Lesson #58
Slide and Divide Introduction

Success Criteria: I am reviewing how to factor out a GCF and using the x puzzle. I am learning the process to do the slide and divide method.

Circle the correct factored form for each problem. Use the GCF method.

1. $3x^2 - 6x =$ $3x(x-6)$ or $3x(x-2)$

2. $8x^2y + 6x =$ $2x(4xy+3)$ or $2x^2(4y+6)$

Circle the correct factored form for each problem. Use the X.

3. $x^2 - x - 6 =$ $(x+2)(x-3)$ or $(x-6)(x+1)$

4. $x^2 - 18x + 72 =$ $(x-2)(x-36)$ or $(x-6)(x-12)$

Circle the correct factored form for each problem. You may distribute the answers.

5. $5x^2 + 17x + 6 =$ $(5x+2)(x+3)$ or $(5x+5)(x+12)$

6. $3x^2 - 2x - 5 =$ $(3x-5)(x+1)$ or $(3x+5)(x-1)$

7. Follow the step by step process below for "Slide and Divide".

For the expression $3x^2 - 2x - 5$:

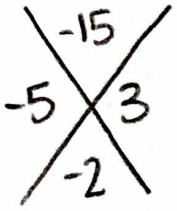
a. Identify a, b, and c in this expression.

$a = 3$ $b = -2$ $c = -5$

b. "Slide" the a in front of the c and multiply ac to create a new expression. Fill in the blank with ac.

$x^2 - 2x - \underline{15}$

c. Create an X, where the number on top is ac, and the number on the bottom is b. Solve the X.



d. Rewrite the original problem by filling your two answers into the blanks of this expression:

$$x^2 - 2x - 15 = (x - \underline{5})(x + \underline{3})$$

e. Divide the number in each parentheses by a (fill in the fraction). Then simplify and fill in the blank.

$$x^2 - 2x - 15 = \left(x - \frac{5}{?}\right)\left(x + \frac{3}{?}\right) = (x - \underline{\frac{5}{3}})(x + \underline{\frac{3}{3}})$$

f. "Slide back": If there is still a denominator, slide it back in front of the x in each group. Fill in the blank.

$$\left(x - \frac{5}{3}\right)(x+1) = (\underline{3x-5})(x+1)$$

g. Look at your results. How do they compare to the answer to #6?

Lesson #58b
Section 7.6: Factoring $ax^2 + bx + c$

Warm-Up:
Factor each expression. Remember to always check for a GCF **!**

1. $x^2 - 12x - 64$

-64: 4, -16; 4 + (-16) = -12

$(x+4)(x-16)$

2. $7p^2 - 42p + 35$

5: -5, -1; -5 + (-1) = -6

$7(p^2 - 6p + 5)$

$7(p-5)(p-1)$

Solve.

3. $x^2 - 2x = 63$

$x^2 - 2x - 63 = 0$

-63: -9, 7; -9 + 7 = -2

$(x-9)(x+7) = 0$

$x - 9 = 0$ $\quad$ $x + 7 = 0$

$x = 9$ $\quad$ $x = -7$

4. $5x - 14 = -x^2$

$x^2 + 5x - 14 = 0$

-14: 7, -2; 7 + (-2) = 5

$(x+7)(x-2) = 0$

$x + 7 = 0$ $\quad$ $x - 2 = 0$

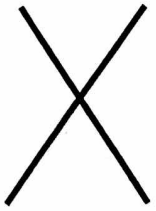
$x = -7$ $\quad$ $x = 2$

What are two ways we could check our answers?

Success Criteria: I can factor a polynomial that has a number in front of x^2.

Factoring $ax^2 + bx + c$

Find the factors of *ac* that add together to give *b*.
Then follow the method from the Introduction.



Examples: Factor each expression. Remember to check for a GCF **.**

1. $2x^2 + 11x + 5$

10: 10, 1; 10 + 1 = 11

$\left(x + \frac{10}{2}\right)\left(x + \frac{1}{2}\right)$

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

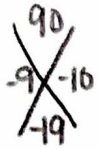
2. $5a^2 - 8a + 3$

15: -3, -5; -3 + (-5) = -8

$\left(a - \frac{3}{5}\right)\left(a - \frac{5}{5}\right)$

$(5a-3)(a-1)$

3. $6x^2 - 19x + 15$



$(x - \frac{9}{6})(x - \frac{10}{6})$

$(6x-9)(6x-10)$

OR

$(x - \frac{3}{2})(x - \frac{5}{3})$

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

4. $8p^2 + 10p + 6$

$2(4p^2+5p+3)$

can't be factored

Lesson #59
Factoring Special Products ($a^2 - b^2$)

Success Criteria: I can factor special products using the x method, slide and divide or the pattern method.

