3.3 Factoring Quadratic Trinomials part 2 (a=1)

1) Factor each expression completely.

a. $x^2 + 8x - 9$ $\quad -9x^2$

$x^2 - 1x + 9x - 9 \quad 9x \wedge -1x$

$x(x-1) + 9(x-1)$

$\boxed{(x+9)(x-1)}$

b. $n^2 - 7n + 6$ $\quad 6n^2$

$n^2 - 1n - 6n + 6 \quad -6n \wedge -1n$

$n(n-1) - 6(n-1)$

$\boxed{(n-1)(n-6)}$

c. $m^2 - m - 56$ $\quad -56m^2$

$m^2 - 8m + 7m - 56 \quad -8m \wedge 7m$

$m(m-8) + 7(m-8)$

$\boxed{(m+7)(m-8)}$

d. $x^2 + 2x - 8$ $\quad -8x^2$

$x^2 + 4x - 2x - 8 \quad 4x \wedge -2x$

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

$\boxed{(x+4)(x-2)}$

Look back on all of the examples that you did. Look for any patterns that happen in the process. Write down anything you notice.

The two numbers that multiply to a·c & add to b are the numbers that end up in the factors (parentheses)

Turns out that sometimes we can use a shortcut to factor. We can use the shortcut when $a=1$ (after we factor out the GCF).

1) Factor each expression.

a. $x^2 + 7x + 10$ $\quad 10x^2$

$\boxed{(x+5)(x+2)}$ $\quad 5x \wedge 2x$

b. $x^2 + 4x - 32$ $\quad -32x^2$

$\boxed{(x+8)(x-4)}$ $\quad 8x \wedge -4x$

Now that we've had practice when a=1, let's combine this with a greatest common factor. Remember, you can still use the shortcut if $a=1$ after factoring out the GCF.

2) Factor each expression.

a. $2v^2 + 18v + 40$ $\quad 20v^2$

$2(v^2 + 9v + 20) \quad 5v \wedge 4v$

$\boxed{2(v+5)(v+4)}$

b. $3x^2 - 12x - 36$ $\quad -12x^2$

$3(x^2 - 4x - 12) \quad -6x \wedge 2x$

$\boxed{3(x-6)(x+2)}$

c. $-x^2 - 5x + 36$ $\quad -36x^2$

$-(x^2 + 5x - 36) \quad 9x \wedge -4x$

$\boxed{-(x+9)(x-4)}$

d. $-4y^2 - 20y + 56$ $\quad -14y^2$

$-4(y^2 + 5y - 14) \quad 7y \wedge -2y$

$\boxed{-4(y+7)(y-2)}$

e. $3a^3 - 6a^2 - 240a$

$3a(a^2 - 2a - 80)$

$-80a^2$

$-10a \quad 8a$

$3a(a-10)(a+8)$

f. $2x^2 + 16x - 66$

$2(x^2 + 8x - 33)$

$-33x^2$

$11x \quad -3x$

$2(x+11)(x-3)$

3) A square has an area of $x^2 + 10x + 25$. Write an expression in terms of x for the possible length and width of the square.

Area = Length x Width

Length: $x+5$
Width: $x+5$

$x^2 + 10x + 25$

$25x^2$

$5x \quad 5x$

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

Find two binomials that multiply to get $x^2 + 10x + 25$ (aka factor it)

4) The Johnsons are putting a fence in their backyard, but are very picky about the ratio of the fence dimensions. They want to make sure that the area of the lawn is always represented by ~~$x^2 + 20x$~~ $x^2 - 12x + 20$. What expressions could represent the dimensions of their fence?

$x^2 - 12x + 20$

$20x^2$

$-10x \quad -2x$

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