8.2 Answers (Revision for TEST)

GCSE Mathematics
Differentiation I

Answer 1

(i) 81 **(ii)** -8 **(iii)** $\frac{1}{27}$
(iv) 5 **(v)** 3 **(vi)** 1
(vii) 1 **(viii)** 0 **(ix)** $\frac{64}{121}$

[9 marks]

Answer 2

(i) (2, 2) **(ii)** (10, 970) **(iii)** ($-10.$ $-$ 970)

[3 marks]

Answer 3

(i) $\frac{dy}{dx} = 25x^4 - 21x^2$ **(ii)** $\frac{d^2y}{dx^2} = 100x^3 - 42x$

[2, 1 marks]

(iii) (1, -2) **(iv)** 4 **(v)** 58, i.e. +ve $\therefore$ Anticlockwise

[1, 1, 2 marks]

Answer 4

(i) $\frac{1}{16}$ **(ii)** 4

[2 marks]

Answer 5

(i) $\frac{dy}{dx} = 3x^2 - 3$ **(ii)** 45 **(iii)** (1, -2), (-1, 2)

[2, 1, 4 marks]

Answer 6

(i) $\frac{dy}{dx} = -15x^{-4}$ **(ii)** $y = 25x^2 + 30x + 9 \Rightarrow \frac{dy}{dx} = 50x + 30$

[2, 3 marks]

Answer 7

(a) $\frac{ds}{dt} = 2t - 6$ **(b)** 4 ms^{-1} **(c)** 2 ms^{-2}

[2, 2, 2 marks]

Answer 8

(a) 0 **(b)** It's a turning point

[4, 1 marks]

Answer 9

(i) $y = 16x^{-3}$ **(ii)** -4

$\Rightarrow \frac{dy}{dx} = -48x^{-4}$

[3, 2 marks]

Answer 10

(a) Consider Perimeter

$$2x + 2y = 72$$

$$x + y = 36$$

$$\therefore\ y = 36 - x$$

Consider Area

$$A = x \times y$$

$$A = x\,(36 - x)$$

$$A = 36x - x^2$$

[3 marks]

(b) $36 - 2x$

[2 marks]

(c) $x = 18$ cm $\Rightarrow$ $A = 324$ cm^2

[3 marks]

Answer 11

(a) $v = \dfrac{ds}{dt} = 3t^2 - 10t$

[2 marks]

(b) $a = \dfrac{d^2s}{dt^2} = 6t - 10 \qquad \therefore t = 5$ seconds

[2 marks]

Answer 12

$$y = 18x^{\frac{1}{2}}$$

$$\Rightarrow \frac{dy}{dx} = 9x^{-\frac{1}{2}}$$

[3 marks]