}$

2. $4x(-2x^2 - 9x + 3)$

    $4x(-2x^2)$ $4x(-9x)$ $4x(3)$

    $\boxed{8x^3 - 36x^2 + 12x}$

3. $(x + 3)(x - 11)$

    $x(x)$ $x(-11)$ $3x$ $3(-11)$

    $x^2 - 11x + 3x - 33$ $\boxed{x^2 - 8x - 33}$

Write the following equations in standard form

4. $y = (x - 1)(5x + 2)$

    $x(5x)$ $x(2)$ $-1(5x)$ $-1(2)$

    $y = 5x^2 + 2x - 6x - 2$ $\boxed{y = 5x^2 - 4x - 2}$

5. $y = (4x + 5)(4x - 5)$

	$4x$	-5
$4x$	$16x^2$	$-20x$
5	$20x$	-25

    $\boxed{y = 16x^2 - 25}$

6. $y = (2x + 9)^2 + 5$

    $y = (2x + 9)(2x + 9) + 5$

    $y = 4x^2 + 36x + 81 + 5$

    $\boxed{y = 4x^2 + 36x + 86}$

	$2x$	$+9$
$2x$	$4x^2$	$+18x$
$+9$	$18x$	81

7. $y = 7(x - 6)^2 + 8$

    $y = 7(x - 6)(x - 6) + 8$ $y = 7x^2 - 84x + 252 + 8$

    $y = 7(x^2 - 12x + 36) + 8$ $\boxed{y = 7x^2 - 84x + 260}$

    $(x - 6)^2$

	x	-6
x	x^2	$-6x$
-6	$-6x$	$+36$

8. $y = 2(x + 5)^2 - 6$

    $y = 2(x + 5)(x + 5) - 6$ $\boxed{y = 2x^2 + 20x + 44}$

    $y = 2(x^2 + 10x + 25) - 6$

    $y = 2x^2 + 20x + 50 - 6$

	x	$+5$
x	x^2	$5x$
$+5$	$5x$	25

<u>Level 2-3</u>

9. Find the area of a rectangular garden with the dimensions $(9r + 2)$ and $(9r - 2)$

    A. $81r^2 - 36r - 4$ B. $81r^2 - 4$ ⟵(circled)   C. $81r^2 + 4$ D. $81r^2 - 36r + 4$

    $9r + 2$

$9r$	$81r^2$	$+18r$
-2	$-18r$	-4

    $81r^2 - 4$

Find the x intercepts of the following quadratic functions

10. $y = (x - 8)(x + 13)$

$$0 = (x-8)(x+13)$$

$$\underline{x - 8 = 0 \qquad x + 13 = 0}$$

$$\boxed{x = 8 \qquad x = -13}$$

11. $y = (2x - 5)(x + 9)$

$$0 = (2x-5)(x+9)$$

$$2x - 5 = 0 \qquad x + 9 = 0$$

$$2x = 5 \qquad x = -9$$

$$x = \tfrac{5}{2}$$

$$\boxed{x = \tfrac{5}{2} \quad \text{or } 2.5 \qquad x = -9}$$

12.   Write the equation of a quadratic function that has x-intercepts at (-3, 0) and (4, 0).

$$x = -3 \qquad x = 4$$
$$x + 3 = 0 \qquad x - 4 = 0$$

Factored Form: $(x + 3)(x - 4)$

	$x + 3$	
x	x^2	$+3x$
-4	$-4x$	-12

Standard Form: $x^2 - x - 12$

13.   Write the equation of a quadratic function that has x-intercepts at $(-4, 0)$ and $(-9, 0)$

$$x = -4 \qquad x = -9$$
$$x + 4 = 0 \qquad x + 9 = 0$$

Factored Form: $(x + 4)(x + 9)$

$$x(x) \qquad x(9) \qquad 4(x) \qquad 4(9)$$

$$x^2 + 9x + 4x + 36$$

Standard Form: $y = x^2 + 13x + 36$

4.3   *I can translate quadratic equations from standard form INTO factored form.*

Factor Completely

1. $8x + 24$

$$8(x+3)$$

4. $x^2 + 26x + 169$

$$(x+13)(x+13)$$

2. $5x^2 - 45x$

$$5x(x-9)$$

5. $2x^2 + 5x - 12$

$$(2x-3)(x+4)$$

3. $x^2 - 10x + 25$

$$(x-5)(x-5)$$

6. $4x^2 - 12x + 9$

$$(2x-3)(2x-3)$$

Write the equation in Factored (Intercept) form and identify the x-intercepts:

