**11A Standard Integrals**

1. Find the value of
2. Find the following integral:
3. Find the following integral:
4. Given that is a positive constant and:

Find the exact value of .

**11B Basic Reverse Chain Rule**

1. Find the following integral:
2. Find the following integral:
3. Find the following integral:
4. Find:
5. Find:

**11D Spotting Derivatives**

1. Find:
2. Find:
3. Find:
4. Find:
5. Find:
6. Find:
7. Find (1f from textbook exercise)

**11C Using Trigonometric Identities**

1. Find the following integral:
2. Find:
3. Find:
4. Show that:

**11G Integration by Partial Fractions**

1. Find:
2. Find:

**11F Integration by Parts**

1. Find:
2. Find:
3. Find:
4. Evaluate:

**11E Integration by Substitution**

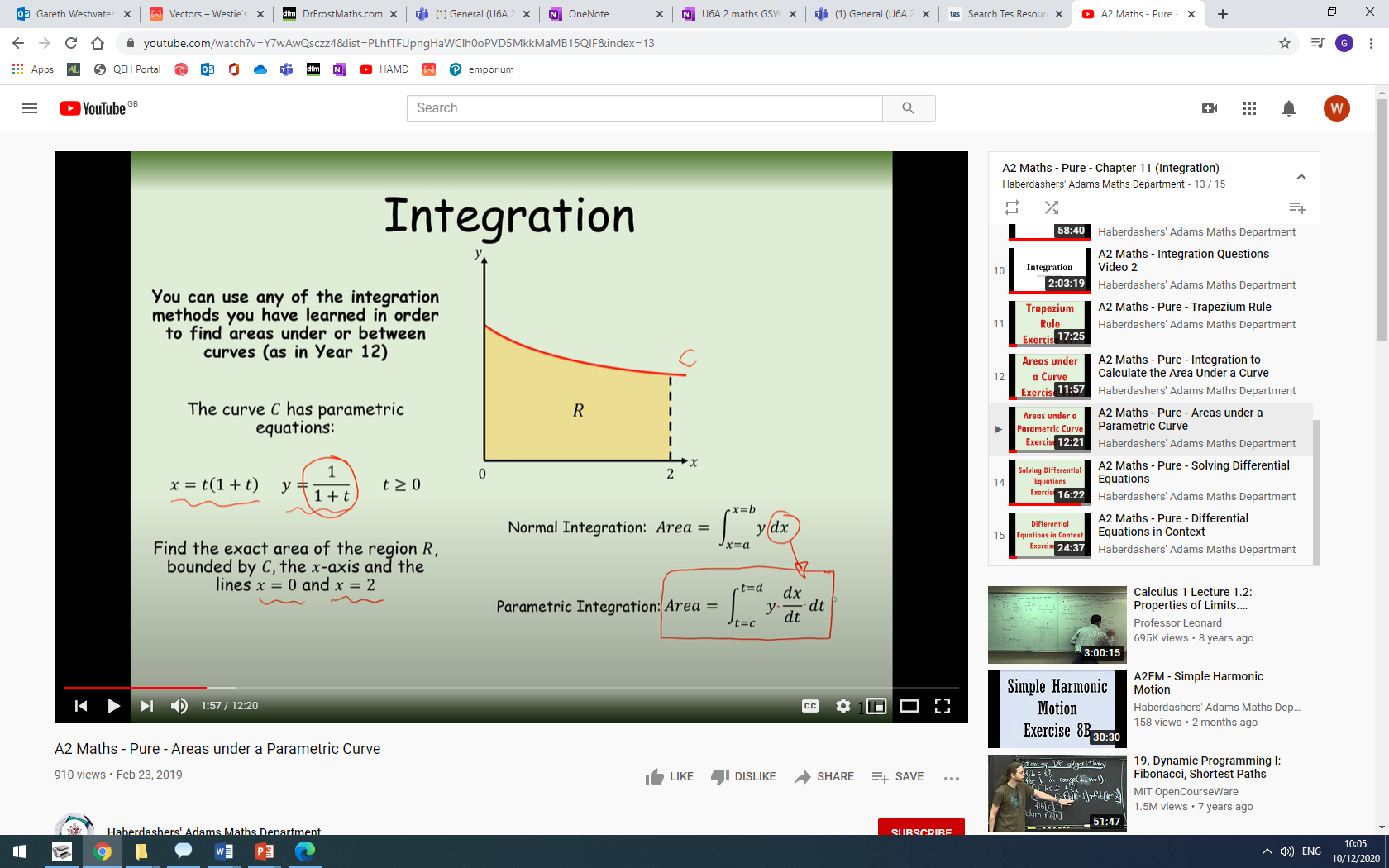
1. Find using the following substitution:
2. Find using the following substitution:
3. Use the substitution to find:
4. Prove that:
5. Use integration by substitution to evaluate:
6. Use integration by substitution to evaluate:

**11H part 2 Integrating Parametric Equations**

Note that this was initially left out of the textbook, so depending on your edition, you may not have practise questions. I will be using the old C4 notes and examples to talk through the theory.

