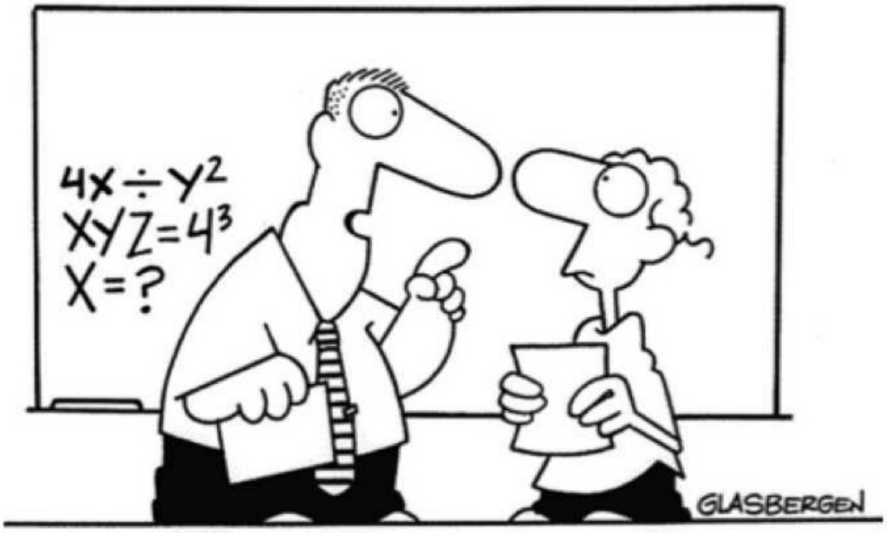
Factoring Bootcamp



"Algebra class will be important to you later in life because there's going to be a test six weeks from now."

*See printout.

