METHODS YEAR 12 Test 3 2017 Name:_____

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.

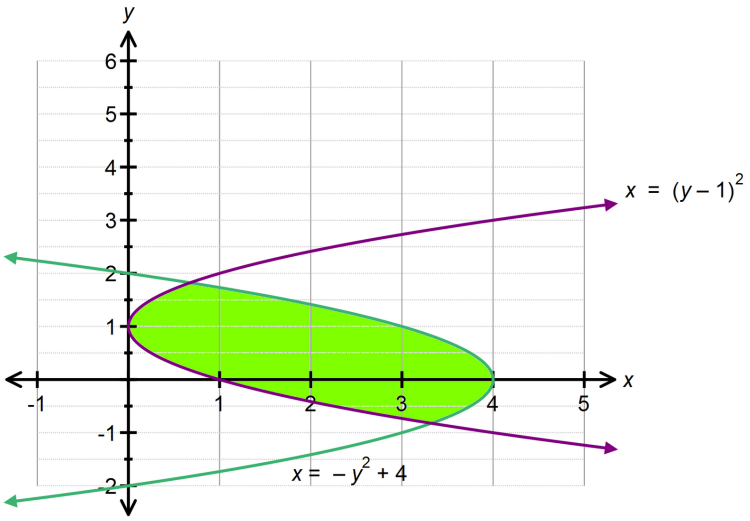
(a) Determine the values of A and k. (6 marks)

(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 $0 \le x \le 10$ is $\frac{40}{3}\left(-e^{-3}+1\right)$.

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

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 1unit². Find the value of the constant c.

END OF PAPER 2

EXTRA PAGE FOR WORK OUT