Restrictions

Restrictions are the values of the variable(s) that cause the function to be undefined.
These are the zeros of the denominator *(even if the factor cancels out*)
These are the numbers that are not in the Domain of the function.

What value(s) of *x* makes each denominator zero …

a) $\frac{2}{x}$ b) $\frac{x}{x-3}$ c) $\frac{2x-3}{2x+1}$

These values are called "Restrictions".
They MUST always be stated.
AND they define the Domain

Determine the Restrictions of the following Rational Functions.

d) $\frac{2}{x^2-2x}$ e) $\frac{x+2}{x^2-4}$

Simplifying Rational Expressions Example $\dfrac{x^2-4x-12}{x^2-4}$

1. Factor numerator and denominator $= \dfrac{(x+2)(x-6)}{(x+2)(x-2)}$
2. ***List all restrictions (values that make the denominator 0)*** $x \neq -2, x \neq 2$
3. Divide common factors in the numerator and denominator $= \dfrac{(x-6)}{(x-2)}$

Worked Examples: Simplify and state the restrictions.

1. $\dfrac{9x^2y}{3xy^2}$
2. $\dfrac{12-8x}{4}$
3. $\dfrac{x-1}{x^2-4x+3}$
4. $\dfrac{x^3-x}{x^2+2x+1}$
5. $\dfrac{12x^2-4x}{6x^2-11x+3}$

Copy to the back of the sheet – you'll need ALOT of space.

6. $\dfrac{(x^3+4x^2+3x)(x^2-4)}{(x^2+5x+6)(x^2-x-2)}$