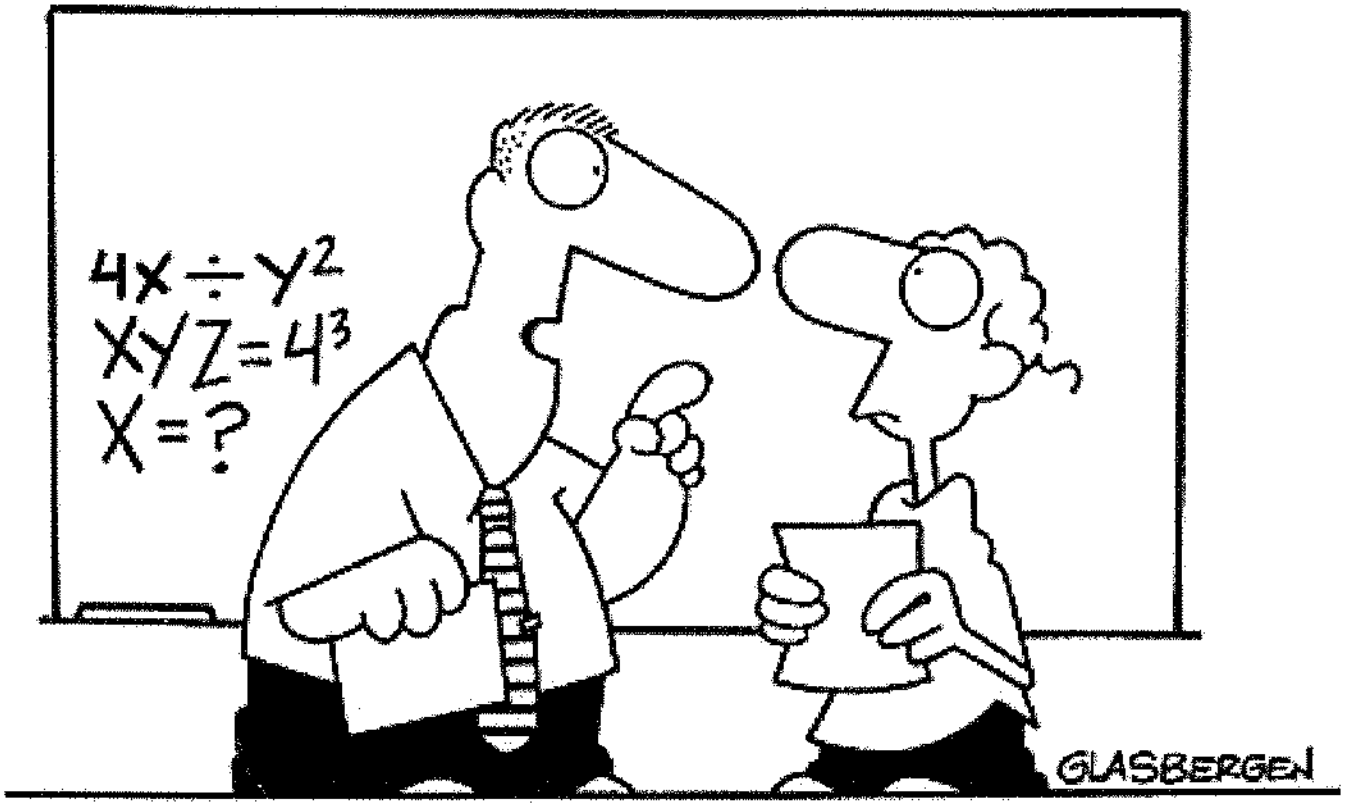
Alg 2

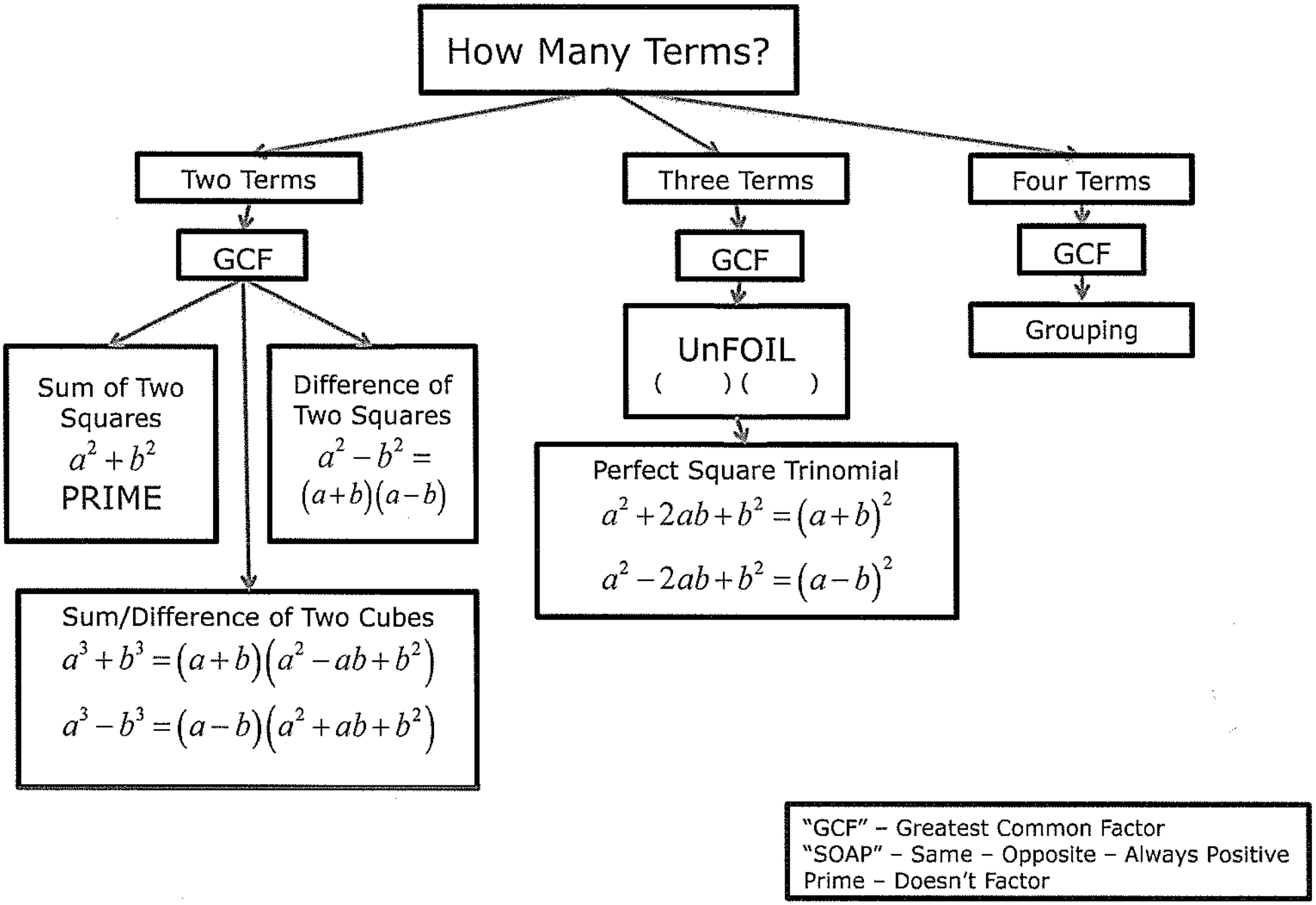
Factoring Bootcamp

Day 1



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

*See printout.



"GCF" – Greatest Common Factor
"SOAP" – Same – Opposite – Always Positive
Prime – Doesn't Factor

GCF - Greatest Common Factor

*ALWAYS the first kind of factoring you do!

1. Identify the GCF.
2. Divide the GCF out of every term.
   "factor"

a) $\frac{9x}{9} + \frac{36}{9}$ 2 terms

gcf ↓

$9(x+4)$

b) $\frac{63}{9} + \frac{45b}{9}$ 2 terms

$9(7+5b)$

Recall:

$n^3 \cdot n^2 = n^5$

$(n^3)^2 = n^6$

c) $\frac{6n^3}{3n^3} - \frac{3n^5}{3n^3}$ 2 terms

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

- Take out the variable w/ the lowest exponent

d) $\frac{+6r^5}{+6r^4} + \frac{+6r^4}{+6r^4}$

leads w/neg.

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

factor out negative

must include

e) $\frac{63x^{12}}{7x^6} - \frac{35x^6}{7x^6}$

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

f) $\frac{14a}{7a} + \frac{21a^2}{7a} + \frac{21a^3}{7a}$ 3 terms

$7a(2 + 3a + 3a^2)$

g) $\frac{10n^3}{n} - \frac{9n^2}{n} + \frac{n}{n}$ 3 terms

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

must include

h) $\frac{-28v^2}{-4} - \frac{8v}{-4} - \frac{36}{-4}$

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

factor out negative

change all signs

i) $\frac{-8x^7}{-4x^5} + \frac{24x^6}{-4x^5} + \frac{12x^5}{-4x^5}$

$-4x^5(2x^2 - 6x - 3)$

Two Terms

Sum/Difference of Squares

$a^2 + b^2 =$ **Prime** "Does not factor."

↑ Sum

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

- opposite signs cause the middle term to cancel

↑ (Diffence of Squares) "DOS"

Foil to check:

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

$a^2 - b^2$

