# Warm-Up 1/31/18

## Factor the following:

1. $4x + 16$

$\frac{4}{4} x + \frac{16}{4}$

$4 \cdot (x + 4)$

2. $x^2+14x+33$

$(x+3)(x+11)$

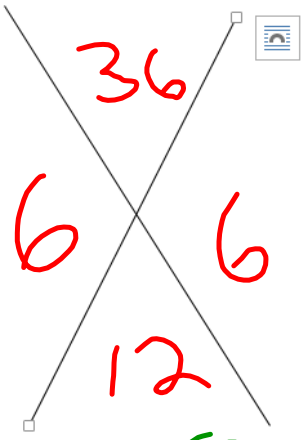
33

3 11

14

## 3. $4x^2 + 12x + 9$

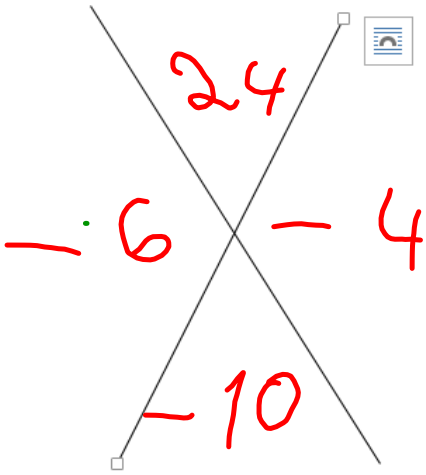
$ac = 36$ $b = 12$




| | $2x$ | $3$ |
|---|---|---|
| $2x$ | $4x^2$ | $6x$ |
| $3$ | $6x$ | $9$ |

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

## 4. $3x^2 - 10x + 8$

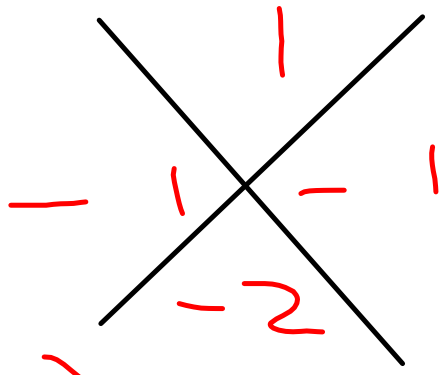



| | $3x$ | $-4$ |
|---|---|---|
| $x$ | $3x^2$ | $-4x$ |
| $-2$ | $-6x$ | $8$ |

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

factored out. It is usually easier to factor out GCF first.

