

1. What does it mean to FACTOR an expression, for example $x^2 + 5x - 14$? Be specific.

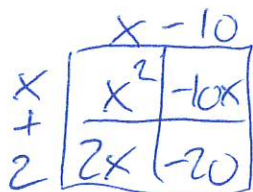
To change it from a sum into a product (L*W)

$$\begin{array}{|c|c|} \hline x & x^2 + 7x \\ \hline -2 & -2x - 14 \\ \hline \end{array} = (x+7)(x-2)$$

L * W

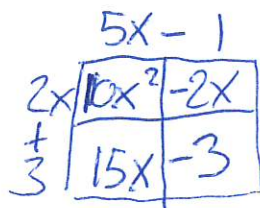
2. Use an area model to factor:

a. $x^2 - 8x - 20$



$(x-10)(x+2)$

b. $10x^2 + 13x - 3$



$(5x-1)(2x+3)$

3. What is the Zero Product Property (you should have notes about this) How can you use the Zero Product Property to solve equations like $10x^2 + 13x - 3 = 0$?

If a product equals zero, then one factor must equal zero.

$$10x^2 + 13x - 3 = 0$$

$$(5x-1)(2x+3) = 0$$

$$5x-1=0 \qquad 2x+3=0$$

4. Solve each equation below. Show your work.

a. $(x-3)(x+7) = 0$

$x=3, x=-7$

b. $(2x-5)(x+3) = 0$

$x=5/2, x=-3$

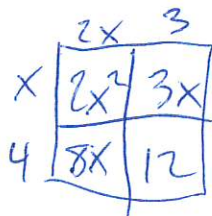
c. $x^2 + 5x - 6 = 0$

$$\begin{array}{|c|c|} \hline x+6 & \\ \hline x & x^2 + 6x \\ \hline -1 & -x - 6 \\ \hline \end{array}$$

$(x+6)(x-1)$

$x=-6, x=1$

d. $2x^2 + 11x + 12 = 0$



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

$x=-3/2, x=-4$

e. $x^2 - 11x = 0$

$x(x-11) = 0$

$x=0, x=11$

f. $(\frac{2}{x} + 2 = \frac{3}{x-1}) \cdot x$

$(x-1)(2+2x = \frac{3x}{x-1}) \cdot x-1$

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

$2x^2-4x-2=0$

$x^2-2x-1=0$

Doesn't factor... Try

5. A model rocket was placed on the Lincoln football field and launched. The rocket follows the path $r(x) = -2(x-2)(x-12)$ where x = horizontal yards traveled and y = height in feet.

a. From what yard line was the rocket launched from? How do you know?

If $r(x)=0$, then $-2(x-2)(x-12)=0$, so $x=2, x=12$ are x -intercepts. Launched from 2 yard line.

b. From what yard line did the rocket land? How do you know?

Landed on 12 yard line b/c x -intercept.

c. What was the maximum height the rocket reached? Explain or show how you found your answer.

Halfway between is highest point.
 $\frac{2+12}{2} = \frac{14}{2} = 7$. Plug in $x=7$

$$r(7) = -2(7-2)(7-12) \\ = -2(5)(-5) = 50 \text{ feet high}$$

6. A second model rocket was launched from 3 yard line on the the Lincoln football field. The rocket reached its highest point of 48 feet directly above the 7 yard line.

a. What yard line did the rocket land on? Show or explain how you know.

Landed on 11 yard line because it went up for 4 yards & must be symmetric! (From 3 to 7) so $7+4=11$

b. Write the quadratic function for this rocket in FACTORED FORM: $y = \#(x - \#)(x - \#)$. Show how you found the dilation factor.

$$y = a(x-3)(x-11) \\ \text{Plug in } (7, 48) \\ 48 = a(7-3)(7-11) \\ 48 = a(4)(-4) \\ 48 = a(-16) \\ -3 = a$$

$$y = -3(x-3)(x-11)$$