

# **Applied Engineering Mathematics/Applied Engineering Mathematics for Apprentices**

## **Revision Guide**

### **Algebra**

I should be able to:

- Manipulate and simplify fractions.
- Use laws of indices to simplify expressions.
- Re-arrange and solve equations.
- Factorise expressions.

### **Functions**

I should be able to:

- Recognise linear, quadratic, exponential and logarithmic functions and plot them.
- Solve quadratic equations.
- Transpose and solve equations involving logs and exponential functions.

### **Trigonometry**

I should be able to:

- Recognise and know the basic properties of the sine wave.
- Understand how parameters such as amplitude and angular frequency influence a general trigonometric function.
- Solve trigonometric functions.

## Differential Calculus

I should be able to:

- Evaluate basic derivatives.
- Utilise the chain rule, product rule and quotient rule to differentiate more complicated functions and understand when to select each of these three techniques.
- Understand how to apply differentiation to solve problems regarding rates of change.
- Use derivatives to locate all stationary points of a function.
- Use the second derivative test to classify stationary points.

## Integral Calculus

I should be able to:

- Evaluate basic definite and indefinite integrals.
- Use integration by substitution to evaluate more complicated integrals.
- Use integration by parts to evaluate more complicated integrals.
- Identify when it is appropriate to use integration by parts or by substitution.

## Complex Numbers

I should be able to:

- Conduct complex number arithmetic (addition, subtraction, multiplication, division) in Cartesian form and determine the conjugate and real and imaginary parts of a complex number.
- Multiply and divide complex numbers in polar form.
- Solve quadratic equations using complex numbers.