$$\frac{3x^2}{3} - \frac{6x}{3} + \frac{3}{3}$$




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

$a=1\ b=-2\ c=1$

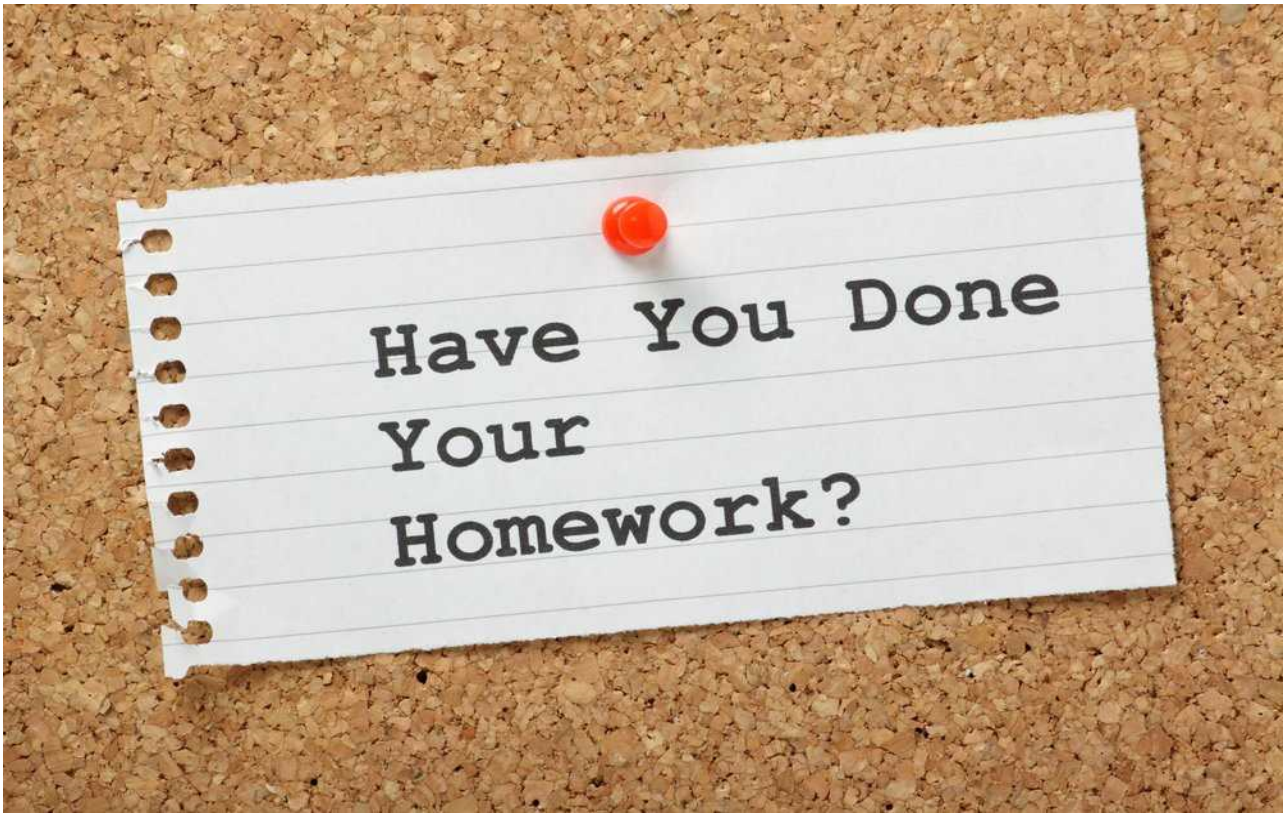
$3(x-1)(x-1)$

$= 3(x-1)^2$

# Objectives 1/31/18

- I can factor quadratic functions using GCF
- I can factor quadratic functions with a = 1, a > 1, and difference of squares

# Turn in your home-work on factoring!



# Review of Factoring 1/31/18

## Factoring Quadratic Expressions

$$ax^2+bx+c$$

To factor means to write an expression as the product of two or more expressions.

A quadratic expression is an algebraic expression in which the greatest exponent is 2.

| Numeric | Algebraic |
|---|---|
| 20 | $x^2+9x+20$ |
| $=(4)(5)$ | $=(x+4)(x+5)$ |

Our goal when factoring is to similar to "undoing" the distributive property.

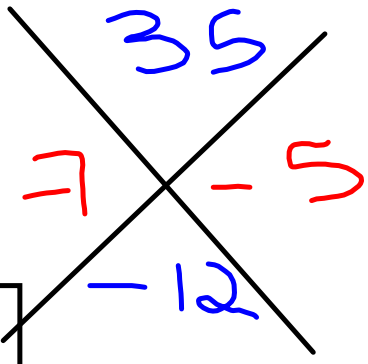
## Factor $x^2+bx+c$ (1-4)

To factor $x^2+bx+c$, you must find what two numbers multiply to c and add to b. If your two numbers are m and n, then $x^2 + bx + c = (x + m)(x + n)$.

