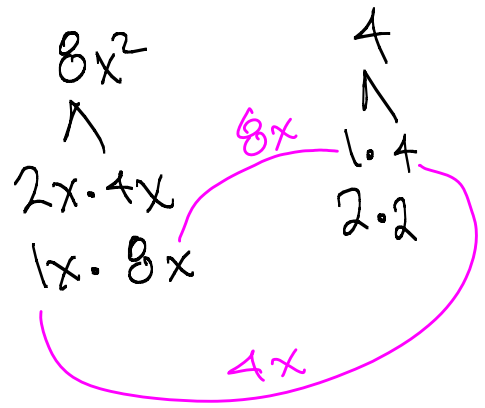
Note Title 10/31/2018

From RR 6

#6) $8x^2 - 12x + 4$ (+) same signs sum of $12x$

$(x - 1)(8x - 4)$



Check: $8x^2 - 4x - 8x + 4$

$8x^2 - 12x + 4$ ✓

→ Not done! we can factor out 4 from $8x - 4$

$(x-1)(8x-4)$

$= (x-1)(4)(2x-1)$

$= \boxed{4(x-1)(2x-1)}$

6.4: Factoring Trinomials using the AC Method

We will not cover this section in class.

★ Do the 6.4 homework the same way you did 6.3

6.5: Difference of Two Squares and Perfect Square Trinomials

Multiply: $(a+b)(a-b)$

$= a^2 - ab + ab - b^2$

$= a^2 - b^2$

Difference of Two Squares Factorization

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

Ex: Factor.

$x^2 - 25$

$= (x)^2 - (5)^2$ [Use $a^2-b^2=(a+b)(a-b)$ with $a=x$ and $b=5$]

$= \boxed{(x+5)(x-5)}$

Check: $x^2 - 5x + 5x - 25$

$= x^2 - 25$ ✓

Ex: Factor.

$4x^2 - 9$

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

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

Check: $4x^2 - 6x + 6x - 9$

$4x^2 - 9$

Perfect squares:

$1^2 = 1$	$7^2 = 49$
$2^2 = 4$	$8^2 = 64$
$3^2 = 9$	$9^2 = 81$
$4^2 = 16$	$10^2 = 100$
$5^2 = 25$	$11^2 = 121$
$6^2 = 36$	$12^2 = 144$

Ex: $100y^2 - 81w^2$

$(10y)^2 - (9w)^2$

$\boxed{(10y - 9w)(10y + 9w)}$

Ex: $36x^2 - 1$

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

$\boxed{(6x-1)(6x+1)}$ or $\boxed{(6x+1)(6x-1)}$

6.5.3

Ex: $x^2 + 49$

Try: $(x+7)^2$

Check: $(x+7)(x+7)$

$x^2 + 7x + 7x + 49$

$= x^2 + 14x + 49$ No!

Try: $(x-7)(x+7)$

$x^2 + 7x - 7x - 49$

$= x^2 - 49$ No!

$x^2 + 49$ is prime. (It does not factor)

Important Fact: $a^2 + b^2$ is always prime.

$x^2 +$ positive is always prime.

Why? Why is $x^2 + 49$ prime?

Rewrite: $x^2 + 0x + 49$ (+) same signs

sum of 0x

A sum of 0x is impossible

x^2 49

$x \cdot x$ $1 \cdot 49$

$7 \cdot 7$

Ex: Factor.

$$32x^2 - 50y^2$$

$$= 2(16x^2 - 25y^2)$$

$$= 2((4x)^2 - (5y)^2)$$

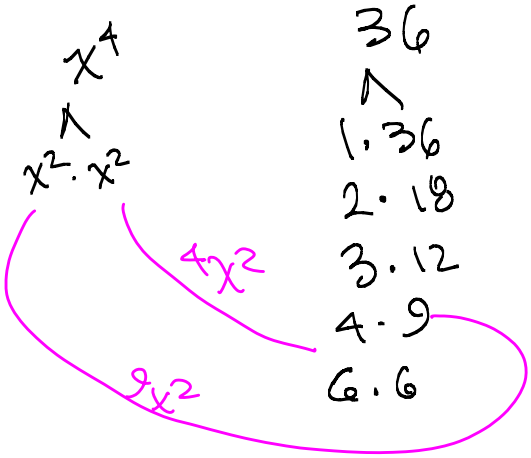
$$= \boxed{2(4x + 5y)(4x - 5y)}$$

Ex: Factor. $x^4 - 13x^2 + 36$

$$(x^2 - 4)(x^2 - 9)$$

(check it!)

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

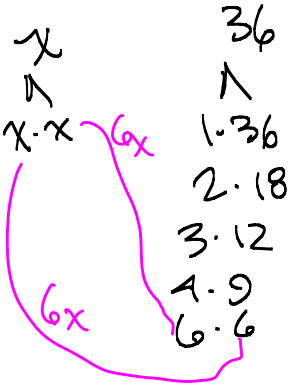


Perfect Square Trinomials

Ex: Factor $x^2 + 12x + 36$.

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

$$= \boxed{(x+6)^2}$$



6.7: Solving Quadratic Equations by Factoring

(skip 6.6)

A **quadratic equation (in x)** is an equation that can be written in the form $ax^2 + bx + c = 0$, where a, b, c are real numbers and $a \neq 0$.

$ax^2 + bx + c = 0$ is **standard form** for a quadratic equation

- ax^2: quadratic term
- bx: linear term
- c: constant term

Zero Product Property

If the product of two numbers is 0, then at least one of the numbers must be 0.

In other words, if $AB = 0$, then

$A = 0$ or $B = 0$.

Ex: Solve.

$$x^2 - 24 = 10x$$

$-10x$ $\quad$ $-10x$

$$x^2 - 10x - 24 = 0$$

[write in standard form with 1 side 0]

$$(x + 2)(x - 12) = 0$$

[factor the nonzero side]

$x + 2 = 0$ $\quad$ OR $\quad$ $x - 12 = 0$

[set each factor equal to 0]

-2 $\quad$ -2 $\quad$ $\quad$ $+12$ $\quad$ $+12$

$$x = -2 \quad \text{OR} \quad x = 12$$

Solution Set: $\boxed{\{-2, 12\}}$

Ex: $4x + 70 = 2x^2$

$-2x^2$ $\quad$ $\quad$ $-2x^2$

$$-2x^2 + 4x + 70 = 0$$

$$-2(x^2 - 2x - 35) = 0$$

$$-2(x + 5)(x - 7) = 0$$

(check it!)

$-2 = 0$ OR $x + 5 = 0$ OR $x - 7 = 0$

False! $\quad$ $x = -5$ $\quad$ $x = 7$

Sol'n Set: $\boxed{\{-5, 7\}}$