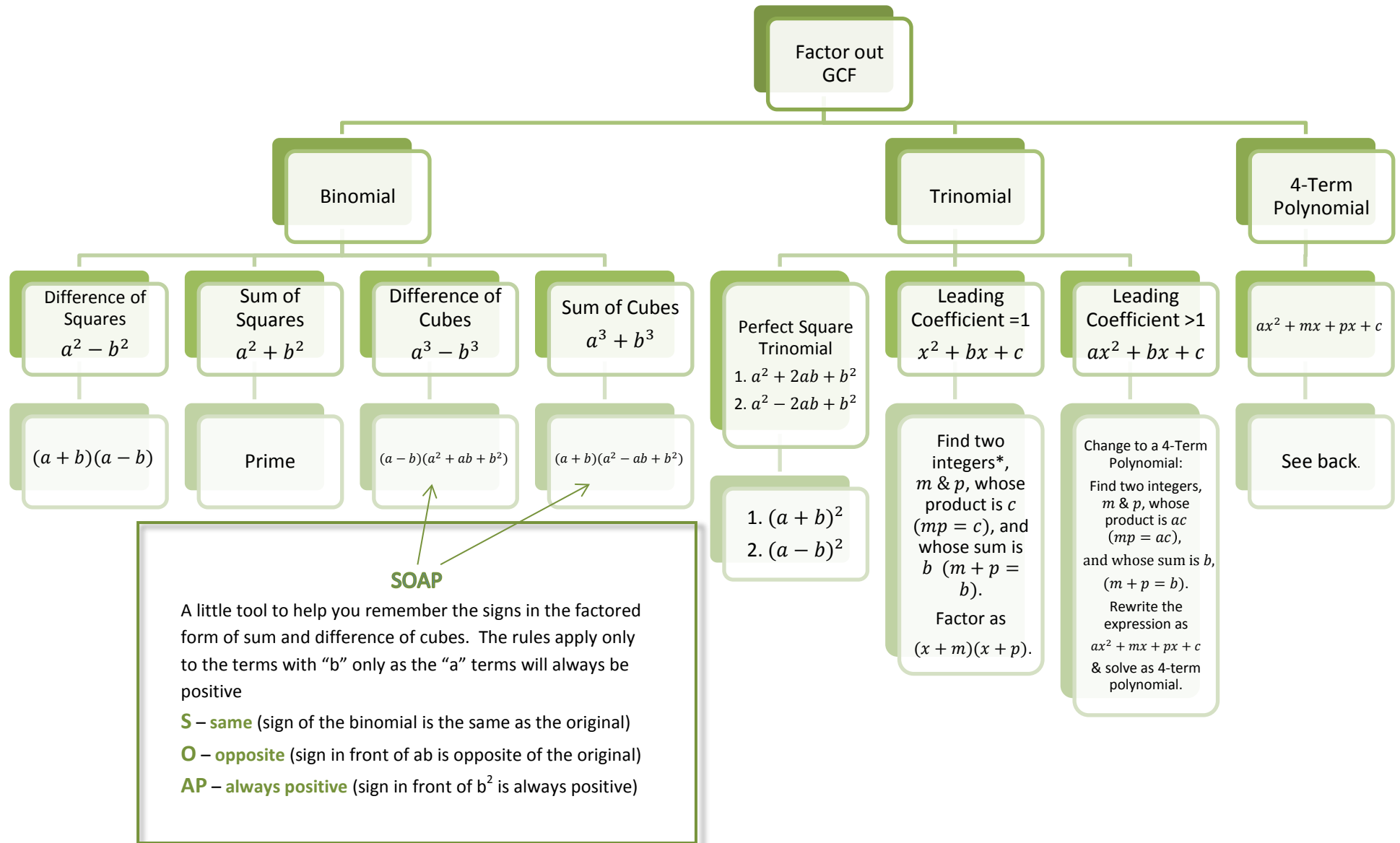


# Factoring Special Polynomials:

UVU Math Lab



More handouts like this are available at: [www.uvu.edu/mathlab/mathresources/](http://www.uvu.edu/mathlab/mathresources/)

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## Finding Pairs of Factors:

Given  $ax^2 + bx + c$ , find  $m$  and  $n$  so that  $mn = ac$  and  $m + n = b$ .

For example, given  $12x^2 - x - 6$ , find  $m$  and  $n$  so that  $mn = 12 \cdot -6 = -72$  and  $m + n = -1$

Make a t-table and list all possible pairs of factors of  $ac$  on one side and check if their sum is  $b$  on the other side:

Product: $ac = -72 = mn$	Sum: $b = -1 = m + n$
$1 \cdot -72$	$1 + (-72) = -71$
$2 \cdot -36$	$2 + (-36) = -34$
$3 \cdot -24$	$3 + (-24) = -21$
$4 \cdot -18$	$4 + (-18) = -14$
(5 is not a factor of -72)	
$6 \cdot -12$	$6 + (-12) = -6$
(7 is not a factor of -72)	
$8 \cdot -9$	$8 + (-9) = -1$

## Factoring Four Term Polynomials Using Grouping:

- Group pairs of terms with common factors.  
 $3x^2 - 5x - 6x + 10$   
 $= (3x^2 - 5x) + (-6x + 10)$   
 $= x(3x - 5) - 2(3x - 5)$
- Factor out the GCF from each grouping.  
 $= (3x - 5)(x - 2)$
- Factor out the new GCF which will be the binomial in parentheses & rewrite as the product of two binomials.