Trapezium Rule (From OCR 4722)

Q1, (Jun 2006, Q9i,ii)

(i) Sketch the curve $y = \left(\frac{1}{2}\right)^x$, and state the coordinates of any point where the curve crosses an axis. [3]

(ii) Use the trapezium rule, with 4 strips of width 0.5, to estimate the area of the region bounded by the curve $y = \left(\frac{1}{2}\right)^x$, the axes, and the line $x = 2$. [4]

Q2, (Jan 2007, Q5b)

Use the trapezium rule, with two strips of width 3, to find an approximate value for

$$\int_3^9 \log_{10} x \, dx,$$

giving your answer correct to 3 significant figures. [4]

Q3, (Jan 2008, Q2)

Use the trapezium rule, with 3 strips each of width 2, to estimate the value of

$$\int_1^7 \sqrt{x^2 + 3}\, dx.$$ [4]

Q4, (Jun 2009, Q9)

(i) Sketch the graph of $y = 4k^x$, where k is a constant such that $k > 1$. State the coordinates of any points of intersection with the axes. **[2]**

(ii) The point P on the curve $y = 4k^x$ has its y-coordinate equal to $20k^2$. Show that the x-coordinate of P may be written as $2 + \log_k 5$. **[4]**

(iii) **(a)** Use the trapezium rule, with two strips each of width $\frac{1}{2}$, to find an expression for the approximate value of

$$\int_0^1 4k^x \, dx.$$ **[3]**

(b) Given that this approximate value is equal to 16, find the value of k. **[3]**

Q5, (Jan 2010, Q4)

(i) Use the trapezium rule, with 4 strips each of width 0.5, to find an approximate value for

$$\int_3^5 \log_{10}(2 + x)\, dx,$$

giving your answer correct to 3 significant figures. **[4]**

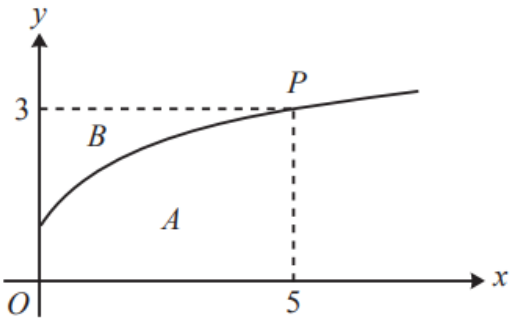
(ii) Use your answer to part **(i)** to deduce an approximate value for $\int_3^5 \log_{10} \sqrt{2 + x}\, dx$, showing your method clearly. **[2]**

Q6, (Jun 2013, Q1)

Use the trapezium rule, with 3 strips each of width 2, to estimate the value of

$$\int_5^{11} \frac{8}{x}\,dx.$$ **[4]**

Q7, (Jun 2014, Q9i,ii)



The diagram shows part of the curve $y = -3 + 2\sqrt{x+4}$. The point $P(5, 3)$ lies on the curve. Region A is bounded by the curve, the x-axis, the y-axis and the line $x = 5$. Region B is bounded by the curve, the y-axis and the line $y = 3$.

(i) Use the trapezium rule, with 2 strips each of width 2.5, to find an approximate value for the area of region A, giving your answer correct to 3 significant figures. **[3]**

(ii) Use your answer to part **(i)** to deduce an approximate value for the area of region B. **[2]**

Q8, (Jun 2015, Q2)

(i) Use the trapezium rule, with 4 strips each of width 1.5, to estimate the value of

$$\int_4^{10} \sqrt{2x-1}\,dx,$$

giving your answer correct to 3 significant figures. **[4]**

(ii) Explain how the trapezium rule could be used to obtain a more accurate estimate. **[1]**

Q9, (Jun 2016, Q8v)

Use the trapezium rule, with 2 strips each of width 1.5, to find an estimate for $\int_1^4 3^{x-2}\,dx$. Give your answer correct to 3 significant figures. **[3]**
