Week 2: Formulae, Functions and Equations

Try these exercises now, do not use a calculator, and try to solve the exercises without help

1. Given two functions $g(t) = 3t + 2$ and $h(t) = t + 3$ obtain an expression for (a) the composition $g(h(t))$, and (b) the composition $h(g(t))$, and (c) $g(g(t))$.

2. Which of these are straight lines?

   (a) $2x + 3y = 4$

   (b) $y = 3x^2 + 5$

   (c) $4xy + 2 = 5$

   (d) $x = 3$

   (e) $x + y = 1.2$

   (f) $x^2 - y^2 = 2$

   State the gradient and y-intercept for the straight lines.

3. What is the gradient of the straight line through (1,2) and (3,5)?

4. What is the equation of the straight line in question 4?

5. What is the distance between the points in question 4?

6. Solve

   (a) $4a^2 - 25 = 0$

   (b) $12y^2 - 10 = 26y$

   (c) $6a^2 - 15a = 0$

7. Sketch the curves: (a) $y = x^2 - 2x - 8$ (b) $y = 3x^2 + 7x - 6$ (c) $y = -4x^2 + 2x + 1$

8. Solve the simultaneous equations:

$$3x + 5y = 31 \quad (1)$$
$$\text{and} \quad 2x + 3y = 20 \quad (2)$$

9. Solve the simultaneous equations: $y = 2x + 3$ and $5x + 2y = -9$