Feasible region

In an optimisation problem, there are typically a number of constraints on the variables. For example, a problem might be to find the maximum possible value of $2x + 3y$ subject to the constraints

$$\begin{aligned} x &\geq 0 \\ y &\geq 0 \\ x + y &\leq 10 \\ y &\geq x - 2. \end{aligned}$$

The *feasible region* for a problem such as this is the set of all possible values of the variables which satisfy the constraints. Any solution to the problem must lie within this set.

For the above example, the constraints are shown in this graph with the excluded regions shaded; the feasible region then remains as the unshaded region.