Standard Integral Exam Questions

Q1, (OCR 4723, Jan 2006, Q1)

Show that $\int_2^8 \frac{3}{x}\,dx = \ln 64$. [4]

Q2, (OCR 4723, Jan 2009, Q1)

Find

(i) $\int 8e^{-2x}\,dx$,

(ii) $\int (4x+5)^6\,dx$.

[5]

Q3, (OCR 4723, Jun 2011, Q1)

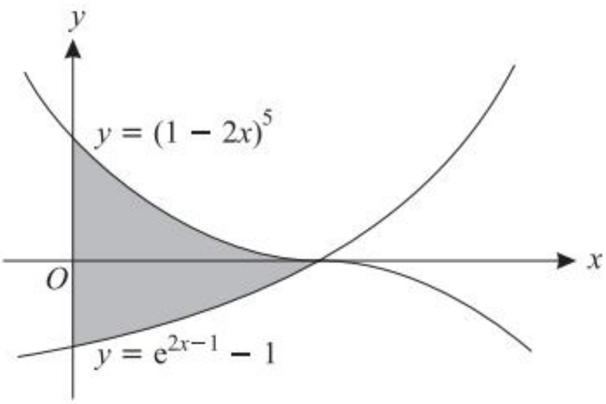
Find

(i) $\int 6e^{2x+1}\,dx$,

(ii) $\int 10(2x+1)^{-1}\,dx$.

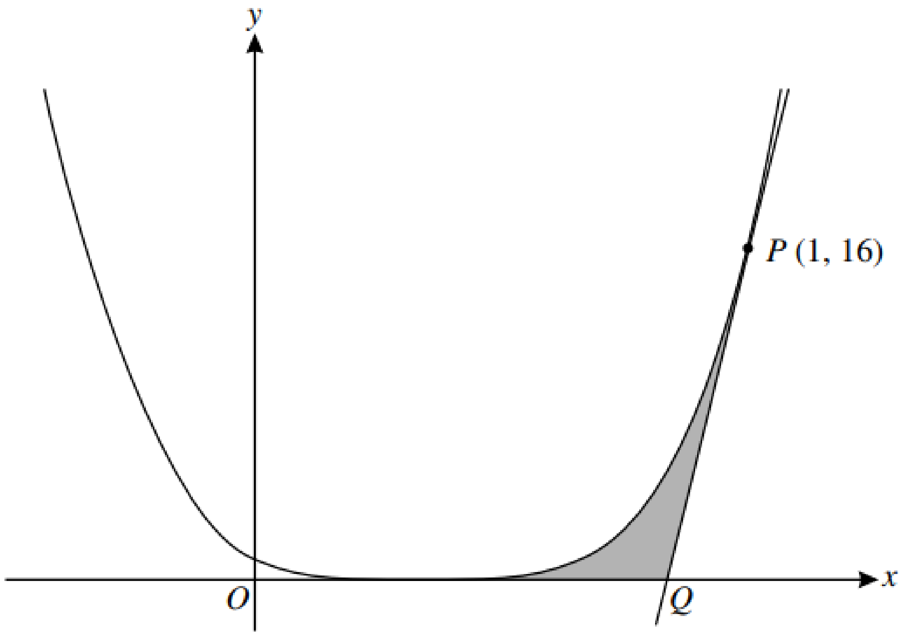
[5]

Q4, (OCR 4723, Jan 2006, Q5)



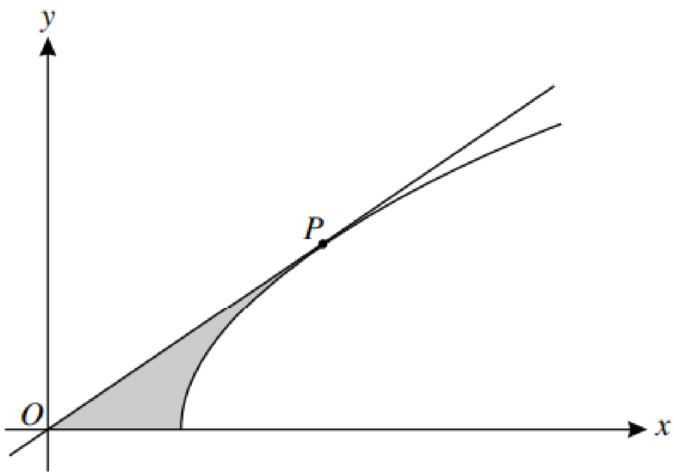
The diagram shows the curves $y = (1-2x)^5$ and $y = e^{2x-1} - 1$. The curves meet at the point $(\frac{1}{2}, 0)$. Find the exact area of the region (shaded in the diagram) bounded by the y-axis and by part of each curve. [8]

