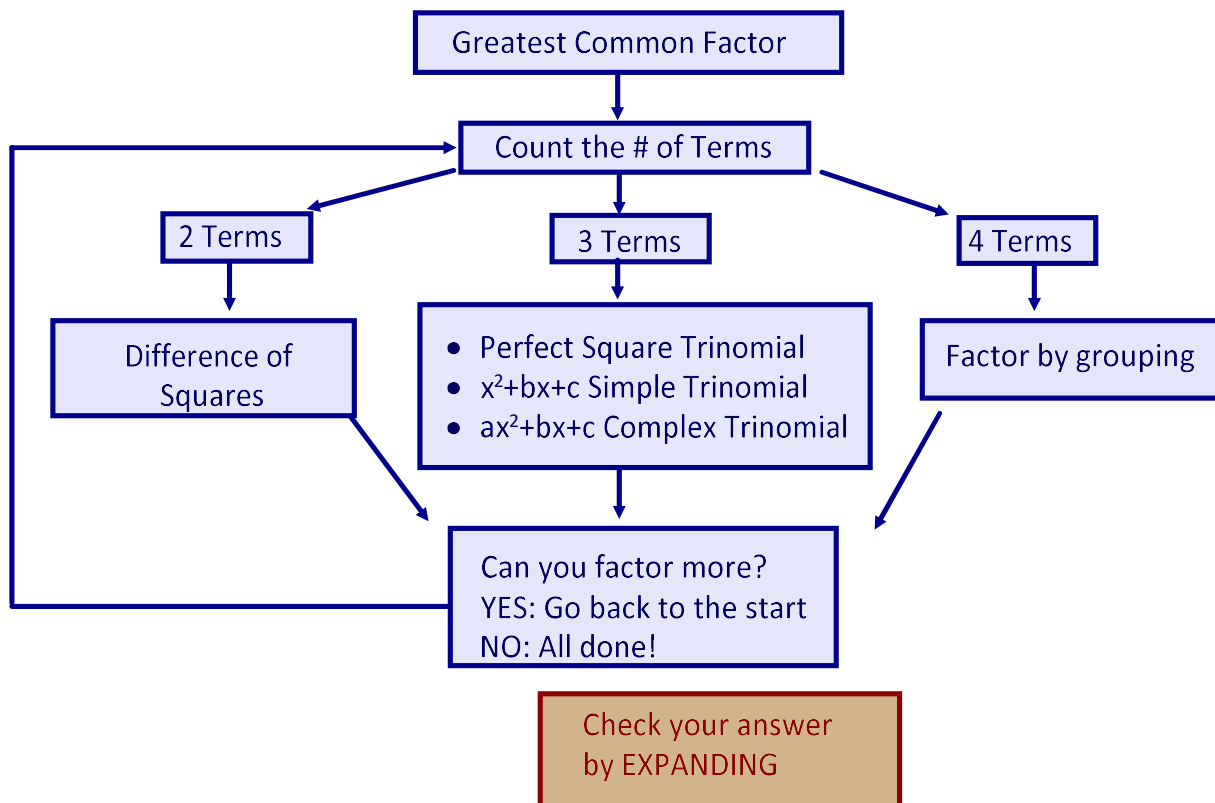


4.9 More Factoring - Putting it All Together

Factoring Decision Tree



Ex. 1 Factor, if possible.

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

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

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

b) $16x^2 - 49y^2z^4$

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

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

$= 3(5x^2 + 9x - 2)$

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

	x	2	M	-10
$5x$	$5x^2$	$10x$	A	9
-1	$-x$	-2	N	$10, -1$

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

$(3x - 7y)^2$
 $\swarrow \quad \searrow$
 $3x \quad 7y$
 $21xy$
 x^2
 $42xy$

It IS a perfect square!

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

	$3x$	$-7y$	M	441
$3x$	$9x^2$	$-21xy$	A	-42
$-7y$	$-21xy$	$49y^2$	N	$-21, -21$

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

Cannot factor
"prime"

		M	-36	$\frac{36}{1, 36}$
	$3x^2$	A	7	$2, 18$
		N		$3, 12$
				$4, 9$
				$6, 6$

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

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

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

Ex. 2 Factor, if possible.

a) $8x^2 + 10xy - 3y^2$
 $= (4x - y)(2x + 3y)$

	$4x$	$-y$	
$2x$	$8x^2$	$-2xy$	M -24 A 10
$3y$	$12xy$	$-3y^2$	N 12, -2

b) $20x^2 + 100xy + 125y^2$
 $= 5(4x^2 + 20xy + 25y^2)$
 $= 5(2x + 5y)^2$

Handwritten notes:
 $4x^2 \rightarrow 2x$
 $25y^2 \rightarrow 5y$
 $20xy \rightarrow 2x \cdot 5y$
 1/25! perfect square

c) $6x^3 + 6x^2 - 8x - 8$
 $= 2(3x^3 + 3x^2 - 4x - 4)$
 $= 2[3x^2(x+1) - 4(x+1)]$
 $= 2[(x+1)(3x^2 - 4)]$
 $= 2(x+1)(3x^2 - 4)$
 $= 2(3x^2 - 4)(x+1)$

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

d) $(x+2)^2 - 9$
 $= (x+2 + 3)(x+2 - 3)$
 $= (x+5)(x-1)$

$x^2 - 9$
 $= (x+3)(x-3)$

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

NOT possible
 "prime"

x^2		M -10
		A 7
	-10	N $\frac{10}{1, 10}$ $\frac{2, 5}$

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) $16h^2 - 16h + 4$
 $= 4(4h^2 - 4h + 1)$
 $= 4(2h-1)(2h-1)$
 $= 4(2h-1)^2$

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

Prime

$\frac{12}{1, 12}$
 $2, 6$
 $3, 4$

	$2h$	-1	
$2h$	$4h^2$	$-2h$	$M \quad 4$
-1	$-2h$	1	$A \quad -4$
			$N \quad -2, -2$

		$M \quad -12$
	$2x^2$	$A \quad -7$
		N
		$-6y^2$

e) $w^4 - 16$
 $= (w^2 - 4)(w^2 + 4)$
 $= (w-2)(w+2)(w^2 + 4)$

f) $12x^2 - 15x + 3$
 $= 3(4x^2 - 5x + 1)$
 $= 3(x-1)(4x-1)$

	x	-1	$M \quad 4$
$4x$	$4x^2$	$-4x$	$A \quad -5$
-1	$-x$	1	$N \quad -4, -1$

Ex. 4 The area of a rectangular swimming pool is represented by $A = 10x^2 + 11x - 6$.

$$\begin{array}{r} -60 \\ 1, 60 \\ 2, 30 \\ 3, 20 \\ 4, 15 \end{array}$$

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

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

$$L = 2x+3$$

$$W = 5x-2$$

ORDER DOESN'T MATTER

	$2x$	3	
$5x$	$10x^2$	$15x$	-60
-2	$-4x$	-6	$15, -4$

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

$$\begin{array}{l} \underline{x=5} \\ L = 2(5)+3 \\ = 13 \end{array}$$

$$\begin{array}{l} W = 5(5)-2 \\ = 23 \end{array}$$

\therefore Length is 13m
Width is 23m

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

Area if $x=5$
Long way $A = 10(5)^2 + 11(5) - 6$

OR $A = L \cdot W$
 $= 13 \cdot 23$
 $= 299 m^2$

\therefore Area is $299 m^2$