(6.) $y = x^2 - 2x - 5$

$y = \underbrace{x^2 - 2x + 1} - 1 - 5$ $\left(\frac{-2}{2}\right)^2$

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

$V : (1, -6)$

3.) $y = \frac{1}{4}(x+4)^2 + 3$

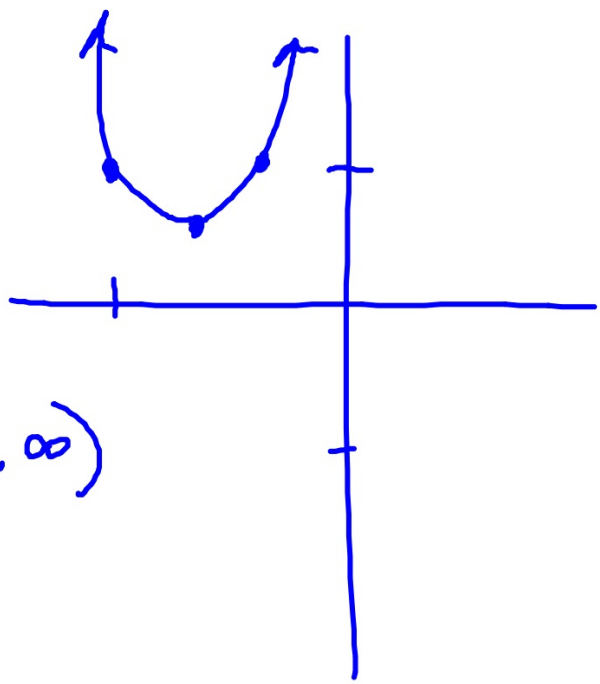
vertex: $(-4, 3)$

AOS. $x = -4$

D: $(-\infty, \infty)$

x	y
-6	4
-4	3
-2	4

R: $[3, \infty)$



10.) $y = x^2 + 3x + 2$

$y = \underbrace{x^2 + 3x + \frac{9}{4}} \underline{-\frac{9}{4}} + 2$

$y = \left(x + \frac{3}{2}\right)^2 - \frac{1}{4}$

$V: \left(-\frac{3}{2}, -\frac{1}{4}\right)$

$\left(\frac{3}{2}\right)^2$

$-\frac{9}{4} + \frac{2}{1} \cdot \frac{4}{4}$

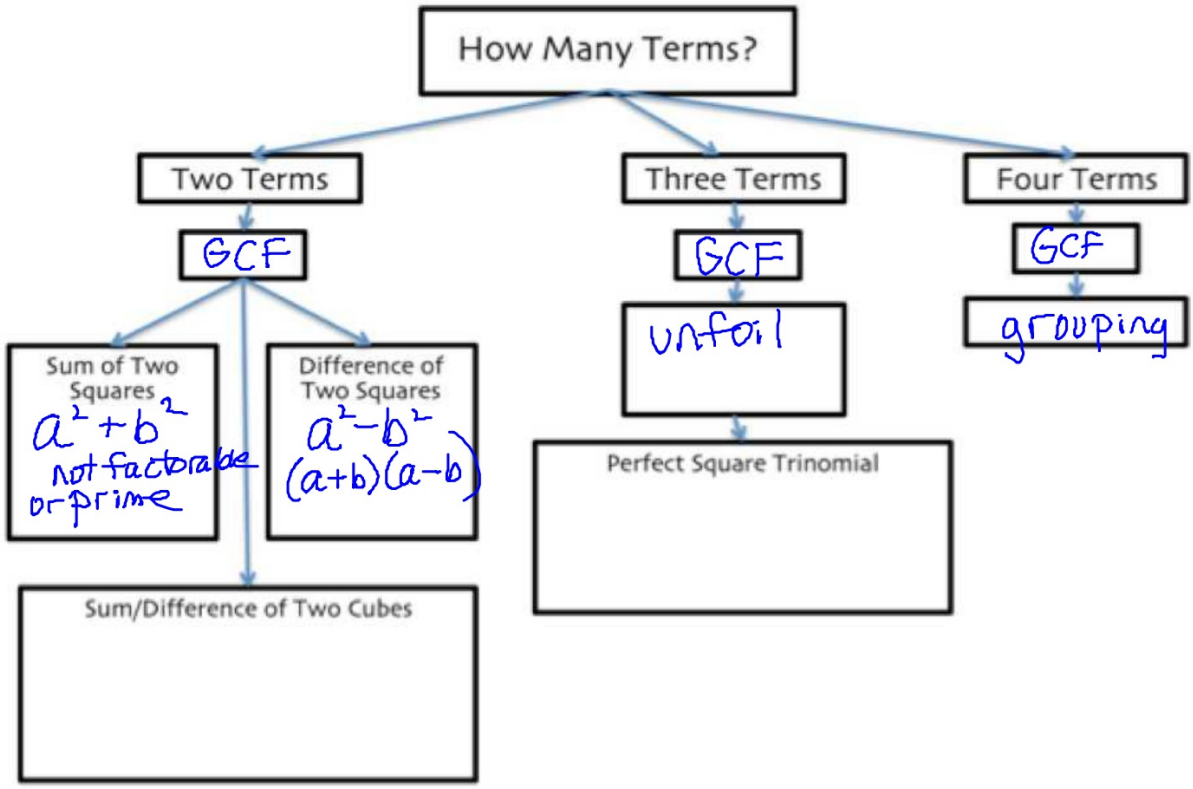
$-\frac{9}{4} + \frac{8}{4}$

5.) $y = x^2 + 16x + 71$

$y = \underbrace{x^2 + 16x + \underline{64}} + \underline{-64} + 71$ $\left(\frac{16}{2}\right)^2$

$y = (x+8)^2 + 7$

Factoring Flowchart



"GCF" –
"SOAP" –
Prime –

GCF - Greatest Common Factor

*ALWAYS the first kind of factoring you do!

