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 using EXCEL.
- 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.

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.

Matrices

I should be able to:

- Identify the order/size of a matrix.
- Conduct matrix arithmetic (addition, subtraction, scalar and matrix multiplication) and understand when these operations are valid.
- Calculate the determinant and inverse of a matrix where appropriate.