

***Maths A2 Level Knowledge Organiser***  
***Year 12 - Summer 2***

## *Pure 01 - Algebraic Methods*

**Define the term "Rational Number"**

**Explain the general process for Proof by Contradiction**

**There are two main methods for solving Partial Fractions. What are they, and when would you use them?**

**1)**

**2)**

## Pure 01 - Algebraic Methods

Given an Algebraic fraction, describe the two methods by which you could turn in from an improper fraction into a mixed fraction

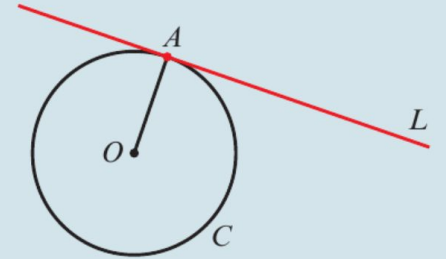
1)

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### Challenge

The line  $L$  meets the circle  $C$  with centre  $O$  at exactly one point,  $A$ .

Prove by contradiction that the line  $L$  is perpendicular to the radius  $OA$ .



## Pure 02 - Functions and Graphs

Define what is meant by the “Modulus Function”, and describe its effect when the original function is positive and when it is negative.

Describe the difference between a One-to-One function and a Many-to-One function

What are the Domain and the Range, and how are they linked?

In which circumstances would  $|f(x)| = f(x)$ ? Give an example.

## Pure 02 - Functions and Graphs

A Piecewise Function can never be continuous. Agree or Disagree? Explain why.

Consider a function  $f(x)$ . In terms of Mapping, how does  $f^{-1}(x)$  vary from this? How is it similar?

Define what is meant by a "Composite Function". How does this alter the Mapping of the functions?

Briefly explain how the factor  $a$  transforms the function  $f(x)$  in each case.

$$f(x + a)$$

$$af(x)$$

$$f(x) + a$$

$$f(ax)$$

## Applied 01 - Regression, Correlation, and Hypothesis Testing

State the forms that a Null and Alternate Hypothesis take in both one and two tailed Hypothesis Tests. Explain how these are used.

What does PMCC stand for? Describe what this represents and state the possible range of values and their meanings.

State the standard form of the logarithm of  $y = ax^n$

$\log y =$

State the standard form of the logarithm of  $y = kb^x$

$\log y =$

## Applied 04 - Moments

Given a force of fixed size  $F$  applied at a distance  $d$  from the axis of rotation, explain how you could maximise and minimise the Moment.

When the force is applied perpendicular to the lever arm, the Moment can be calculated by  $P = |F| \times d$ . Using a diagram, derive the expression for when the force is applied at an angle  $\theta$  to the lever arm.

Describe the process for calculating the Resultant Moment from multiple Moments.

## Applied 04 - Moments

What is required for a system to be in Equilibrium?

Explain why the reaction is zero in all other supports is zero when a rigid body is at the point of tilting around a pivot.

Define the Centre of Mass.

Describe the difference between a uniform and non-uniform rigid body.