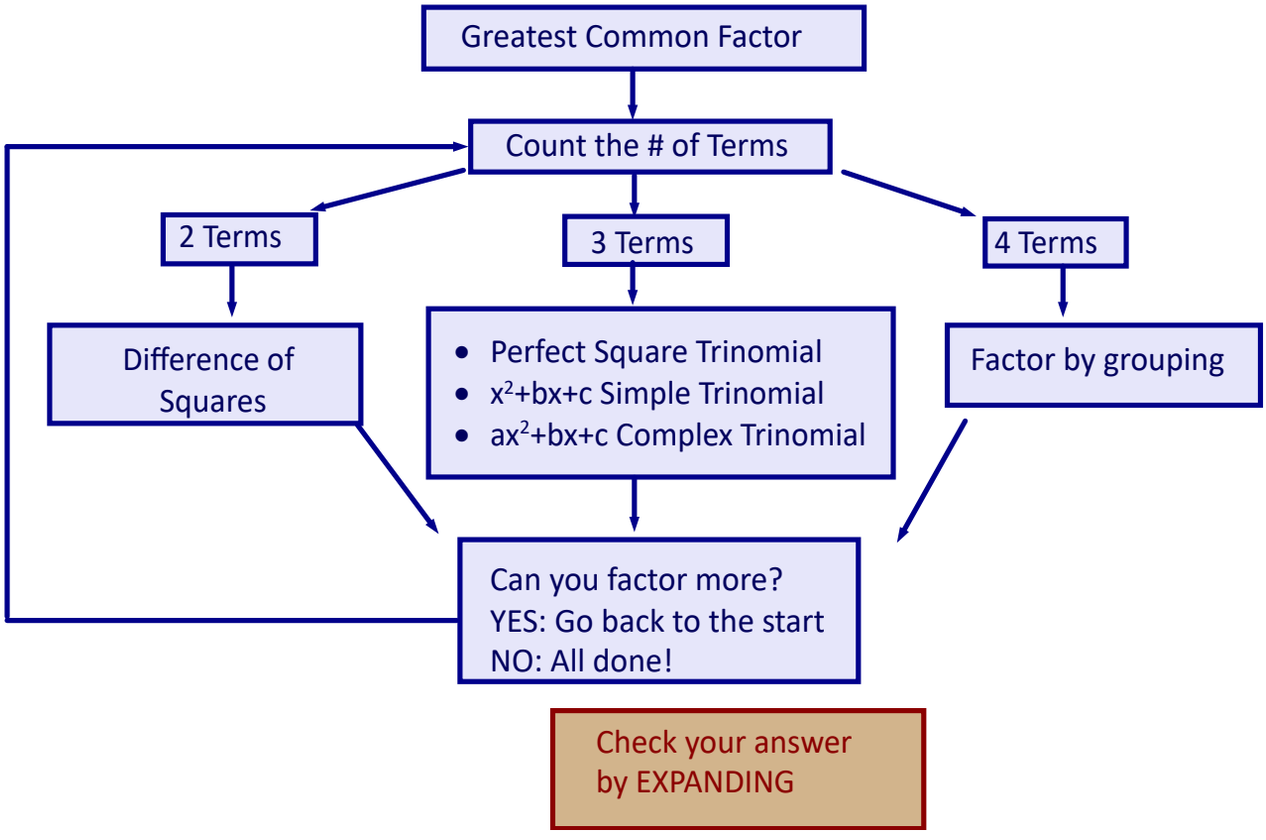
4.9 More Factoring - Putting it All Together

Factoring Decision Tree



Ex. 1 Factor, if possible.

a) $x^2 - 2x - 15$

$= (x-5)(x+3)$

M -15
A -2
N $-5, 3$

b) $16x^2 - 49y^2z^4$ Diff. of squares!

$= (4x - 7yz^2)(4x + 7yz^2)$

c) $15x^2 + 27x - 6$

$= 3(5x^2 + 9x - 2)$
$= 3(5x^2 + 10x - 1x - 2)$
$= 3[5x(x+2) - 1(x+2)]$
$= 3(x+2)(5x-1)$

M -10
A 9
N $10, -1$

	x	2
$5x$	$5x^2$	$10x$
-1	$-1x$	-2

d) $9x^2 - 42xy + 49y^2$

$3x$ $7y$

$3x(7y)(2) = 42xy$ ✓ Perfect square

$= (3x - 7y)^2$

e) $3x^2 + 7x - 12$

Cannot factor.

