**FB1:** Find a parametric equation of the line passing through the points A(1, 2, 4) and B(11,-8, 26) and find the point where this line intersects the line

by solving a system of linear equations.

To find the line that passes through both points, one needs a point on the line and a vector parallel to the line. The vector can be found by calculating , a vector from point A to point B,

Furthermore, any of the two given points can be chosen to make a position vector required for this line, for example, let vector **a** be

Thus, the second line L2’s vector equation is

where *t* is a real number.

To find the intersection of both lines, a system of linear equations can be formed by using the parametric equations of L1 and equating them with the equations of L2:

By performing elementary row operations 3R2 + R3, one finds that

By substituting *t* as in R2:

Then substituting *t* and *s* in R1 to check for consistency,

Thus, the intersection of L1 and L2 is

**FB2:** Consider an arbitrary 2 x 2 matrix with real entries, A, and let B be the matrix

a) What restrictions must be placed on the entries of A in order for tr(A) = tr(AB)?

Let A be defined as

Then the matrix product AB is

Since and the equation is

which means that

b) Show that if det (A) = det (AB), then A is not invertible.

Since and

which means that A is not invertible.

**FB3:**

a) Write down and simplify the expansion of , for . (*Hint*: Use the Binomial Theorem.)

By using the Binomial Theorem, the expansion is

b) What is the coefficient of the b3 term?

The coefficient of the b3 term is 20.

c) Let b = 1. What is the simplified form of the expression now?

If b = 1, the expression is