# Proves

# Partial fractions

For

, sub

For

# Parametric equations

Change subject:

1. To t
2. To trigonometric functions of t, then sub

* Domain = range f(t) [x]
* Range = range g(t) [y]

# Binominal expansion

# Differentiation

Implicit: “Differentiate all xy, add behind all differentiations of y”

Chain rule substitution: “ etc.”

# Integration

Rotating about x-axis & y-intercept

By substitution: “sub find and replace all functions of with ”

By part:

* Use partial fractions!
* Common trigo integrations

## Solving differential equations

# Vectors

## Basics

Position vectors: Vectors originating from a point

Unit vectors: Vectors with magnitude of 1

Column vector:

Resultant vectors:

Resultant vector of position vectors:

## Magnitude & direction

For :

**3D vectors**

For

Magnitude =

Unit vector =

## Solving vector ratio problems

To find unknown vector’s expression (e.g. )

## Parallel vectors

A set of parallel vectors:

For

If **:**

## Lines of vectors

Passing throughparallel to:

Passing through :

* Different values of represent different points on line. The equation of the line represent all possible points on the line

Check if point **P** on line:

Check if lines have intersection:

Point of intersection:

Prove collinear: Common point, same direction (factor)

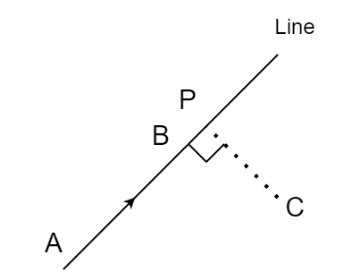
## Scalar product, angles & areas

Angle between vectors:

Angle between vectors:

For

Lines make angle:



Prove perpendicular:

Find shortest distance to other line:

Area:

Cosine rule: /