

9.2 Answers (Homework Revision for TEST)

GCSE Mathematics Differentiation I

Answer 1

- | | | | | | |
|-------|-----|--------|-----|-------|-----------------|
| (i) | 144 | (ii) | -64 | (iii) | $\frac{1}{125}$ |
| (iv) | 10 | (v) | 4 | (vi) | -1 |
| (vii) | 1 | (viii) | 0 | (ix) | $\frac{16}{81}$ |

[9 marks]

Answer 2

- | | | | | | |
|-----|---------|------|-----------|-------|----------------------|
| (i) | (2, -2) | (ii) | (10, 950) | (iii) | $\sqrt{(-10, -950)}$ |
|-----|---------|------|-----------|-------|----------------------|

[3 marks]

Answer 3

- | | | | |
|-----|---------------------------------|------|--------------------------------------|
| (i) | $\frac{dy}{dx} = 30x^5 - 28x^3$ | (ii) | $\frac{d^2y}{dx^2} = 150x^4 - 84x^2$ |
|-----|---------------------------------|------|--------------------------------------|

[2, 1 marks]

- | | | | | | |
|-------|---------|------|---|-----|---|
| (iii) | (1, -2) | (iv) | 2 | (v) | 66, i.e. +ve $\therefore$ Anticlockwise |
|-------|---------|------|---|-----|---|

[1, 1, 2 marks]

Answer 4

- | | | | |
|-----|----------------|------|----|
| (i) | $\frac{1}{49}$ | (ii) | 64 |
|-----|----------------|------|----|

[2 marks]

Answer 5

- | | | | | | |
|-----|-----------------------------|------|----|-------|--------------------|
| (i) | $\frac{dy}{dx} = 3x^2 - 12$ | (ii) | 15 | (iii) | (2, -16), (-2, 16) |
|-----|-----------------------------|------|----|-------|--------------------|

[2, 1, 4 marks]

Answer 6

- | | | | |
|-----|-----------------------------|------|--|
| (i) | $\frac{dy}{dx} = -10x^{-3}$ | (ii) | $y = 49x^2 + 42x + 9 \Rightarrow \frac{dy}{dx} = 98x + 42$ |
|-----|-----------------------------|------|--|

[2, 3 marks]

Answer 7

- | | | | | | |
|-----|------------------------------|-----|--------------------|-----|--------------------|
| (a) | $v = \frac{ds}{dt} = 2t - 9$ | (b) | 1 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) | $y = 16x^{-4}$ | (ii) | 2 |
| $\Rightarrow \frac{dy}{dx} = -64x^{-5}$ | | | |

[3, 2 marks]

Answer 10**(a)** Consider perimeter,

$$2x + 2y = 84$$

$$x + y = 42$$

$$\therefore y = 42 - x$$

Consider Area,

$$A = x \times y$$

$$A = x (42 - x)$$

$$A = 42x - x^2$$

[3 marks]

(b) $42 - 2x$

[2 marks]

(c) $x = 21 \text{ cm} \Rightarrow A = 441 \text{ cm}^2$

[3 marks]**Answer 11**

(a) $v = \frac{ds}{dt} = 3t^2 - 6t - 2$

[2 marks]

(b) $a = \frac{d^2s}{dt^2} = 6t - 6 \quad \therefore t = 6 \text{ seconds}$

[2 marks]**Answer 12**

$$y = 24x^{\frac{1}{2}}$$

$$\Rightarrow \frac{dy}{dx} = 12x^{-\frac{1}{2}}$$

[3 marks]