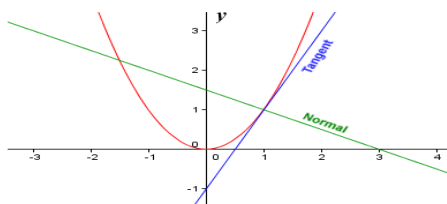


Goals



This fortnight we will be:

- Finding gradient function from first principle
- Differentiating using first principles
- Finding the gradient function (derivative) of polynomial functions using the power rule
- Differentiating using power rule
- Locating stationary points: $f'(x)=0$
- Finding gradients and equations of tangents and normals at points on a curve

Theoretical Components

Resources:

Maths Quest Year 11 Chapter 9

Derivative as slope of a tangent line:

<https://youtu.be/ANyVpMS3HL4>

Knowledge Checklist:

- what is a rate?
- constant rates
- variable rates
- average rates of change
- instantaneous rates of change
- interpret graphs that illustrate rates of change
- equations of tangents
- what is a limit?
- evaluating limits
- what is a gradient function?
- what is the x-intercept of a gradient function?
- power rule
- finding gradient functions by sketching
- finding gradient functions by using the rule
- finding gradient functions using your CAS

The derivative of $f(x)=x^2$ for any x

https://youtu.be/HEH_oKNLgUU

Example of finding gradient function from first principle for $f(x) = 5x + 1$

<https://www.youtube.com/watch?v=6rJ9hDUeEQ>

Practical Components

Ex 9C Differentiation using first principles

Qs 1 (a, b), 3, 5 (a,c), 6

Fortunately, the long process of finding derivatives from first principles need not be applied once rules are established. For polynomial functions, the following rules apply:

Rule 1. If $f(x) = x^n$, then $f'(x) = nx^{n-1}$.

Rule 2. If $f(x) = ax^n$, then $f'(x) = nax^{n-1}$.

Rule 3. If $f(x) = c$, then $f'(x) = 0$ (where c is constant).

Rule 4. If $f(x) = g(x) + h(x)$, then $f'(x) = g'(x) + h'(x)$

Ex 9D Finding derivatives by rule

All questions

Ex 9E Rates of Change - Applications

Qs 2, 4, 5, 6, 7, 11 – 17

Investigation

Complete the following mathspace task:

<https://mathspace.co/student/tasks/TopicCustomTask-585563/>

Have some working out paper handy for this task.

QFO

Quiz/Forum/Other

Complete Learning Briefs from Weeks 7 to 12 inclusive, including mathspace and class activities.

In-Class task to be held during Week 13.