1. $x^2 - 12x + 35$

$a=1 \quad b=-12 \quad c=35$

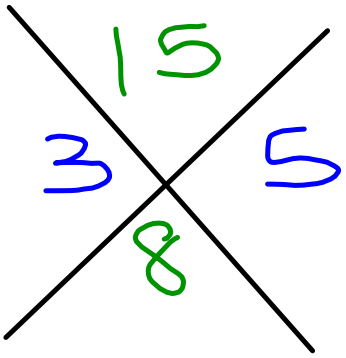
$(x-7)(x-5)$




2. $x^2 + 8x + 15$

$a=1 \quad b=8 \quad c=15$

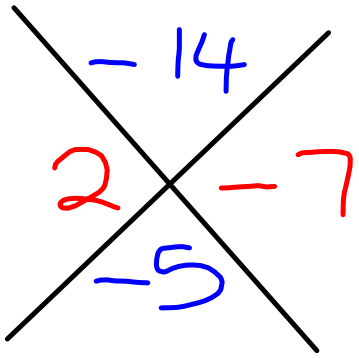
$(x+3)(x+5)$



3. $x^2 - 5x - 14$

$a=1 \quad b=-5 \quad c=-14$

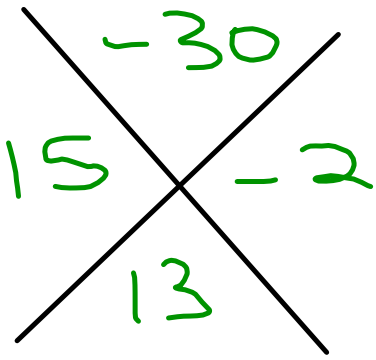
$(x+2)(x-7)$




4. $x^2 + 13x - 30$

$a=1 \quad b=13 \quad c=-30$

$(x+15)(x-2)$



# Factor $a^2-b^2$ (5-9) Difference of Squares

To factor $a^2-b^2$, a difference of squares, you just take the square roots of the terms. These are the terms of each factor. One factor has +, and the other factor has -.

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

5. $x^2 - 9$ $= x^2 - 3^2$

$a = x$

$b = 3$

$(x+3)(x-3)$

6. $x^2 - 36$ $= x^2 - 6^2$

$= (x+6)(x-6)$

7. $x^2 - 400$

$x^2 - 20^2$

$(x+20)(x-20)$

4. $x^2 - 121 = x^2 - 11^2$

$= (x+11)(x-11)$

5. $x^2 - 25$ $x^2 - 5^2$

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

# HW Review

13c

$m^{4 \div 2} - 81$

$\sqrt{m^4} = m^2$

$\sqrt{81} = 9$

$(m^2+9)(m^2-9)$

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

13b $4b^2 - 400$

$a = 2b \quad b = 20$

$(2b+20)(2b-20)$

$$121a^{8} - 64b^{4}$$

$$\div 2 \qquad \div 2$$

$$a = 11a^{4} \qquad b = 8b^{2}$$

$$(11a^{4} + 8b^{2})(11a^{4} - 8b^{2})$$

Post-It

Check!!!

# Factor the following difference of squares

$4x^2-16$

$x^2 = x \cdot x$

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

$\sqrt{4x^2} = 2x$

$\sqrt{16} = 4$

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

Post-It

Check!!!

Factor the following difference of squares

$9x^2-100$

$(3x+10)(3x-10)$

a>1

# Factoring Quadratics

$14x^2 - 12x - 2 = 2(x-1)(7x+1)$

$2(7x^2 - 6x - 1)$

ac = -7
b = -6

-7
1 -7
-6

7x
1

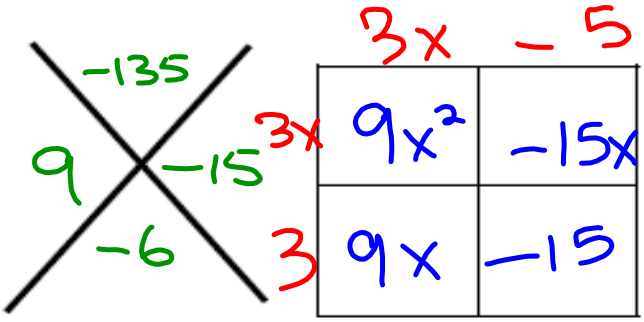
| x | -1 |
|---|---|
| $7x^2$ | -7x |
| 1x | -1 |

## How to Factor

- Check to see if you can factor out a GCF.
- Write the squared term in the top left box.
- Write the constant in the bottom right box.
- The missing diagonal sums to the middle term.
- The missing diagonal multiplies to the product of the other diagonal.
- Find the missing diagonal.
- Determine what was multiplied to form the four boxes.
- Rewrite with parentheses.

