Simplifying a rational expression

Rational fraction $= \frac{P}{Q}$ P, Q are polynomials.

Ex: $\frac{x^3+3x^2+2x}{x^2+9x+8} = \frac{x(x^2+3x+2)}{x^2+9x+8} = \frac{x\cancel{(x+1)}(x+2)}{\cancel{(x+1)}(x+8)} = \frac{x(x+2)}{x+8}$.

$A^2 - B^2 = (A-B)(A+B)$.	$A^3 + B^3 = (A+B)(A^2 - AB + B^2)$
$A^2 + 2AB + B^2 = (A+B)^2$	$A^3 - B^3 = (A-B)(A^2 + AB + B^2)$
$A^2 - 2AB + B^2 = (A-B)^2$	

Ex: $\frac{2(x-2)(x^3+8)}{(-2x+5)(x^2-4)} = \frac{2\cancel{(x-2)}\cancel{(x+2)}(x^2-2x+4)}{(-2x+5)\cancel{(x-2)}\cancel{(x+2)}}$.

$= \frac{2(x^2-2x+4)}{-2x+5}$

* $x^2+3x+2=0$.

$\Delta = 9-4(2) = 1$

$x_1 = \frac{-3+1}{2} = -1$

$x_2 = \frac{-3-1}{2} = -2$.

* $x^2+9x+8=0$.

$\Delta = 9^2 - 4(8)(1) = 81-32 = 49 = 7^2$

$x_1 = \frac{-9+7}{2(1)} = -1$.

$x_2 = \frac{-9-7}{2} = -\frac{16}{2} = -8$

* $x^2-2x+4=0$.

$\Delta = (-2)^2 - 4(1)(4) = 4-16 = -12 < 0$

no roots.