1. Identidy the GCF.
2. Divide the GCF out of every term.

Factor completely.

a) $9x + 36$

$9(x+4)$

$x^m \cdot x^n = x^{m+n}$

$\frac{x^m}{x^n} = x^{m-n}$

b) $63 + 45b$

$9(7+5b)$

c) $6n^3 - 3n^5$

$3n^3(2-1n^2)$

d) $-6r^5 - 6r^4$

$-6r^4(1r + 1)$

e) $63x^{12} - 35x^6$

$7x^6(9x^6 - 5)$

f) $14a + 21a^2 + 21a^3 = 7a(2 + 3a + 3a^2)$

g) $10n^3 - 9n^2 + n$

$n(10n^2 - 9n + 1)$

h) $-28v^2 - 8v - 36$

$-4(7v^2 + 2v + 9)$

i) $-8x^7 + 24x^6 + 12x^5 = -4x^5(2x^2 - 6x - 3)$

Two Terms

Sum/Difference of Squares

$$a^2 + b^2 =$$

$$a^2 - b^2 =$$

ex: Factor completely.

a) $x^2 - 49$

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

b) $x^2 - 16$

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

c) $x^2 + 1$

not factorable

d) $4y^2 - 1$

$a = 2y$

$b = 1$

$(2y - 1)(2y + 1)$

$a^2 - b^2$

$(a-b)(a+b)$

e) $2x^2 - 50$

$2(x^2 - 25)$

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

$9y^2 - 25$

$(3y-5)(3y+5)$ $a = 3y$ $b = 5$

f) $x^2 - 9x$

$x(x-9)$

$x^2 - 9$

g) $144 - x^2$

$(12+x)(12-x)$

$x^2 - 144$

$(x+12)(x-12)$

h) $x^{\cancel{4}\,2} - 81$

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

Four Terms

grouping

ex: Factor completely.

a) $\underbrace{12x^3 + 2x^2}\underbrace{-30x - 5}$

$\underbrace{2x^2(6x+1)}\underbrace{-5(6x+1)}$

$(6x+1)(2x^2-5)$

b) $x^3 + x^2 + 4x + 4$

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

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

c) $9x^3 - 9x^2 - 4x + 4$

$9x^2(x-1) - 4(x-1) = (x-1)(9x^2-4)$

$a = 3x$
$b = 2$

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

1.) $y = x^2 + 6x - 4$

vertex:

AOS:

y-int:

set D:

R:

graph

max/min value

2.) $y = -2(x-3)^2 + 1$

vertex

AOS

interval D

R

graph

Convert to standard form

3.) $y = 2(x+5)(x-4)$

4.) $y = 3(x+3)^2 + 7$

5.) Convert to vertex form

$y = x^2 - 8x + 27$

1.) $y = x^2 + 6x - 4$

vertex

$x = \frac{-6}{2(1)} = -3$

$y = (-3)^2 + 6(-3) - 4$

$y = 9 - 18 - 4$

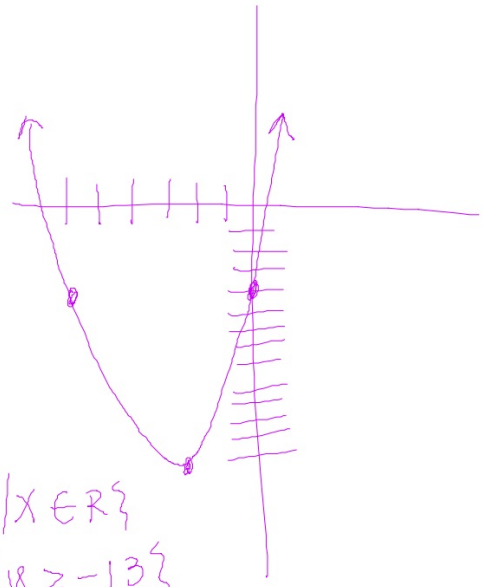
$y = -13$

$(-3, -13)$

$\boxed{\text{min value: } -13}$

AOS: $x = -3$

x	y
0	-4
-3	-13
-6	-4



D: $\{x \mid x \in R\}$

R: $\{y \mid y \geq -13\}$

3.) $y = 2(x+5)(x-4)$

$y = 2(x^2 - 4x + 5x - 20)$

$y = 2(x^2 + x - 20)$

$y = 2x^2 + 2x - 40$