Gaussian Elimination

1. Solve the following system of equations:

a) $2x + z = 2$
$x + y + z = -1$
$y - 2z = 3$

b) $2x + y + z = 4$
$2x - y - 2z = 1$
$x - z = 2$

c) $3x - y - z = -11$
$x - y + z = -9$
$x + 2y - 2z = 9$

2. A parabola passes through the points (0, 3), (2, 5) and (-1,8).
Form a system of equations and solve to find the equation of the parabola

3. For the system of equations:

$$x + 2y + z = 60$$
$$2x + 3y + z = 85$$
$$3x + y + pz = 105$$

find the value of p such that there is inconsistency and hence no solutions.

4. For what values of a and b will the system of equations

$$2x + y - 3z = 5$$
$$x - 2y + 3z = 1$$
$$2x - y + az = b$$

a) be inconsistent (i.e. have no solutions)
b) be redundant (i.e. have infinitely many solutions)?

5. For the system of equations:

$$2x + 3y = 4$$
$$4x + ay = 10$$

a) solve the equations for $a = 6 \cdot 1$
b) solve the equations for $a = 5 \cdot 9$
c) comment on the difference between your solutions