## 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

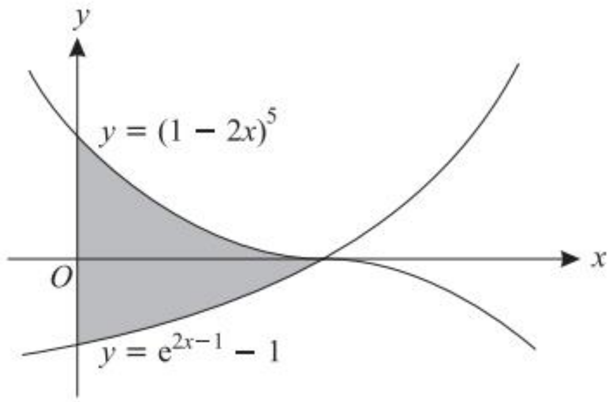
**(i)** $\int 6e^{2x+1}\,dx$,

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

**[5]**

---

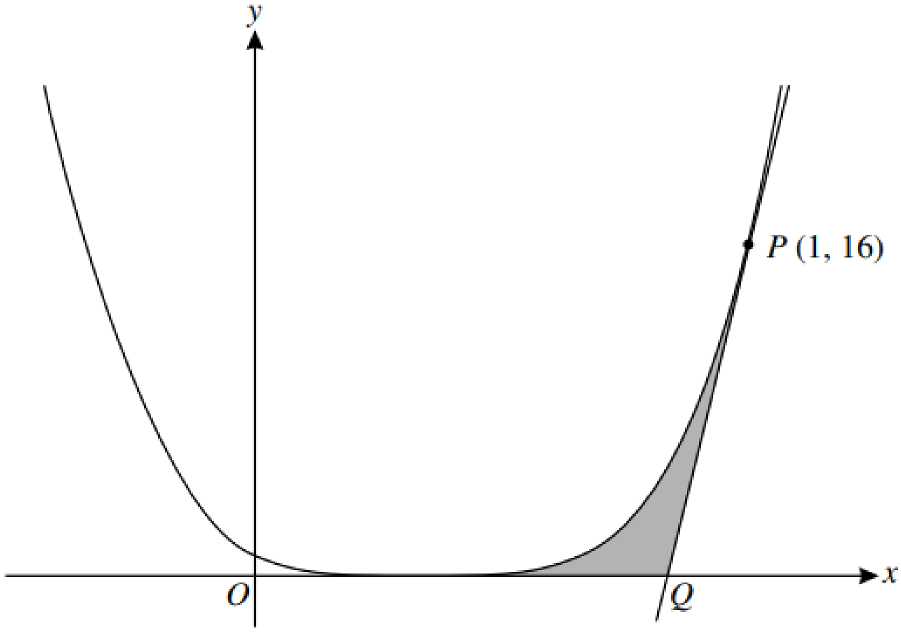
### Q4, (OCR 4723, Jan 2006, Q5)




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]

---

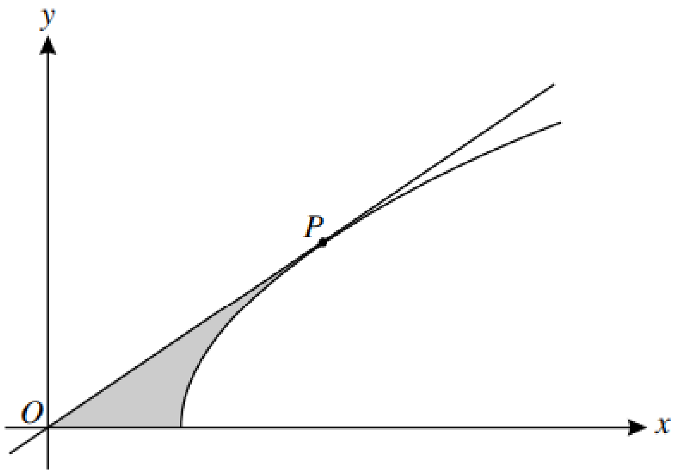
Q5, (OCR 4723, Jun 2010, Q7)




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]**

---

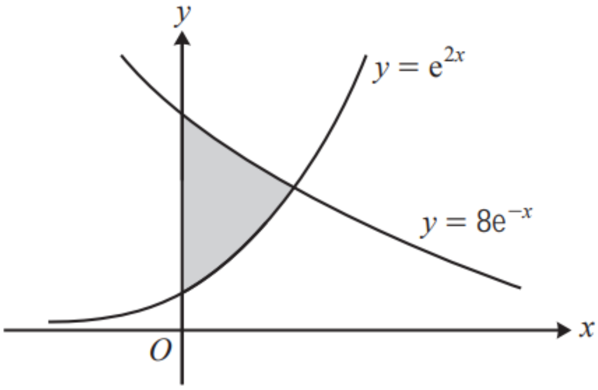
Q6, (OCR 4723, Jun 2011, Q6)




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]**

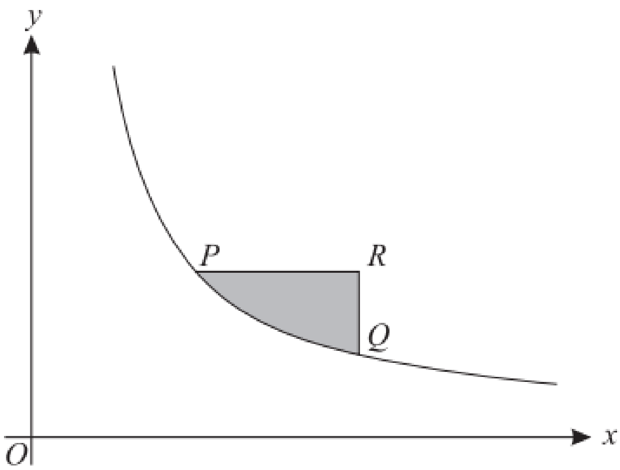
**(ii)** find the area of the shaded region, giving your answer in simplified form. **[5]**

---

Q8, (OCR 4723, Jun 2006, Q7)

**(a)** Find the exact value of $\displaystyle\int_1^2 \frac{2}{(4x-1)^2}\,dx$. [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 $\ln(\frac{1}{2}e)$. [6]