Pure maths 3

Algebra:

- Modulus function
  - graph : graph of line => reflect anything below x axis
  - Solve
    - equation: solve and check answers
      - both side inequality: squaring both side
      - one side inequality: Take +ve and negative
    - inequality
      - Graph or +ve/-ve
- Polynomial
  - Division
  - Remainder theorem: f(x) / (x-a) => Remainder = f(a)
  - Factore theorem: if f(a) = 0 => x-a is a factor
  - Factorize:
    - Substitute different values until you get f(a) = 0, x-a is factor => divide (Calculator: table)

Logarithmic and exponential function:

- Graph of e^x, lnx and shifting
- Equations : take log on both side and simplify
- Converting to linear : take log on both side => y=mx+c, new variables

Differentiation:

- Product rule, Quotient rule
- Parametric/implicit : chain rule
  - find dy/dx if $x^2 + 3xy + 2y^2 = 10$
  - if $x = 3 - t^3$, $y = t^2 - 2t$, find dy/dx

Integration:

- ax+b instead of x : divide by derivative of ax+b i.e. a
  - Differentiate: e^{5x+6}, 1/(ax+b), sin(ax+b)...

Numerical solution of equations:

- Bisection method
  - proving that there is a solution between the given range of values
  - Finding approx. root*(rarely asked)
- Iterative formula

Further algebra:

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- Partial fraction
- expansion of $(1+x)^n$, where $|x| < 1$

Further calculus:

- $\tan^{-1}(x/a)$
- derivative of num/den on numerator
- partial fraction
- Substitution (use substition, and replace dx)
- Integration by part : DI method

Vectors:

- Addition, subtraction, multiplication by scalar
- magnitude, direction
- Scalar product (dot product)
- Vector equation of line
    - find
    - prove parallel, perpendicular
    - intersection

Differential equations:

- Create differential equation
- Variable separable
    - general solution(with c)
    - particular solution(without c)

Complex number:

- Simplification
- Solve quadratic(quadratic formula)
- find r and theta
- square root
- Argand diagram

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