

Factoring



Step 1: look for GCF

Ex 1) Factor $\frac{24x^4}{6x^2} - \frac{12x^3}{6x^2} + \frac{18x^2}{6x^2}$ GCF: $6x^2$

$$\boxed{6x^2(4x^2 - 2x + 3)}$$

Type 2: Difference of 2 squares

$$(a^2 - b^2) = (a+b)(a-b)$$

Ex 2) factor $x^2 - 9$ $\rightarrow \boxed{(x+3)(x-3)}$

\downarrow \downarrow
 $\sqrt{x^2} = x$ $\sqrt{9} = 3$

Ex 3) factor $\frac{4x^2}{4} - \frac{16}{4}$ $\rightarrow \boxed{4(x+2)(x-2)}$

$4(x^2 - 4)$

$\sqrt{x^2} = x$ $\sqrt{4} = 2$

Type 3: Factoring trinomials

- 1) multiply 1st & last terms
- 2) find factors that add up to the middle term
- 3) replace middle term w/ both factors
- 4) factor by grouping

Ex 4) factor $x^2 + x - 6$

$$\begin{array}{r|rr} x^2 + 3x & -2x & -6 \\ \hline x & x & -2 & -2 \\ \hline x(x+3) & & -2(x+3) & \end{array}$$

$$\begin{array}{l} -6x^2 \\ \wedge \\ 3x + \cancel{3x} = x \\ \wedge \\ -2x \end{array}$$

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

Ex 5) factor: $12m^2 - 5m - 3$

$$\begin{array}{r|rr} 12m^2 - 9m & +4m & -3 \\ \hline 3m & 3m & 1 & 1 \\ \hline 3m(4m-3) & & +1(4m-3) & \end{array}$$

$$\begin{array}{l} -36m^2 \\ \wedge \\ -9m + 4m = -5m \end{array}$$

$$(4m-3)(3m+1)$$