ex: Factor completely.

a) $x^2 - 49 = \boxed{(x+7)(x-7)}$

DOS

no gcf

$7^2 = 49$

b) $x^2 - 16 = \boxed{(x+4)(x-4)}$

DOS

no gcf

$4^2 = 16$

no gcf:

c) $x^2 + 1 = \boxed{\text{Prime}}$

sum of squares

$1^2 = 1$

no gcf:

d) $4y^2 - 1 = \boxed{(2y+1)(2y-1)}$

Dos

$2^2 = 4$

$1^2 = 1$

e) $\frac{2x^2}{2} - \frac{50}{2} = 2(x^2 - 25)$

gcf: 2

↓ Dos

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

f) $\frac{x^2}{x} - \frac{9x}{x} = \boxed{x(x-9)}$

gcf: x

not squared, can't factor further.

g) $144 - x^2 = \boxed{(12+x)(12-x)}$

no gcf

DOS

$12^2 = 144$

not the same as $(x+12)(x-12) = x^2 - 144$

no gcf:

h) $x^4 - 81 = (x^2+9)(x^2-9)$

Prime DOS again!

Study this one!

$= \boxed{(x^2+9)(x+3)(x-3)}$

DOS

$x^4 = x^2 \cdot x^2$

$9^2 = 81$

Four Terms "Grouping"

ex: Factor completely. GCF 1st !!!

no gcf for all 4 terms

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

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

gcf gcf

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

write this one once.

no gcf for all 4 terms

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

x^2 x^2 | 4 4

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

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

Prime (sum of squares)

no gcf for all 4 terms

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

$9x^2$ $9x^2$ | -4 -4

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

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

Dos

Study this one!

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

no gcf for all 4 terms

d) $8x^3 - 64x^2 + x - 8$

$8x^2$ $8x^2$ | | |

Study this one!

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

↑ needed

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

↑ must have