"prime"

M -36
A 7
N ?

f) $3x^2 - 18x + 24$

$= 3(x^2 - 6x + 8)$
$= 3(x-2)(x-4)$

M 8
A -6
N $-2, -4$

	x	-2
x	x^2	$-2x$
-4	$-4x$	8

Ex. 2 Factor, if possible.

a) $8x^2 + 10xy - 3y^2$

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

	$2x$	$3y$
$4x$	$8x^2$	$12xy$
$-y$	$-2xy$	$-3y^2$

M -24
A 10
N 12, -2

b) $20x^2 + 100xy + 125y^2$

$= 5(4x^2 + 20xy + 25y^2)$

$= 5(2x + 5y)^2$

c) $6x^3 + 6x^2 - 8x - 8$

$= 2(3x^3 + 3x^2 - 4x - 4)$

$= 2[3x^2(x+1) - 4(x+1)]$

$= 2(x+1)(3x^2 - 4)$

	x	1
$3x^2$	$3x^3$	$3x^2$
-4	$-4x$	-4

d) $(x+2)^2 - 9$ if $a = x+2$....

$a^2 - 9$

$= (a+3)(a-3)$

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

$= (x+5)(x-1)$

e) $x^2 + 7x - 10$

Not possible "prime"

M -10
A 7
N ?

f) $121w^2 - 144$

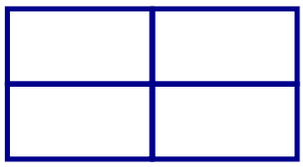
$= (11w - 12)(11w + 12)$

Ex. 3 Factor, if possible.

a) $3k^2+12k-36$

$=3(k^2+4k-12)$

$=3(k+6)(k-2)$



b) $4mn+3m+12n+9$

$=(4n+3)(m+3)$

	$4n$	3
m	$4mn$	$3m$
3	$12n$	9

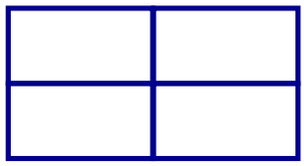
c) $16h^2-16h+4$

$=4(4h^2-4h+1)$

$=4(2h-1)^2$

$2h \times 2 = 4h$?

Yes! Perfect Square



d) $2x^2-7xy-6y^2$

Cannot factor

"Prime"

M -12

A -7

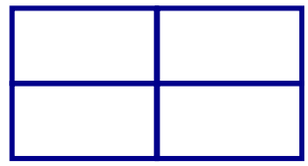
N

-12

$1, 12$

$2, 6$

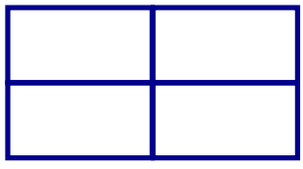
$3, 4$



e) w^4-16

$=(w^2-4)(w^2+4)$

$=(w-2)(w+2)(w^2+4)$



f) $12x^2-15x+3$

$=3(4x^2-5x+1)$

$=3(4x-1)(x-1)$

M 4

A -5

N $-4, -1$

	x	-1
$4x$	$4x^2$	$-4x$
-1	$-1x$	1

Ex. 3 The area of a rectangular swimming pool is represented by $A = 10x^2 + 11x - 6$.

a) Determine an expression for the length and width of the pool.

Just means "factor"

$A = (2x+3)(5x-2)$

$L = 2x+3$

$W = 5x-2$

	$5x$	-2
$2x$	$10x^2$	$-4x$
3	$15x$	-6

M -60
A 11
N -4, 15

b) Determine the length and width of the pool if x=5m.

$x = 5$

$L = 2(5)+3$
$= 13$

$W = 5(5)-2$
$= 23$

∴ length is 13m

width is 23m

c) Determine the area of the pool if x=5m.

$Area = L \times W$
$= 13(23)$
$= 299$

Long way...
$A = 10(5)^2 + 11(5) - 6$

∴ Area is $299m^2$