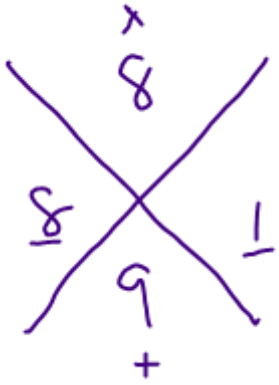
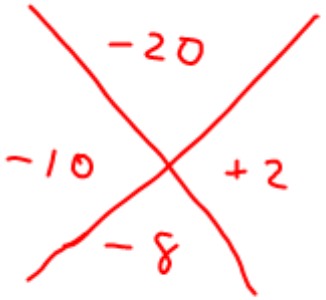
Warmup:
Factor each of the following expressions:

$1x^2 + 9x + 8 = (x+8)(x+1)$



$1x^2 - 8x - 20$ $(x-10)(x+2)$



Warmup:
Factor each of the following expressions:

$12x^2 + 11x + 2 = (3x+2)(4x+1)$

24, 8, 3, 11

$12x^2 + 8x + 3x + 2$

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

$10x^2 - 19x + 6$

60, −15, −4, −19

$10x^2 - 15x - 4x + 6$

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

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

Warmup:
Factor each of the following expressions:

perfect squares

$t^2 - 20t + 100$

$a(1ot) = 20t$

100
-10 -10
-20

$(t-10)(t-10)$

$(t-10)^2$

difference of squares

$49x^2 - 36$

$7x$ 6

$(7x+6)(7x-6)$

1764
42 -42
0

sum of squares

$n^2 + 25$

n 5

$(n+5i)(n-5i)$

E.Q.:

How do we solve a quadratic equation using factoring?

What are the **roots**, or **x-intercepts**, or **zeroes**, or **solutions** to a quadratic equation?

Zero Product Property

-The zero product property is used when solving equations that involve multiple factors.

-The zero product property states:

$$If\ a \cdot b = 0, then\ a = 0\ or\ b = 0$$

-When an equation is in factored form, applying the zero product property says:

1) Set every factor equal to zero.

2) Solve each equation.

Examples:

1) $(2x)(x+4)=0$

$\frac{2x}{2}=\frac{0}{2}$ or $x+4=0$

$x=0$ or $x=-4$

2) $(x-6)(x+9)=0$

$x-6=0$ $\quad$ $x+9=0$

$x=6$ $\quad$ $x=-9$

3) $(2x-5)(x-3)=0$

$2x-5=0$ $\quad x-3=0$

$+5 \quad +5$

$\frac{2x}{2}=\frac{5}{2}$ $\quad x=3$

$x=\frac{5}{2}$

$x=2.5$

4) $x(3x-12)(2x+1)=0$

$x=0$ $\quad 3x-12=0$ $\quad 2x+1=0$

$\frac{3x}{3}=\frac{12}{3}$ $\quad 2x=-1$

$x=4$ $\quad x=-\frac{1}{2}$

SOLVING EQUATIONS BY FACTORING

-We can use our methods of factoring and the zero product property to solve equations.

-In order to solve by factoring:

1) ALWAYS set the equation equal to zero

Make sure the term with x^2 is positive

2) Factor the equation using the appropriate method.

Remember to always check for a GCF first

3) Use factored form to apply the zero product property

Examples:

$x^2 - 7x - 120 = 0$

-120

-15 +8

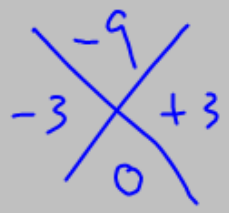
-7

$(x - 15)(x + 8) = 0$

$x - 15 = 0$ $\quad x + 8 = 0$

$x = 15$ $\quad x = -8$

$$x^2 - 9 = 0$$



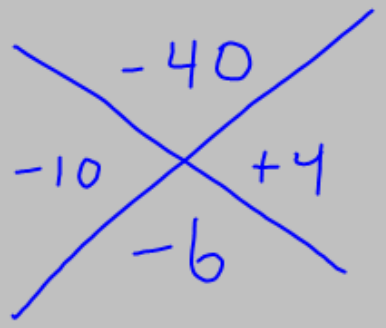
$(x+3)(x-3) = 0$

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

$x=-3$ $\quad$ $x=+3$

$x=\pm 3$

$$8x^2 - 6x - 5 = 0$$



$8x^2 - 10x + 4x - 5$

$2x(4x-5) + 1(4x-5)$

$(2x+1)(4x-5) = 0$

$2x+1=0$ $\quad -1 \quad -1$ $\qquad 4x-5=0$

$x = -\frac{1}{2}$ $\qquad x = \frac{5}{4}$

$$x^2 + 36 = 0$$

$x^2 - 36$

$(x + 6i)(x - 6i) = 0$

$x + 6i = 0 \quad x - 6i = 0$

$x = -6i$ or $6i$

$$x^2 + 2x + 1 = 0$$

Homework #16

Solving quadratics by factoring