1. The cure has parametric equations

Find the exact area of the region R, bounded by the curve C, the x-axis and the lines x=0 and x=2



1. A curve has Parametric equations:

Work out:



1. The diagram shows a sketch of the curve with Parametric equations:

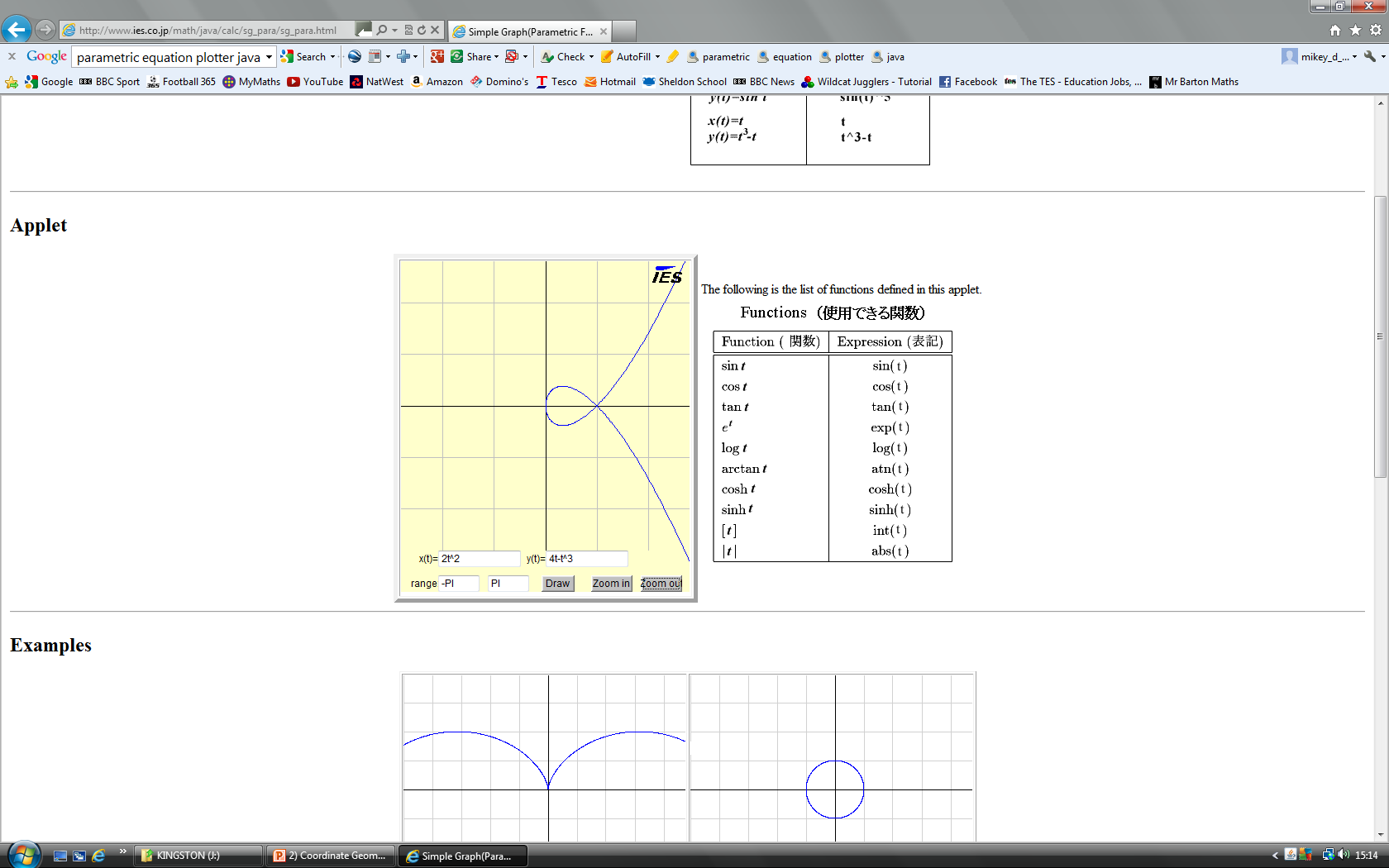
The curve meets the x-axis at x = 0 and x = 9. The shaded region is bounded by the curve and the x-axis.

