

$$f(x) = 3x^4 + 6x^3 - 24x^2 = 0$$

degree = 4

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

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

Linear Factorization

Zeros:

$$\frac{3x^2}{3} = 0 \Rightarrow x^2 = 0 \Rightarrow x = 0$$

$$x+4=0 \Rightarrow x = -4$$

$$x-2=0 \Rightarrow x = 2$$

repeated root  $\rightarrow x=0$

$$(x-0)(x+4)(x-2)$$

zeros:  $x = 0, 0, 2, -4$

FACTORIZING

- GCF ✓
- DOTS ✗
- TRIE ✓
- GROUP ✗
- TRICKY ✗

QUADRATIC FORMULA

$\leftarrow ax^2 + bx + c$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

If  $x = c$  (constant #) is a zero or root of the function  $f(x)$ , then the following are true:

- ①  $c$  is a solution when  $f(x)$  is set equal to zero
- ②  $(x-c)$  is a factor of  $f(x)$
- ③ The point  $(c, 0)$  is an x-intercept of the graph of  $f(x)$

The degree of a function is the value of its greatest exponent.

\* The degree is the number of zeros.

ex  $f(x) = 2x^3 + 2x^2 - 72x - 72$

GCF:  $2(x^3 + x^2 - 36x - 36)$

~~$2(x^2 + 1)(x - 2)(x + 18)$~~

GROUP:  $2(x^2(x+1) + -36(x+1))$

$$2(x+1)(x^2 - 36)$$

DOTS:  $2(x+1)(x+6)(x-6)$

Linear Factorization:  $f(x) = \frac{2(x+1)(x+6)(x-6)}{}$

$\downarrow$                        $\downarrow$                        $\downarrow$   
 $x+1=0$                        $x+6=0$                        $x-6=0$

Zeros:  $x =$                      -1                      -6                      6