

Class #10 - Thurs, Sept. 23

Today: More factoring.

Last time:

GCF
Factoring by grouping

- factoring quadratic polynomials

"binomials"

$$ax^2 + bx + c$$

"degree 2"

(What is factorization / factoring?)

Breaking up a number / algebraic expression
as a product of smaller numbers / (expressions)

Ex:

$$360 = 2^3 \cdot 3^2 \cdot 5$$



unique prime factorization -
1 360



Techniques for factoring quadratic polynomials :

- Difference of squares

- AC-method.

→ Start w/ some simple examples - of factoring quadratics

Ex: Factor $x^2 + 5x + 4$

$$\begin{array}{c} \rightarrow \\ = \\ \leftarrow \end{array} (x+4)(x+1)$$

} "undo/reverse FOIL"

check (by FOIL)

$$\begin{aligned} & (x+4)(x+1) \\ &= x^2 + 4x + x + 4 \\ &= x^2 + 5x + 4 \checkmark \end{aligned}$$

factored into as product of 2 "binomial" terms

Ex: Factor $ax^2 + bx + c$

$$1x^2 + \textcircled{6}x + \textcircled{9}$$

$$= (x+3)(x+3)$$

} factors of $c=9=3 \times 3$
that add up
to $b=6$?

Strategy for factoring quadratic

● $x^2 + bx + c$:

look for 2 factors of c which sum to b !

Ex: Factor:

$$x^2 - \textcircled{1}x - \textcircled{12}$$

$c = -12$
two factors
of $c = -12$
which sum to
 $b = -1$

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

$$-12 = (-4)(3)$$

$$\frac{g^2 + \textcircled{10}g + \textcircled{24}}{= (g + \textcircled{6})(g + \textcircled{4})}$$

$$x^2 - 10x + 24$$

$$= (x - 6)(x - 4)$$

two factors of
 $c = +24 = (-6)(-4)$
 which sum
 to $b = -10$?

(See Examples 6.9 - ~~6.10~~ "Try It 6.22")

$$2x + x^2 - 48 = x^2 + 2x - 48$$

$$= (x + 8)(x - 6)$$

} factors of
 48
 which differ
 by 2?

48	diff
48, 1	47
24, 2	22
16, 3	13
12, 4	
8, 6	2
12, 4	8

AC method : $ax^2 + bx + c$ } ① Look for 2 factors of $a \cdot c$ which sum to b

Factor: $6x^2 + 7x + 2$

① Factors of $ac = 6(2) = 12$ } $12 = 4 \cdot 3$
which sum to $b = 7$ } $4 + 3 = 7$

② ~~Write $bx + c$~~
Break up bx into a sum of two terms (using the #s you identified in step 1)

$$6x^2 + 7x + 2 = [6x^2 + 4x] + [3x + 2]$$

③ Factor by Grouping:

$$2x \cdot (3x + 2) + 1 \cdot (3x + 2)$$
$$= (3x + 2)(2x + 1)$$

⑤

Check (FOIL) :

$$(3x+2)(2x+1)$$

$$= 6x^2 + 3x + 4x + 2$$

$$= 6x^2 + 7x + 2$$

factored

Why is factoring important/useful?

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