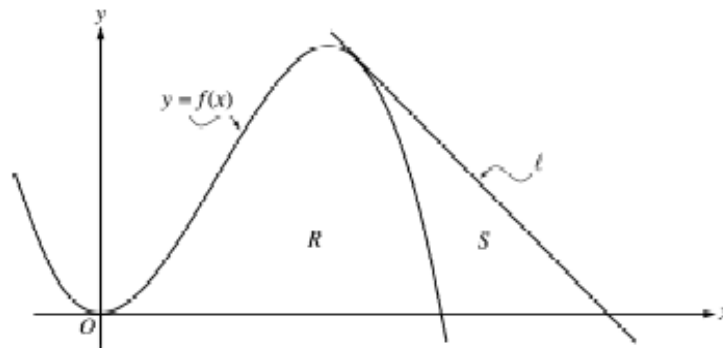


## 2003 Form B AB1/BC1



A. Let  $g(x) = 18 - 3x$  be the tangent line

$$f(3) = 4(3)^2 - 3^3$$

$$= 9$$

$$g(3) = 18 - 3(3)$$

$$= 9$$

Therefore  $(3, 9)$  is a common point shared by the two functions.

$$f'(x) = 8x - 3x^2$$

$$f'(3) = 24 - 27 \text{ or } -3$$

$$g'(x) = -3$$

$$g'(3) = -3$$

So both functions have the same slope at the common point  $(3, 9)$

B. Area of S:  $\frac{1}{2}(2)(18 - 12) + \int_3^4 ((18 - 3x) - (4x^2 - x^3))dx = 7.916 \text{ or } 7.197$

C.  $\pi \int_0^4 f(x)dx = 156.038\pi \text{ or } 490.208$