

Maths AS Level Knowledge Organiser
Spring 2/Summer 1

Pure 08 - The Binomial Expansion

Draw Pascal's Triangle for $(a + b)^n$ for $\{0 \leq n \leq 4\}$

What is the general term for the expansion of $(a + b)^n$?

Define a Factorial:

What is the Factorial Notation equation for ${}^n C_r$?

When looking at x^n , what approximation can you use when x is very small?

Pure 13 - Integration

State the general form for the integral of x^n

$$\frac{dy}{dx} = x^n \rightarrow y =$$

State the general form for the integral of kx^n

$$\frac{dy}{dx} = kx^n \rightarrow y =$$

State how you could alter the expression $\int(f(x) + g(x)) dx$ in order to make the integral easier.

Describe the process required to find the constant term c in an integration.

Explain the difference between a definite and an indefinite integral.

Pure 13 - Integration

Describe the process for finding the definite integral for the expression $\int_a^b f'(x) dx$

Explain how integrals are related to the area beneath a curve. How is this different for definite and indefinite integrals?

What happens to an integral when the bounded area is beneath the x-axis?

Pure 14 - Exponentials and Logarithms

Complete the following statements:

$$f(x) = e^x \rightarrow f'(x) =$$

$$f(x) = ke^x \rightarrow f'(x) =$$

$$f(x) = e^{kx} \rightarrow f'(x) =$$

$$f'(x) = e^x \rightarrow f(x) =$$

$$f'(x) = ke^x \rightarrow f(x) =$$

$$f'(x) = e^{kx} \rightarrow f(x) =$$

Explain how logarithms and exponentials of the same base are related. Use the natural logarithm and exponential in your answer.

Describe how you could transform the graphs of $y = ax^n$ and $y = ab^x$ into linear graphs.

State the multiplication, division, and power laws for logarithms.

State the conditions and assumptions for each of these special cases.

$$\log_a \left(\frac{1}{x} \right) = \log_a (x^{-1}) = -\log_a x$$

$$\log_a a = 1$$

$$\log_a 1 = 0$$

Applied 06 - Statistical Distributions

Explain the concept of a Probability Distribution.

State the notation for a Binomial Distribution and define each term. What are the conditions and assumptions intrinsic to the Binomial Distribution?

Explain Sum Notation. Give an example of how this is written mathematically, and define each term.

Give the Probability Mass Function for a Binomially distributed variable X .

Applied 07 - Hypothesis Testing

Define the terms Null Hypothesis and Alternate Hypothesis.

Explain what the Critical Region is, and how it relates to the Critical Values.

Describe a One-Tailed Test and state the basic form of both the hypotheses.

Explain how the Significance Level is used to determine the significance of the data. Describe how this is used to either accept or reject the Null Hypothesis.

Describe a Two-Tailed Test and state the basic form of both the hypotheses.

Applied 11 - Variable Acceleration

State the formulae for Displacement in terms of integrals of Velocity and Acceleration.

State the formulae for Velocity in terms of either integrals or derivatives of Displacement and Acceleration.

State the formulae for Acceleration in terms of derivatives of Displacement and Velocity.

Explain the process for finding maximum or minimum values of Displacement, Velocity, or Acceleration for a given range of time. Use a graph to assist the explanation.