Factoring Strategies Nov 1/2011

Consider the factoring methods we have explored so far:

*1. Common Factors $3x^2 + 6x + 9$

*2. Factoring by Grouping $\underbrace{ac + ad} + \underbrace{bc + bd}$

3. Simple Trinomials $1x^2 + bx + c$

*4. Complex Trinomials $ax^2 + bx + c$, a not 1 SPI

5. Perfect Squares $a^2 + 2ab + b^2$

6. Difference of Squares $a^2 - b^2$

It is often sufficient to use only one method, but there are times when they must be combined. This occurs most often when **common factors** are involved.

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Always check for common factors before you start **and** after you think you are done.

When your are asked to "fully factor" or "factor completely", all common factors must also be accounted for.

Ex.1 Remove Common Factors First and Last

$4x^2 - 20x + 24$

$= 4(x^2 - 5x + 6)$

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

$= \underbrace{4x^2 - 8x} \underbrace{- 12x + 24}$

$= 4x\underbrace{(x-2)}_{a} - 12\underbrace{(x-2)}_{a}$

$= 4x a - 12 a$

$= a(4x - 12)$

$= (x-2)(4x-12)$

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

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

S −20
P 96
I −8, −12

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Ex.2 Determine the best strategies required to factor:

(a) $1x^2 + 8x + 15$

simple

(b) $6x^2 + 19x + 8$

complex

(c) $40x^2 - 250$

common factor 10

$4x^2 - 25$

diff. of squares

(d) $4x^2 - 8x + 4$

common factor 4

$4(x^2 - 2x + 1)$

Simple / perfect

(e) $9x^2 + 48x + 64$

perfect sq.

(f) $-5x^2 + 60x - 180$

common -5

$-5(x^2 - 12x + 36)$

perfect / simple

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Assigned Work:

p. 236 # 1, (6-8)ace, 9, 10, 12, 14ac, 17*

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6(e) $12x^2+4x-21$

$= 12x^2-14x+18x-21$

$= 2x(6x-7)+3(6x-7)$

$=(6x-7)(2x+3)$

S +4
P −252
I −14, 18

−1	252
−2	126
−3	84
−4	63
−6	42
−7	36
−9	28
−12	21
−14	18

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12. $A = \pi x^2 + 10\pi x + 25\pi$

(a) $A = \pi r^2$

$\pi r^2 = \pi x^2 + 10\pi x + 25\pi$

$\frac{\pi r^2}{\pi} = \frac{\pi(x^2+10x+25)}{\pi}$

$r^2 = \underline{x^2+10x+25}$

$r^2 = (x+5)^2$

$r = \pm(x+5)$, but $r>0$

$r = x+5$, $x>-5$

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7(c)

$$\underbrace{24ac-8c}+21a-7$$

$$=8c\underbrace{(3a-1)}+7\underbrace{(3a-1)}$$

$$=(3a-1)(8c+7)$$

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10(d)

$$x^2\underbrace{-y^2-2y-1}$$

$$=x^2-1(\underbrace{y^2+2y+1}_{(y+1)^2})$$

$$=x^2-\underbrace{(y+1)^2}_{\text{let } a=y+1}$$

$$=x^2-a^2$$

$$=(x-a)(x+a)$$

$$=(x-(y+1))(x+(y+1))$$

$$=(x-y-1)(x+y+1)$$

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