ELECTRICAL MATHEMATICS
TEST 4 – *TRIAL TEST/ASSIGNMENT*

Notes:

- Test covers simultaneous equations, factorising, solving and graphing quadratic equations.
- The actual test will be closed book, with calculator and ruler required.
- It is **ESSENTIAL** to show working/steps, where asked, otherwise **no marks** can be given.

1. Factorise the following:

   a. $4x^2 - 6x$

   b. $b^2 - 16$

   c. $F^2 + 13F + 12$

   d. $4a^2 + 28a - 15$

2. Given that the roots/solutions of the quadratic equation $ax^2 + bx + c = 0$ are

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a},$$

solve $2y^2 - 6y + 3 = 0$, giving the roots correct to three significant figures.

3. For each of the following, determine the axis of symmetry, turning point (vertex) coordinates and the y-intercept (ie **three** quantities for each equation):

   a. $y = x^2 + 8x + 4$

   b. $y = -2x^2 + 4x + 6$

4. **Sketch** the curve for each of the equations in Q3, clearly labelling the key features. (Use the graph paper provided on p.6).

5. Solve each of the following quadratic equations by factoring:

   a. $5f - f^2 = 0$

   b. $x^2 - 7x - 18 = 0$

c. $4a^2 - 16a + 15 = 0$

6. Solve (algebraically) for x and y, in each of the simultaneous equation pairs below:

a. $y = x^2 - 4x - 12$
$y = -3x + 5$

b. $y = x^2 - 2x - 3$
$2y - x + 2 = 0$

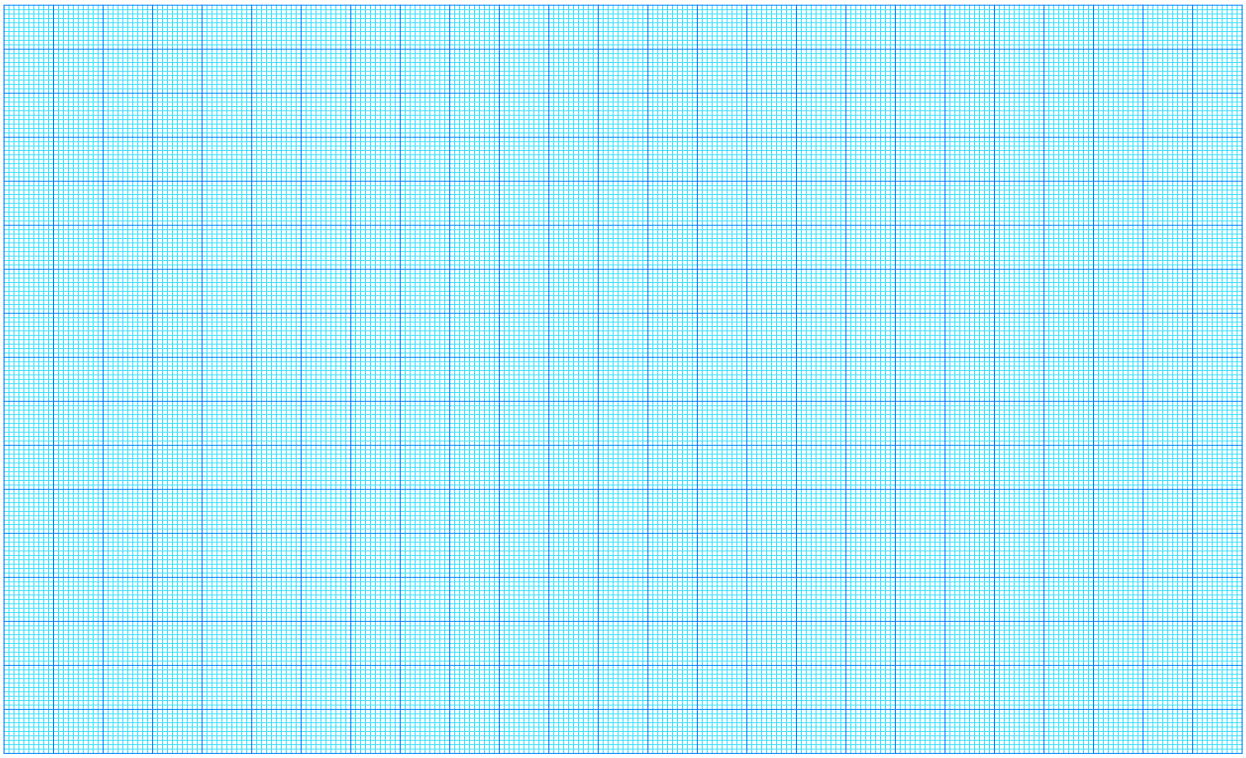
7. Solve, by determinants, the following simultaneous equations:

