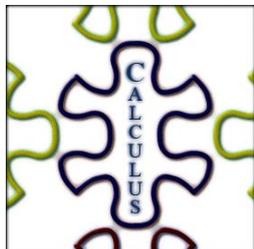


## Goals



### Unit Goals

- differentiate polynomial and simple rational functions;
- apply chain, product and quotient rules for finding derivatives;
- use the second derivative to investigate changes in concavity;
- use calculus to confirm critical features of the graphs of polynomial and simple rational functions;
- solve problems using differential calculus.

### This Week

- Related rates and Anti-derivatives
- Revision

## Theoretical Components

### Resources:

Maths Methods Year 11 and Year 12  
3 Unit Cambridge Year 11  
Related Rates SM2

[https://www.khanacademy.org/math/differential-calculus/derivative\\_applications/rates\\_of\\_change/v/rates-of-change-between-radius-and-area-of-circle](https://www.khanacademy.org/math/differential-calculus/derivative_applications/rates_of_change/v/rates-of-change-between-radius-and-area-of-circle)

Related Rates SM2 extra videos

<http://www.youtube.com/watch?v=tZl5h7590go>

<http://www.youtube.com/watch?v=9bMJtNxjUk>

<http://www.youtube.com/watch?v=uUwOVu4pA4U>

Anti-Differentiation

[https://www.khanacademy.org/math/integral-calculus/indefinite-definite-integrals/indefinite\\_integrals/v/antiderivatives-and-indefinite-integrals](https://www.khanacademy.org/math/integral-calculus/indefinite-definite-integrals/indefinite_integrals/v/antiderivatives-and-indefinite-integrals)

## Practical Components

### Week 15

Related Rates:

12 Methods Book

8E 1, 3, 5, 6, 14

8F 1, 2, 3, 4, 5, 8, 11

Cambridge Yr 11 3 unit:

7H any 3 of 1-6 any 2 of 7-11

Anti-Differentiation

12 Methods Book

9A

Cambridge Yr 11 3 unit:

10J

### Week 16 Revision

You are required to complete:

- Monday lecture
- 1hr of face to face maths in learning commons
- QUIZ – complete Week 14
- INVESTIGATION - prepare an A4 double sided, hand written summary sheet for the test
- Get all your investigations up to date

## Q/F/O

Catch up week.

Chance for you to reduce your absences. Show me your completed Investigations and complete Week 14 Quiz, if you have not already done so.

# Investigation

Week 15 – Not Compusory. Catch up week.

PART A:

A 5m long ladder rests against a vertical wall with its feet on the horizontal ground. The feet on the ground slip, and at the instant when they are 3m from the wall, they are moving at 10m/s. At what speed is hte other end of the ladder moving at this instant?

PART B:

An air traffic controller spots two planes at the same altitude converging on a point as they fly at right angles to each other. One plane is 362 km from the point moving at 724 km per hour. The other plane is 483 km from the point moving at 965 km per hour.

- a) At what rate is the distance between the planes decreasing?
- b) How much time does the air traffic controller have to get one of the planes on a different flight path?

Week 16

INVESTIGATION - prepare an A4 double sided, hand written summary sheet for the test. To be collected at the end of the exam – make sure you have your name on the sheet.

## Knowledge Checklist:

- what is a gradient function?
- what is the x-intercept of a gradient function?
- power rule
- Chain rule
- Product rule
- Quotient rule
- finding gradient functions by sketching
- finding gradient functions by rule
- finding gradient functions using your CAS
- curve components
- identify increasing curve
- identify decreasing curve
- find equations of tangents and normals
- identify and classify stationary points
- second derivative
- properties of the second derivative
- concavity
- identifying concavity
- sketching graphs
- solve problems using calculus
- solve maximising problems
- solve minimising problems
- what is a rate
- using calculus to solve rate problems
- explicitly use the chain rule to solve rate problems
- solve worded and contextual problems using calculus