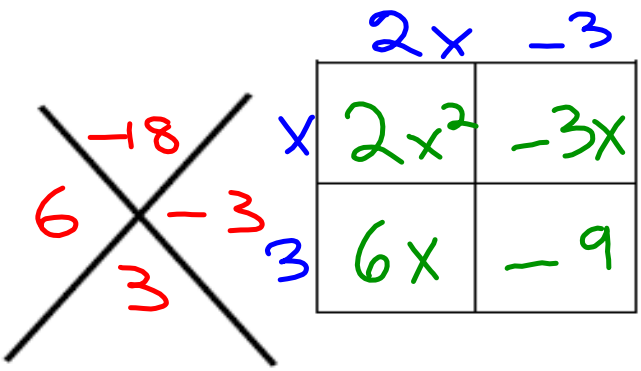
$ac = -135$
$b = -6$

$9x^2 - 6x - 15 =$ $(3x-5)(3x+3)$



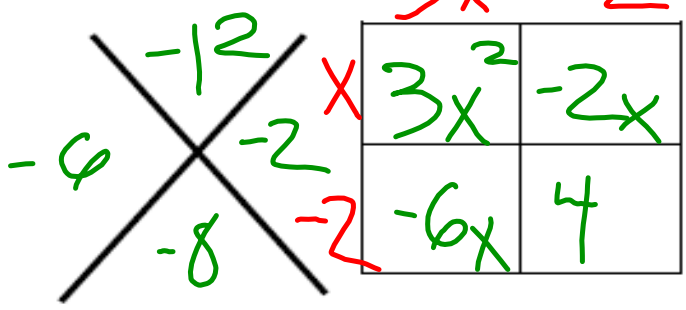

$ac = -18$
$b = 3$

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



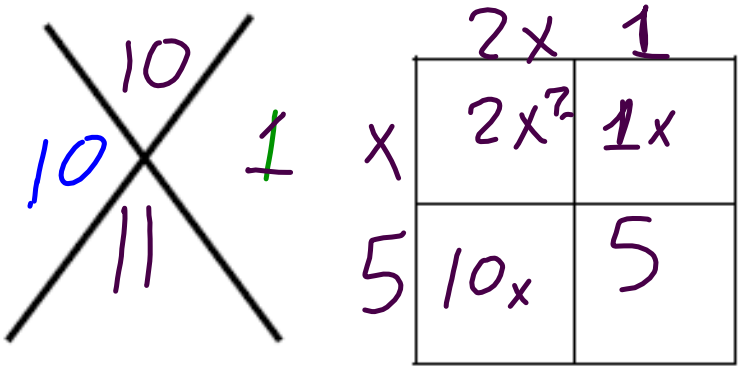

$ac = 12$
$b = 8$

$3x^2 - 8x + 4 =$ $(3x-2)(x-2)$

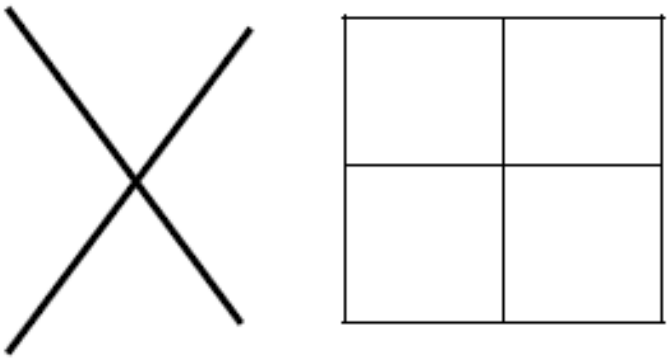


$ac = 10$
$b = 11$

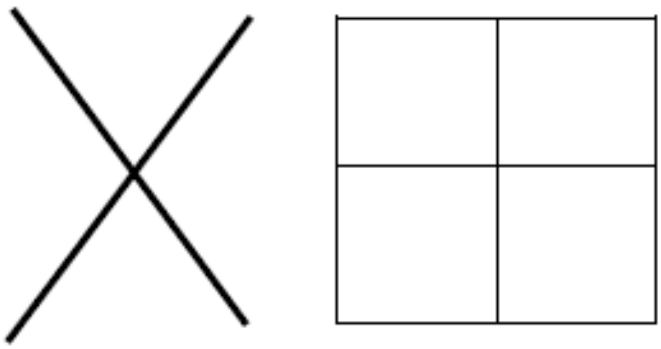
$2x^2 + 11x + 5 =$ $(2x + x)(1 + 5)$




$10x^2 + 80x + 70 =$ ( )( )

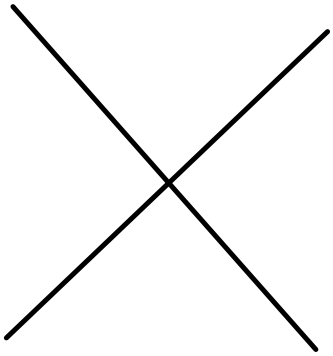


$x^2 - 16 =$ ( )( )