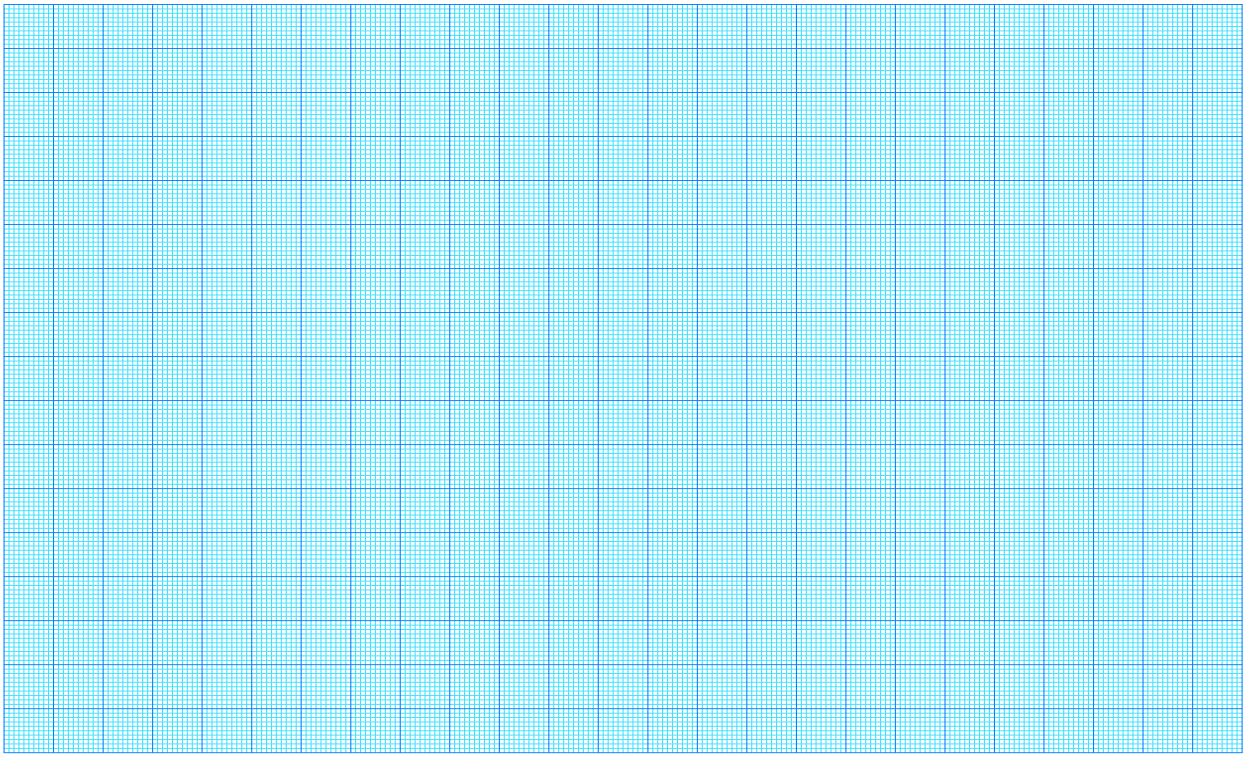
$4x - 3y = 18$
$x + 2y = -1$

Solution of simultaneous equations using determinants

$$a_1x + b_1y = c_1$$
$$a_2x + b_2y = c_2$$

$$x = \frac{\begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}} = \frac{c_1b_2 - c_2b_1}{a_1b_2 - a_2b_1} \quad \text{and} \quad y = \frac{\begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}} = \frac{a_1c_2 - a_2c_1}{a_1b_2 - a_2b_1}$$





------- END OF TRIAL TEST/ASSIGNMENT - *Check your work!* -------