

Factoring Review

common factoring

- a number, variable or both is common to every term and can be divided out
 - must take the greatest common factor
 - check by multiplying back out
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ex. $2x^2 + 4x^2y + 2x^3$

- 2, x, x^2 , $2x^2$ can all be divided evenly
- use $2x^2$ as it is the biggest

$$= 2x^2(1 + 2y + x)$$

quadratic factoring

- must be in the form $ax^2 + bx + c$ where a, b, and c are integers
 - check to see if a can be common factored out (2 in this case)
 - want two numbers that multiply out to c and add up to b
($-10 \times 3 = 30$ and $-10 + 3 = -7$)
 - if a cannot be factored out must factor by decomposition or trial and error
 - look for 2 numbers that multiply to a x c and add up to b
 - break down middle term using those 2 numbers
 - factor first 2 terms and then second two
 - combine
 - T or E - look for factors of a and c that add to b
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$$2x^2 - 14x - 60$$

$$= 2(x^2 - 7x - 30)$$

$$= 2(x - 10)(x + 3)$$

$$\begin{aligned} &2x^2 + 7x + 3 \text{ (multiply to 6 add to 7 use 6 and 1)} \\ &= 2x^2 + 6x + 1x + 3 \\ &= 2x(x + 3) + 1(x + 3) \\ &= (2x + 1)(x + 3) \end{aligned}$$

difference of squares

- a special type of quadratic factoring
- two numbers that are separated by a -ve sign that have been squared (each can have square root determined that are whole numbers or variables)
- take the square of both and put in two sets of brackets with differing signs.
- check by multiplying out
- $a^2x^2 - b^2y^2 = (ax-by)(ax+by)$

ex1.
 $x^2 - 49$

$$= (x - 7)(x + 7)$$

ex2
 $25x^2 - 64$

$$= (5x - 8)(5x + 8)$$

perfect squares Trinomial

- a special type of quadratic factoring
- $a^2x^2 + 2abx + b^2$
- both the first term and the last term can have square roots taken easily
 $25^{1/2} = 5$, $36^{1/2} = 6$,
 $5 \times 6 \times 2 = 60$
- the middle term is those square roots multiplied together and by 2
- $(ax + b)^2$
- the sign used is the second sign in the trinomial

ex:

$$25x^2 + 60x + 36$$

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

ex2

$$36x^2 - 48x + 16$$

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