Q5, (OCR 4723, Jun 2010, Q7)



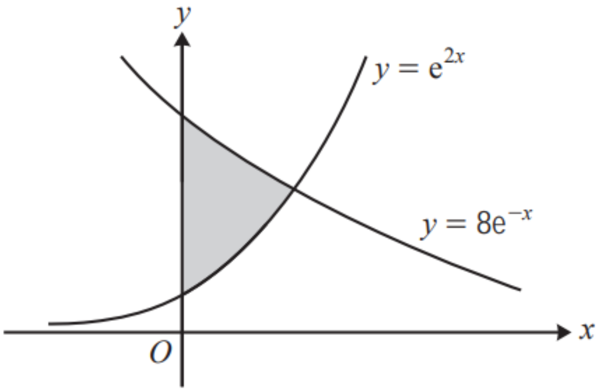
The diagram shows the curve with equation $y = (3x - 1)^4$. The point P on the curve has coordinates $(1, 16)$ and the tangent to the curve at P meets the x-axis at the point Q. The shaded region is bounded by PQ, the x-axis and that part of the curve for which $\frac{1}{3} \leqslant x \leqslant 1$. Find the exact area of this shaded region. **[10]**

Q6, (OCR 4723, Jun 2011, Q6)



The diagram shows the curve with equation $y = \sqrt{3x - 5}$. The tangent to the curve at the point P passes through the origin. The shaded region is bounded by the curve, the x-axis and the line OP. Show that the x-coordinate of P is $\frac{10}{3}$ and hence find the exact area of the shaded region. **[9]**

Q7, (OCR 4723, Jun 2016, Q5)



The diagram shows the curves $y = e^{2x}$ and $y = 8e^{-x}$. The shaded region is bounded by the curves and the y-axis. Without using a calculator,

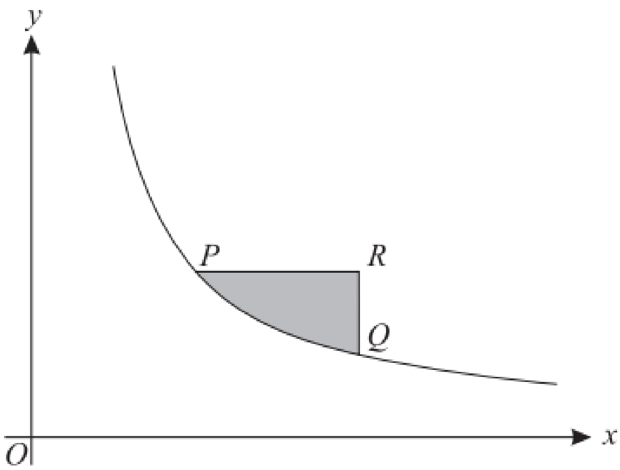
(i) solve an appropriate equation to show that the curves intersect at a point for which $x = \ln 2$, **[2]**

(ii) find the area of the shaded region, giving your answer in simplified form. **[5]**

Q8, (OCR 4723, Jun 2006, Q7)

(a) Find the exact value of $\int_1^2 \frac{2}{(4x-1)^2}\,dx$. [4]

(b)



The diagram shows part of the curve $y = \frac{1}{x}$. The point P has coordinates $\left(a, \frac{1}{a}\right)$ and the point Q has coordinates $\left(2a, \frac{1}{2a}\right)$, where a is a positive constant. The point R is such that PR is parallel to the x-axis and QR is parallel to the y-axis. The region shaded in the diagram is bounded by the curve and by the lines PR and QR. Show that the area of this shaded region is $\ln\left(\frac{1}{2}e\right)$. [6]