

### Anti-Differentiation

Resource Assumed

Time: 25 minutes

Marks:     / 25

CAS calculator + A4 page 1 side of notes

#### Question 8

(8 marks)

Sam has invested \$ $A$  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.

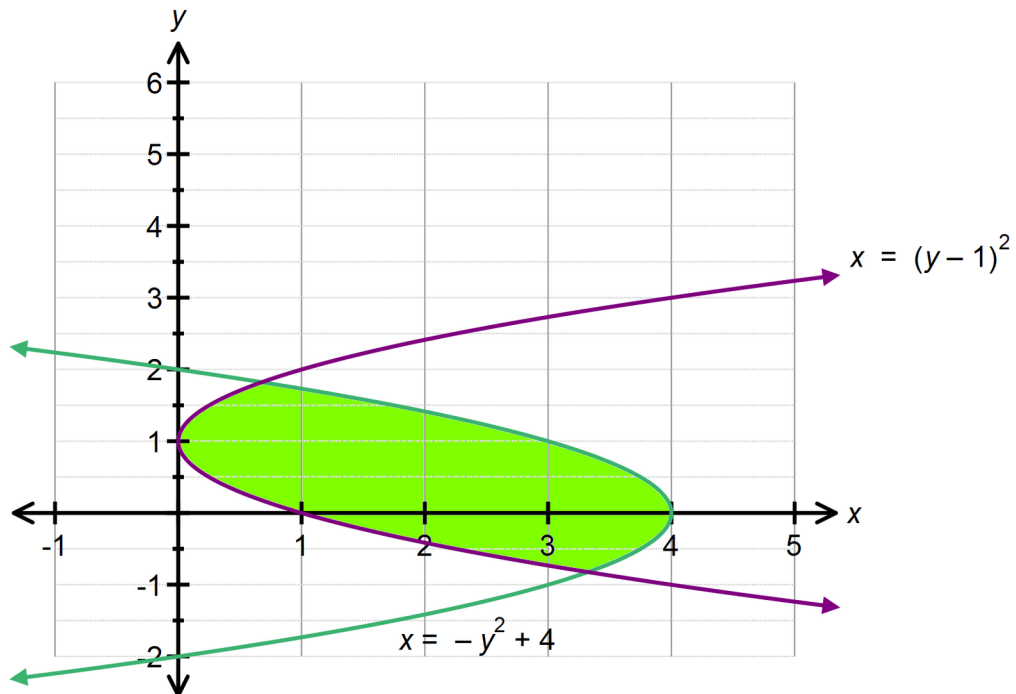
(a)     Determine the values of  $A$  and  $k$ . (6 marks)

(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.)*



**Question 10****(4 marks)**

Show that  $\int_1^2 \left( \frac{6x+4}{\sqrt{x}} \right) dx = 16\sqrt{2} - 12.$

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

**Question 11****(3 marks)**

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 1unit<sup>2</sup>. Find the value of the constant  $c$ .

END OF PAPER 2

EXTRA PAGE FOR WORK OUT