

INTEGRATION (Q 8, PAPER 1)

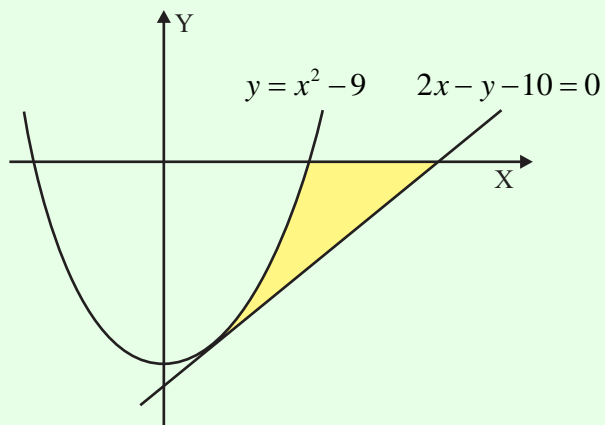
2007

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

(b) (i) Evaluate  $\int_0^4 x\sqrt{x^2+9} dx$ .

(ii)  $f$  is a function such that  $f'(x) = 6 - \sin x$  and  $f(\frac{\pi}{3}) = 2\pi$ .  
Find  $f(x)$ .

(c) The line  $2x - y - 10 = 0$  is a tangent to the curve  $y = x^2 - 9$ , as shown.  
The shaded region is bounded by the line, the curve and the  $x$ -axis.  
Calculate the area of this region.



ANSWERS

8 (a) (i)  $\frac{1}{4}x^4 + c$

(ii)  $-\frac{1}{2x^2} + c$

(b) (i)  $\frac{98}{3}$

(ii)  $f(x) = 6x + \cos x - \frac{1}{2}$

(c)  $\frac{20}{3}$