1. Find the value of t when:
2. x = 0
3. x = 9

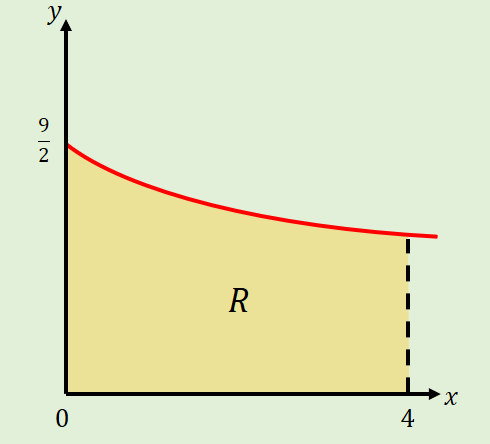
b) Find the Area of R

1. The diagram shows a sketch of the curve with Parametric equations:

Calculate the finite area inside the loop…

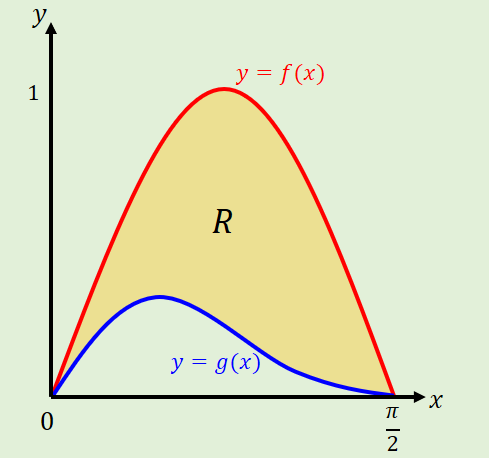


**11H Part 1 Integrating to Find Areas**



1. The diagram shows part of the curve:

The region is bounded by the curve, the x-axis, and the lines and , and shown. Use integration to find the area of .



1. The diagram shows part of the curves and , where:

The region is bounded by the two curves. Use integration to find the area of .

**11I The Trapezium Rule**

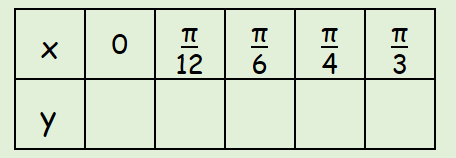
1. Using 4 strips, estimate the area under the curve:

Between the lines x = 0 and x = 2

1. Using 8 strips, estimate the area under the curve:

Between the lines x = 0 and x = 2

1. Complete the table of values and use it to find an estimate for:



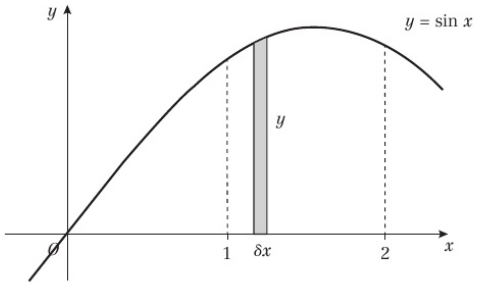
1. Use the trapezium rule with 4 strips to find an approximation for:

**11L Integration as the Limit of a Sum**

1. The diagram shows a sketch of the curve with equation .

The area under the curve between and can be thought of as a thin series of strips of height and width

Calculate, giving your answer correct to 4 significant figures.



**11J Separating the Variables**

1. Find a general solution to the differential equation:
2. Find the **particular solution** of the differential equation:

given that x = 1 when y = 4

**11K Modelling with Integration**

1. The rate of increase of a population P of micro organisms at time t, in hours, is given by:

Initially, the population was of size 8.

1. Find a model for in the form , stating the value of
2. Find, to the nearest hundred, the size of the population at the time
3. Find the time at which the population will be 1000 times its starting value.
4. State one limitation of this model for large values of
5. Water in a manufacturing plant is held in a large cylindrical tank of diameter 20m. Water flows out of the bottom of the tank through a tap at a rate proportional to the cube root of the volume (of the water).
6. Show that after minutes after the tap is opened, for some constant .
7. Show that the general solution to this differential equation may be written as , where and are constants

Initially, the height of the water is 27m. 10 minutes later, the height is 8m.

1. Find the values of the constants and
2. Find the time in minutes when the water is at a depth of 1m