Higher Maths — Key Steps and Exam Strategies

6·1 – Differentiation

To differentiate a function…

1. Bring the power down and multiply
2. Subtract '1' from the power

$f(x) = ax^n$

$f'(x) = nax^{n-1}$

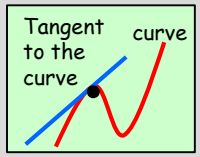
Some useful laws of indices…

$\frac{1}{x} = x^{-1}$ $\sqrt{x} = x^{\frac{1}{2}}$ $\sqrt[3]{x} = x^{\frac{1}{3}}$ $\sqrt[n]{x^m} = x^{\frac{m}{n}}$

6·2 – Finding the derivative at a particular point

1. f'(x)
2. f'(number)

6·3 – Tangent to Curve



To find the equation of the tangent to a curve…

1. Sub in to get y
2. f'(x)
3. f'(number)
4. y – b…

$m_{tan} = \frac{dy}{dx}$

To find a point (x, y) when given the gradient of the tangent to the curve…

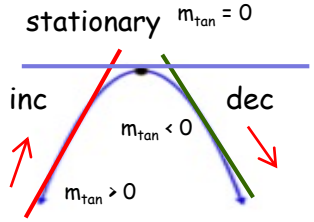
1. Differentiate
2. Set equal to the gradient
3. Find x
4. Sub in to get y

6·4 – Increasing/decreasing functions

A function is increasing if… f'(x) > 0

A function is decreasing if… f'(x) < 0

A function is stationary if… f'(x) = 0



6·5 – Stationary points and curve sketching

(sub in x = 0!)

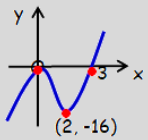
To find the coordinates of stationary points and determine their nature…

1. f'(x)
2. @ SP's…
3. Set equal to zero
4. Find x (factorise)
5. Find y (sub in)
6. Nature table

x	-10	-3	0	1	10
f'(x)	+ve	0	-ve	0	+ve
slope	/	–	\	_	/

To sketch a curve…

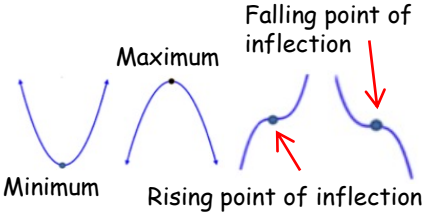
1. Calculate the y-intercept
2. Find the roots (set = 0 and factorise!)
3. Calculate stationary points
4. Show this information in a sketch



All of these words/phrases mean differentiate!

- f'(x)
- $\frac{dy}{dx}$
- Rate of Change
- Stationary
- Maximum/Minimum
- Increasing/Decreasing
- Greatest/Least
- Velocity/Acceleration
- Tangent to Curve

Types of stationary points…



6·6 – Closed intervals

To find the max and min values of a function within a closed interval;

1. Consider end points
2. Consider stationary points
3. State max and min values

6·7 – Optimisation

Part (a) – Problem Solving

Part (b) – Stationary points in disguise!