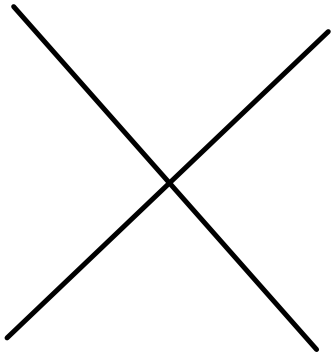


## More Practice

1. $5x^2 - 45x + 40$



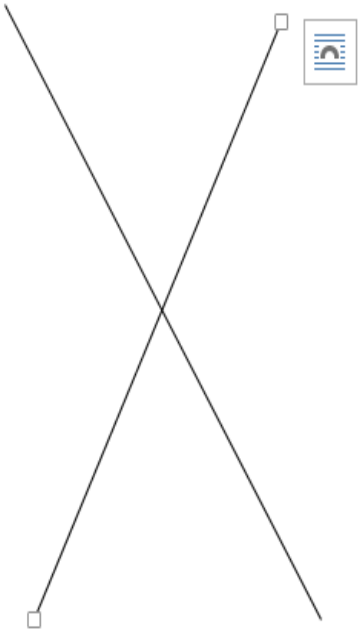
**2.** $3x^3 - 18x^2 - 24x$

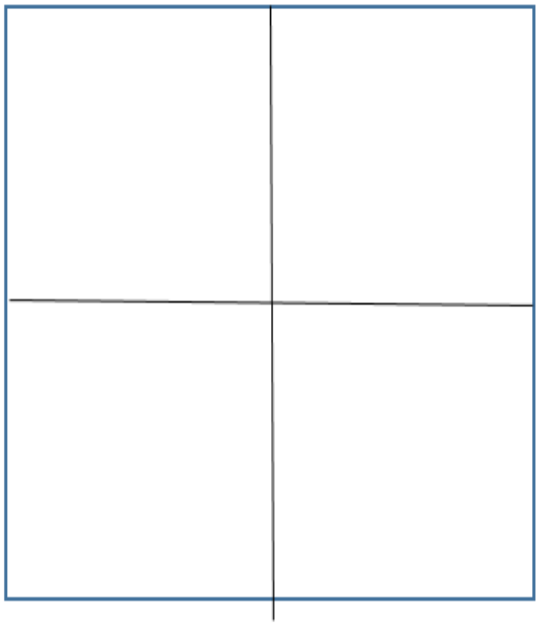


## Factor $ax^2+bx+c$

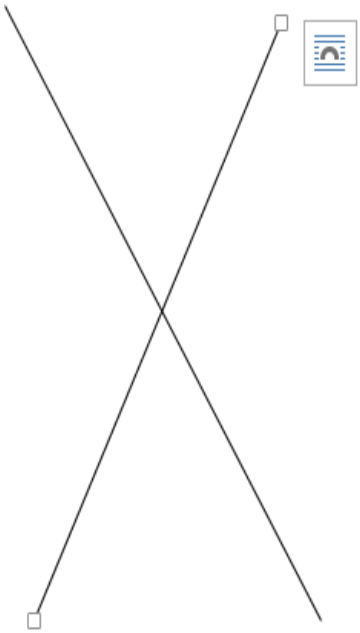
To factor $ax^2+bx+c$, you must find what two numbers multiply to ac and add to b. Then draw the box and fill in with 1st and last term, then fill with m and n.

