

Anti-Differentiation

Resource Assumed Time: 25 minutes Marks: / 25

CAS calculator + A4 page 1 side of notes

Question 8 (8 marks)

Sam has invested \$4 in a fund which compounds her investment continuously at a rate of $k\%$ per annum.

The rate of change of her investment is given by $\frac{dV}{dt} = k(Ae^{kt})$ where V is the value of her investment in dollars and t is the time in years.

The net change in the value of her investment in the first 10 years is \$12 331 . 78.

The net change in the value of her investment in the next 10 years is \$22 469 . 97.

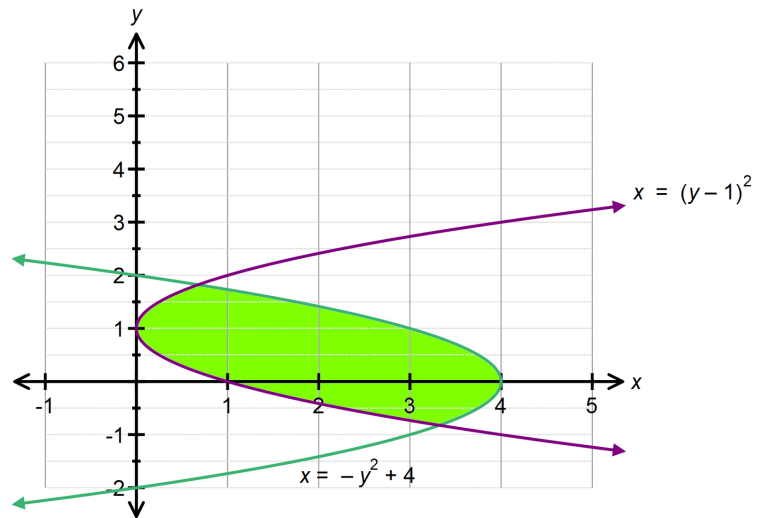
(a) Determine the values of A and k . (6 marks)

(b) Hence determine the function that defines the value of her investment. (2 marks)

Question 9**(6 marks)**

Calculate the shaded area shown below, showing all relevant working.

(Round both your boundaries and your final answer to 2 decimal places.)



(4 marks)

(3 marks)

Question 10

Show that $\int_2^1 \left(\frac{6x+4}{\sqrt{x}} \right) dx = 16\sqrt{2} - 12$.

(Show sufficient work out please and use **exact** values)

Question 11

The area under the curve $f(x) = 4e^{kx}$ over the domain $0 \leq x \leq 10$ is $\frac{40}{3}(e^{-3} + 1)$.

Determine the value of k , given that $-1 \leq k \leq 1$.

Question 12**(4 marks)**

The area bound by the parabola $y = 6x^2 - 6x$, the x – axes and the lines $x = 1$ and $x = c, (c > 1)$ is equal to 1 unit². Find the value of the constant c .

END OF PAPER 2

EXTRA PAGE FOR WORK OUT