Sec 5-4: Factoring

Step 1: GCF

Step 2:

- If a binomial look to continue factoring using difference of perfect squares.
- If a trinomial continue factor using X and the Box.
- If four terms factor using the Box.

Also look to see if resulting factors can be factored further, especially if they aren't linear factors.

Factor completely. $-48x^2 + 64x + 12$

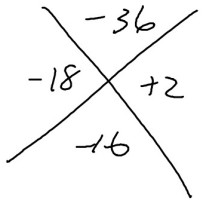
I strongly suggest when you look for GCF that you always factor such that a is positive. You'll find it is easier to factor and will lead to fewer mistakes later on. Even if the three terms didn't have a number in common, if a was negative I would still factor out -1.

GCF = -4

$-48x^2 + 64x + 12$

1. $-4(12x^2 - 16x - 3)$

2a.



3.

	2x	-3
6x	$12x^2$	-18x
+1	+2x	-3

$-4(2x-3)(6x+1)$

Expand each.

The square of a binomial:

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

1. $(x - 6)^2$

You could just use the Box to expand.

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

$x^2 - 12x + 36$

OR

You could use the above formula

You will always get a trinomial. The first and last terms will always be the squares of the terms of the binomial you are squaring. The middle term of the trinomial will always be twice the product of the the terms in the original binomial.

$(x - 6)^2 = (x)^2 + 2(x \cdot -6) + (-6)^2$

$= x^2 - 12x + 36$

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

You could use the box

OR

Use the formula:

$(3x + 5)^2 = (3x)^2 + 2(3x \cdot 5) + (5)^2$

$= (3x)^2 + 2(15x) + (5)^2$

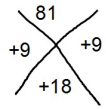
$= 9x^2 + 30x + 25$

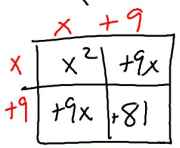
Factor completely. $x^2 + 18x + 81$

You could factor this just as you would any trinomial: GCF, draw the X, then use the BOX.

OR

You might notice that both a and c are perfect squares.

1. No GCF
2. 

3. 

$(x+9)^2$

If you square root x^2 you get x.
If you square root 81 you get 9.
The product of x and 9 is 9x.
Since b is twice this product the final factored form will look like this ( )^2

The terms inside the parentheses will be the square roots you found:

$(x+9)^2$

The sign in the final answer is the same as the sign on the middle term in the original trinomial.

Perfect square trinomial:

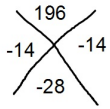
Property	Factoring Perfect Square Trinomials
$a^2 + 2ab + b^2 = (a + b)^2$	$a^2 - 2ab + b^2 = (a - b)^2$

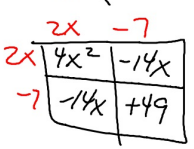
Factor completely. $4x^2 - 28x + 49$

You could factor this just as you would any trinomial: GCF, draw the X, then use the BOX.

OR

You might notice that both a and c are perfect squares.

1. No GCF
2. 

3. 

$(2x-7)^2$

If you square root $4x^2$ you get 2x.
If you square root 49 you get 7.
The product of 2x and 7 is 14x.
Since b is twice this product the final factored form will look like this ( )^2

The terms inside the parentheses will be the square roots you found:

$(2x-7)^2$

The sign in the final answer is the same as the sign on the middle term in the original trinomial.

Factor completely. $48x^4 - 120x^3 + 75x^2$

$3x^2(16x^2 - 40x + 25)$

both a and c are perfect squares. Test to see if b is the correct number.

$\sqrt{16x^2} = 4x$ $\sqrt{25} = 5$

$2(4x \cdot 5) = 40x$

This is the correct value of b to factor into ( )^2

$3x^2(4x-5)^2$

You will get the same answer if you'd rather factor using the X then the Box after the GCF.