Solutions to Equations

Determining Solutions to Equations
Graphical Solutions
By sketching both functions, the solution to the equation is the x-values of the intersections of the two functions.

Numerical Solutions
An approximate solution can be found using methods such as bisection, or a CAS calculator.

Algebraic Solutions
For some pairs of functions, they can be algebraically manipulated to solve for x.
This is the case for most equations where f and g are the same type of function.

Nature of Corresponding Solutions
Real
Solutions that are in the real numbers.
Solutions such as the square root of a negative number are not real solutions.

Exact
Solutions that are the true value that satisfies the equation.
Exact solutions include: integers (a), rational numbers $\left(\dfrac{a}{b}\right)$, surds $\left(b\sqrt[n]{a}\right)$.
Exact solutions will prefer fractions to decimals.

Approximate
Solutions that are approximations to a number of decimal places or significant figures. These are used where exact solutions are not practical to find, or an approximation is sufficient.

The Effect of Domain Restrictions
The functions f and g may have restrictions on their domains. They might be implied from the function, or from what they are modelling, such as measurement units ≥ 0.

Solutions to $f(x) = g(x)$ must lie within the intersection of the two domains.