

Section 6.4 - Factoring Polynomials

Focus: Factor Completely.

	GCF	$4y$ sum of 5 cubes	Diff of SQ
1) $8a^2b^3 - 12ab^4$	2) $64y^3 + 125$	3) $81x^2 - 16$	
$4ab^3(2a - 3b)$	$(4y + 5)(16y^2 - 20y + 25)$	$(9x - 4)(9x + 4)$	

Grouping	Trinomial	Trinomial
4) $(3x^3 - 2x^2) - 12x + 8$	5) $12x^4 - 19x^2 - 18$	6) $6x^2 - x - 12$
$x^2(3x - 2) - 4(3x - 2)$	$(4x^2 - 9)(3x^2 + 2)$	$(3x + 4)(2x - 3)$
$(x^2 - 4)(3x - 2)$	$(2x - 3)(2x + 3)(3x^2 + 2)$	
$(x - 2)(x + 2)(3x - 2)$		

Determine if a binomial is a factor of a polynomial.

ex: Is $x - 2$ a factor of $x^3 + 2x^2 - 5x + 1$?

↳ must divide in evenly!

↳ remainder must be 0!

* use synthetic division...

$$\begin{array}{r|rrrr} 2 & 1 & 2 & -5 & 1 \\ & \downarrow & 2 & 8 & 6 \\ \hline & 1 & 4 & 3 & 7 \end{array} \leftarrow \text{remainder} \neq 0!$$

$x - 2$ is not a factor of $x^3 + 2x^2 - 5x + 1$.

could also ask... is $x = 2$ a zero of $x^3 + 2x^2 - 5x + 1$?

ex: Is $x+2$ a factor of $P(x) = 3x^4 + 6x^3 - 5x - 10$

$$\begin{array}{r|rrrrr} -2 & 3 & 6 & 0 & -5 & -10 \\ & \downarrow & -6 & 0 & 0 & 10 \\ \hline & 3 & 0 & 0 & -5 & \underline{0} \end{array}$$

Yes $x+2$ is a factor of $P(x)$

-2 is a zero of $P(x)$.