Warm-Up: Factor each expression using an X. (Hint: If there is no *x*-term, what is *b*?)

1. x^2-16

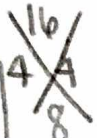
$(x+4)(x-4)$

2. x^2+16

can't be factored

3. $x^2+8x+16$

$(x+4)(x+4)$



Difference of Squares Pattern: (TWO Terms)

$$a^2 - b^2 = (a+b)(a-b)$$

Example: $9x^2 - 25 = (3x)^2 - (5)^2 = (3x+5)(3x-5)$

There must be a subtraction sign in between terms*

Examples: Factor each expression. Be sure to always check for a GCF.

4. $p^2 - 25$

p^2-5^2 $(p-5)(p+5)$

5. $16s^2 - 225$

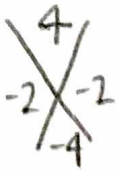
$(4s)^2-15^2$ $(4s-15)(4s+15)$

6. $x^2 + 4$

x^2+2^2 can't be factored

7. $x^2 - 4x + 4$

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



Examples: Solve.

8. $x^2 - 64 = 0$

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

$x-8=0$ $\quad$ $x+8=0$

$\boxed{x=8}$ $\quad$ $\boxed{x=-8}$

9. $8n^2 = 32$

$8n^2-32=0$

$8(n^2-4)=0$

$8(n-2)(n+2)=0$

$n-2=0$ $\quad$ $n+2=0$

$\boxed{n=2}$ $\quad$ $\boxed{n=-2}$

10. $4g^2 - 81 = 0$

$(2g)^2-9^2=0$

$(2g-9)(2g+9)=0$

$2g-9=0$ $\quad$ $2g+9=0$

$2g=9$ $\quad$ $2g=-9$

$\boxed{g=\frac{9}{2}}$ $\quad$ $\boxed{g=\frac{-9}{2}}$

11. $4x^2 - 12x + 9 = 0$

$(x-\frac{6}{4})(x-\frac{6}{4})=0$

$(4x-6)(4x-6)=0$

$(2x-3)(2x-3)=0$

$2x-3=0$ $\quad$ $2x-3=0$

$2x=3$

$\boxed{x=\frac{3}{2}}$ $\quad$ $\boxed{x=\frac{3}{2}}$

Practice: Factor. Remember to check for a GCF _____.

Lesson #60
Factoring Polynomials Completely

Success Criteria: I can apply all of the different factoring methods I have learned to different situations.

Examples: Factor each expression. Be sure to always check for a GCF **!**

1. $z^5 - 4z^4 - 21z^3$

$z^3(z^2-4z-21)$

-21: -7×3, -4

$z^3(z-7)(z+3)$

2. $9x^2 + 6x + 15$

$3(3x^2+2x+5)$

15: 5×3, 2

can't be factored

3. $12x^2 - 2x - 30$

$2(6x^2-x-15)$

-90: -10×9, -1

$2(x-\frac{10}{6})(x+\frac{9}{6})$

$2(x-\frac{10}{6})(x+\frac{9}{6})$

OR

$2(x-\frac{5}{3})(x+\frac{3}{2})$

OR

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

4. $2x^5 - 162x^3$

$2x^3(x^2-81)$

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

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

Examples: Solve each equation. Be sure to always check for a GCF !

1. $2x^3 = 14x^2 + 36x$

$2x^3 - 14x^2 - 36x = 0$

$2x(x^2 - 7x - 18) = 0$

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

$2x = 0 \quad x-9=0 \quad x+2=0$

$\boxed{x=0} \quad \boxed{x=9} \quad \boxed{x=-2}$

2. $12s^4 = 3s^2$

$12s^4 - 3s^2 = 0$

$3s^2(4s^2 - 1) = 0$

$3s^2((2s)^2 - 1^2) = 0$

$3s^2(2s-1)(2s+1) = 0$

$3s^2 = 0 \quad 2s-1=0 \quad 2s+1=0$

$s^2 = 0 \quad 2s = 1 \quad 2s = -1$

$\boxed{s=0} \quad \boxed{s=\frac{1}{2}} \quad \boxed{s=-\frac{1}{2}}$

3. $12x^3 + 42x^2 = -18x$

$12x^3 + 42x^2 + 18x = 0$

$6x(2x^2 + 7x + 3) = 0$

$6x\left(x+\frac{6}{2}\right)\left(x+\frac{1}{2}\right) = 0$

$6x(x+3)(2x+1) = 0$

$6x = 0 \quad x+3=0 \quad 2x+1=0$

$2x = -1$

$\boxed{x=0} \quad \boxed{x=-3} \quad \boxed{x=-\frac{1}{2}}$

Practice:
Factor each expression. Be sure to always check for a GCF !