7. $y = x^2 - 36$

$$y = (x-6)(x-6)$$
$$0 = (x-6)(x-6)$$
$$x-6=0 \qquad x-6=6$$
$$x=6 \qquad x=6$$

X-intercepts: $\underline{x=(6,0)}$
$(6,0)$

8. $y = x^2 + 5x - 24$

$$y = (x-3)(x+8)$$
$$0 = (x-3)(x+8)$$
$$x-3=0 \qquad x+8=0$$
$$x=3 \qquad x=-8$$

X-intercepts: $\underline{(3,0)(-8,0)}$

9. $y = 2x^2 + 19x + 17$

$$y = (2x+17)(x+1)$$
$$0 = (2x+17)(x+1)$$
$$2x+17=0 \qquad x+1=0$$
$$2x=-17 \qquad x=-1$$
$$x=\frac{-17}{2}$$

X-intercepts: $\underline{(-\frac{17}{2},0)(-1,0)}$

Write the equation in Factored (Intercept) form:

10. $y = 36x^2 - 100$

$$y = 4(9x^2 - 25)$$
$$y = 4(3x-5)(3x+5)$$
$$0 = 4(3x-5)(3x+5)$$
$$3x-5=0 \qquad 3x+5=0$$
$$\frac{3x}{3}=\frac{5}{3} \qquad \frac{3x}{3}=-\frac{5}{3}$$
$$x=\frac{5}{3} \qquad x=-\frac{5}{3}$$

X-intercepts: $\underline{(\frac{5}{3},0)(-\frac{5}{3},0)}$

11. $y = 12x^2 + 18x - 30$

$$y = 6(2x^2 + 3x - 5)$$
$$y = 6(2x+5)(x-1)$$
$$0 = 6(2x+5)(x-1)$$
$$2x+5=0 \qquad x-1=0$$
$$2x=5$$
$$x=\frac{5}{2}$$

X-intercepts: $\underline{(\frac{5}{2},0)(1,0)}$

12. $y = 5x^2 + 16x + 12$

$$y = (5x+6)(x+2)$$
$$0 = (5x+6)(x+2)$$
$$5x+6=0 \qquad x+2=0$$
$$5x=-6 \qquad x=-2$$
$$x=\frac{-6}{5}$$

X-intercepts: $\underline{(-\frac{6}{5},0)(-2,0)}$

Find the x intercepts of the equations

13. $y = x^2 + 5x - 104$

$$Y = (x+13)(x-8)$$
$$0 = (x+13)(x-8)$$
$$x+13=0 \qquad x-8=0$$
$$x=-13 \qquad x=8$$

X-intercepts: $(-13, 0)(8, 0)$

14. $y = 2x^2 + 13x - 45$

$$Y = (2x-5)(x+9)$$
$$0 = (2x-5)(x+9)$$
$$0 = 2x-5 \qquad x+9=0$$
$$5 = 2x \qquad x=-9$$
$$x = \tfrac{5}{2}$$

X-intercepts: $\left(\tfrac{5}{2}, 0\right)(-9, 0)$

15. Which of the following are x-intercepts for the equation: $y = 2x^2 + 9x - 5$
   Choose ALL that apply.

$$Y = 2x^2 + 9x - 5$$
$$Y = (2x - 1)(x + 5)$$
$$0 = (2x-1)(x+5)$$
$$2x-1=0 \qquad x+5=0$$
$$2x=1 \qquad x=-5$$
$$x=\tfrac{1}{2}$$

   a. ½
   b. - ½
   c. 5
   d. -5

16. The area of a rectangular box is given by the expression $3x^2 - 2x - 16$.
   Find the missing side of the box. *Recall: Area = length x width*

? $3x-8$

$x+2$

$(x+2)(3x-8)$
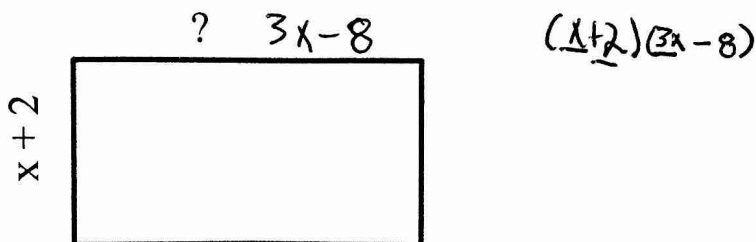
17. Which of the following is a binomial factor of the expression $4x^2 - x - 3$?

   a. 2x + 3
   b. 2x – 3
   c. 4x + 3
   d. 4x - 3