

**INTEGRATION (Q 8, PAPER 1)**

**2001**

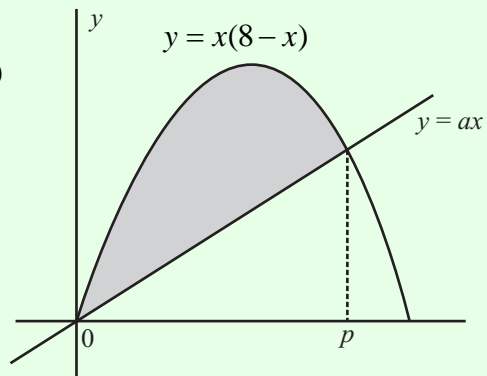
8 (a) Find (i)  $\int \frac{1}{x^3} dx$  (ii)  $\int \sin 5x dx$ .

8 (b) Evaluate (i)  $\int_0^3 \frac{12}{x^2+9} dx$  (ii)  $\int_0^4 \frac{(x+4)}{\sqrt{x^2+8x+1}} dx$ .

8 (c)  $a$  is a real number such that  $0 < a < 8$ .  
The line  $y = ax$  intersects the curve  $y = x(8-x)$   
at  $x = 0$  and at  $x = p$ .

(i) Show that  $p = 8 - a$ .

(ii) Show that the area between the curve  
and the line is  $\frac{p^3}{6}$  square units.



**ANSWERS**

8 (a) (i)  $-\frac{1}{2x^2} + c$  (ii)  $-\frac{1}{5} \cos 5x + c$

8 (b) (i)  $\pi$  (ii) 6