

## Chapter 6 Systems of Equations and Inequalities

### Section 6.1

**System of equations** – A model used for solving a problem that involves two or more equations in two or more variables

**Solution of a system of equations** – (in two variables) An ordered pair that satisfies each equation in the system

**Solving a system of equations** – The process of finding the set of all solutions of a system

**Method of substitution** – A method for solving systems of equations which involves substituting for one of the variables in one equation in the system an expression that represents that variable in terms of the other variable

**Graphical method** – A method for finding the solution(s) to a system of equations in which the solutions are determined by finding points of intersection of the graphs of the

**Points of intersection** – The points, which correspond to the solutions of the system, where the graphs of the equations in a system of equations intersect

**Break-even point** – Point that sales meet when enough units of a product have been sold so that the total revenue  $R$  equals the total cost  $C$

### Section 6.2

**Method of elimination** – A method for solving a system of equations which involves obtaining coefficients that differ only in sign for one of the variables, so that adding the equations eliminates that variable

**Equivalent systems** – Two systems that have precisely the same solution set

**Consistent system** – A system that has at least one solution

**Inconsistent system** – A system that has no solution

### Section 6.3

**Row-echelon form** – A system that has a “stair-step” pattern with leading coefficients of 1

**Ordered triple** – Real numbers  $(x, y, z)$  which correspond to the solution of a system of three equations in three unknowns

**Row operations** – A set of operations that can be performed on a system of equations in order to produce an equivalent system of equations

**Gaussian elimination** – The process of rewriting a system of equations in row-echelon form through a chain of equivalent systems each of which is obtained by using one of the three row operations

**Nonsquare system of equations** – A system of equations in which the number of equations differs from the number of variables

**Position equation** – The height at time  $t$  of an object that is moving in a vertical line with constant acceleration  $a$  is given by the position equation

$$s = \frac{1}{2}at^2 + v_0t + s_0$$

### Section 6.4

**Solution of an inequality** – An ordered pair  $(a, b)$  is a solution of an inequality in  $x$  and  $y$  if the inequality is true when  $a$  and  $b$  are substituted for  $x$  and  $y$  respectively.

**Graph of an inequality** – The collection of all solutions of the inequality represented on the Cartesian plane

**Linear inequalities** – An inequality written in the form  $ax + by < c$

**Solution of a system of inequalities** – A point  $(x, y)$  that satisfies each inequality in the system

**Consumer surplus** – The area of the region that lies below the demand curve, above the horizontal line passing through the equilibrium point, and to the right of the  $p$ -axis

**Producer surplus** – The area of the region that lies above the supply curve, below the horizontal line passing through the equilibrium point, and to the right of the  $p$ -axis

**Section 6.5**

**Optimization** – A process in which the minimum or maximum of a quantity is sought

**Linear programming** – An optimization strategy

**Objective function** – Gives the quantity that is to be maximized or minimized

**Constraints** – A system of linear inequalities that determines the region of feasible solutions

**Feasible solutions** – All points in a region satisfying each of the constraints