

# DIFFERENTIATION: STATIONARY VALUES (A2)

## A2 Unit 3: Pure Mathematics B

### WJEC past paper questions: 2010 – 2017

Total marks available 44 (approximately 55 minutes)

1. The function  $g$  is defined by  $g(x) = 3 \ln(4x^2 + 9) + 2x - 7$ .
  - (a) Show that  $g'(x) = \frac{2(2x+3)^2}{4x^2+9}$ . [3]
  - (b)
    - (i) Show that the graph of  $y = g(x)$  has one stationary point.
    - (ii) Find the nature of this stationary point. [4]

(Summer 10)
  
2. Show that  $f(x) = (2x - 3)e^{2x} - 4x + 5$  has a stationary value when  $x$  satisfies
 
$$(x - 1)e^{2x} - 1 = 0.$$
 [6]

(June 09)
  
3. (a) Show that  $f(x) = \sin^{-1} x - 2x^{\frac{3}{2}} + 1$  has a stationary value when  $x$  satisfies
 
$$9x^3 - 9x + 1 = 0.$$
 [4]

(Summer 08)
  
4. Find the  $x$ -coordinate and the nature of the stationary point of the curve given by  $y = e^{2x} - x - 1$ . [6]

(January 07)
  
5. Show that  $2 \tan^{-1} x - 6 \ln(1 + x^2) - 4x^2$  has a stationary value when  $x$  satisfies
 
$$4x^3 + 10x - 1 = 0.$$
 [5]

(Summer 06)

6. The curve  $y = ax^4 + bx^3 + 18x^2$  has a point of inflection at (1, 11).
- (a) Show that  $2a + b + 6 = 0$ . [2]
- (b) Find the values of the constants  $a$  and  $b$  and show that the curve has another point of inflection at (3, 27). [8]
- (c) Sketch the curve, identifying all the stationary points including their nature. [6]

(WJEC Sample 17)