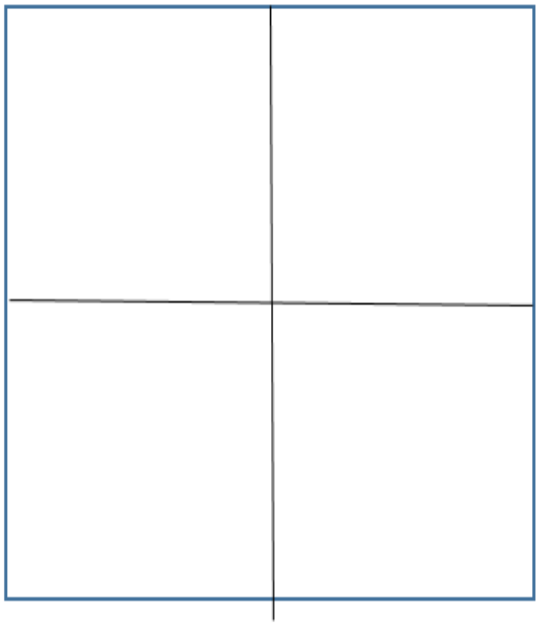
3. $11x^2 - 31x - 6$



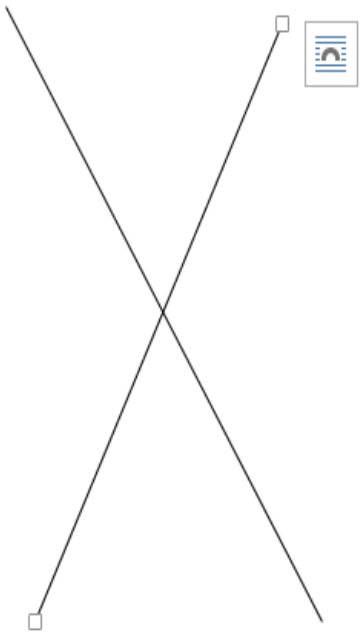


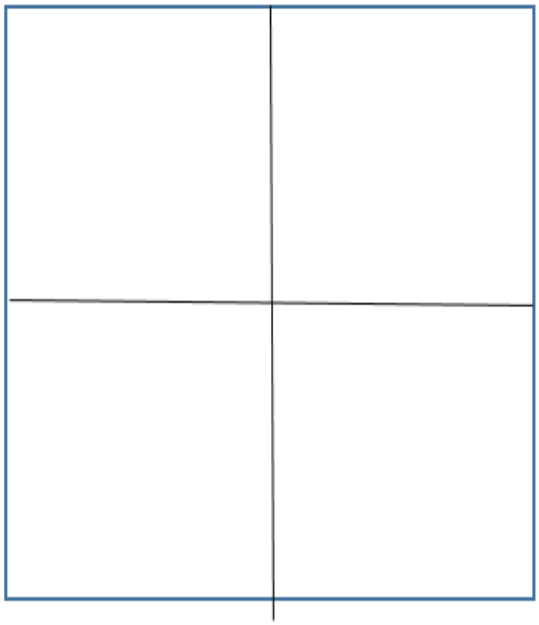
**4.** $7x^2 + 27x - 4$



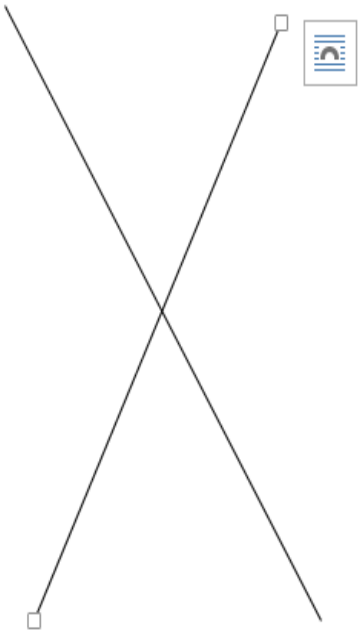


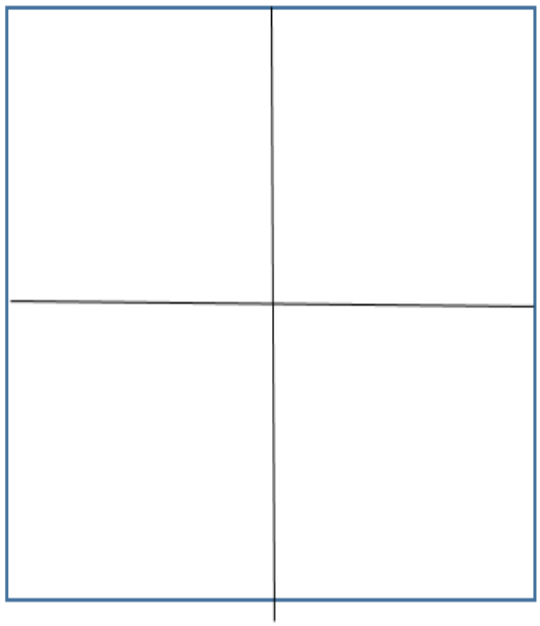
5. $6x^2 + 7x - 5$





**6.** $2x^2 - 19x + 24$





# Closing: Exit Ticket 1/31/18

Factor using GCF, Big X, and X-Box Methods.

1. $18x^2 - 6x$

2. $x^2 + 7x - 18$

3. $7x^2 - 13x - 2$