

## Chapter 5 Systems of Equations and Inequalities

### Section 5.1

**Systems of equations** – Models used for solving problems that involve 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

**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

**Point of intersection** – A point in a graphical solution of a system of equations that corresponds to a solution of the system

**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 5.2

**Method of elimination** – A method for solving a system of equations that 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 5.3

**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

**Gaussian elimination** – The process of converting a system of equations that is not in row-echelon form into an equivalent system that is in row-echelon form by using one or more of the elementary row operations

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

**Three-dimensional coordinate system** – A system for representing points in space which consists of three non-coplanar real number lines, called axes, that intersect in a single point called the origin

**Graph of an equation in three variables** – A plane that consists of all points  $(x, y, z)$  that are solutions of the equation

**Partial fraction** – A rational expression can be written as the sum of two or more simpler fractions. Each simpler fraction is called a partial fraction.

**Partial fraction decomposition** – A rational expression written as the sum of two or more simpler rational expressions

**Basic equation** – The equation that results when both sides of the form of a decomposition is multiplied by the least common denominator

### Section 5.4

**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

### Section 5.5

**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