Greatest Common Monomial

Step 1: Determine the greatest common factor of the given terms. The greatest common factor or GCF is the largest factor that all the terms have in common.

Step 2: Factor out (or divide out) the greatest common factor, or GCF, from each term.

Step 3: Factor as normal

Practice Problems

1: $4x^3 - 8x^2 + 4x$

2: $27x^2 - 12$

3: $2x^2 - 4x - 6$

4: $10x^2 - 25x - 15$

Sum/Difference of Cubes

Description: For factoring the sum and difference of cubic expressions. Uses the following formula: $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$ and $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

Example

$54m^3 - 2t^3$

$2(27m^3 - t^3)$

$2((3m)^3 - t^3)$

$3m^3 - t^3 = (3m-t)(9m^2 + 3mt + t^2)$

Practice Problems

1) $125c^3 + d^3$
2) $64a^3 - b^3$
3) $5L^3 + 5x^3$
4) $x^3 + y^3$

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FACTORING BY GROUPING:

description: Taking the polynomial and splitting into two groups in which you can take out the greatest common factor in each group. Then, take the common factors and put them in the same group & leave the other part (which should be the same) as one group.

EXAMPLE

x^3-2x^2+4x-8

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

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

① Split into two groups & see what common factors exist

② You can take out x^2 from the first half & 4 from the 2nd.

③ Put the 2 common factors in one group and the matching factors in another group!

④ Done!!

PRACTICE TIME!

① $x^3-6x^2+3x-18$

② $x^3+4x^2+3x+12$

③ x^3-4x^2+2x-8

④ $x^3-7x^2+5x-35$

Perfect Squares

When C is a perfect square, you can factor it easily into either $(A+B)^2$ or $(A-B)^2$. This can be expanded to A^2+AB+B^2 or A^2-AB+B^2

$4x^2+12x+9$

Check if C is a perfect C.

$\sqrt{9}=3$

Input B in the factor!

$(A+3)^2$

Check if A is perfect.

$\sqrt{4}=2$

Check if $2AB=b$

$2(2)(3)=12$

Input A into factor

$(2x+3)^2$

Check work

$4x^2+12x+9$

① $16x^2+48x+36$

② $169x^2-130x+25$

③ x^2+2x+1

④ $36x^2-72x+36$

Factoring Trinomials

Maxine's

This uses the same basic principles as the diamond method, just without the diamond. Broken down into variables, it looks like this:

ax^2+bx+c

$a=d\cdot f$

$c=g\cdot h$

$b=dg+fh$

a	b	c
d, f	dg, fh = b	g, h

here you list as many factors of a & c as you need to until $dg+fh=b$ is true.

answer: $(d+h)(f+g)$

Ex: $3x^2-16x+5$

3	-16	5
3, 1	-15, -1	-5, -1

$\rightarrow \boxed{(3-1)(1-5)}$

proof

$3=3\cdot 1$

$5=-5,-1$

$-16=(-5\times 3)+(-1\cdot 1)$

$-16=-15+(-1)$

PROBLEMS:

1. $6x^2+5x-4=0$
2. $6x^2-21x-45=0$
3. x^2-2x+1
4. $x^2+10x+25$

Ethan's Method

$2x^2-10x-28$

$2(x^2-5x-14)$ ← Find GCF if possible

$2((x+2)(x-7))$

$x_1+x_2=-b \qquad -2+7=5$

$x_1\cdot x_2=c \qquad -2\cdot 7=-14$

E

1. X

2.

3.

4.