



1. Find the value of the gradient of the curve $y = 3x^2 + x - 5$ at the point $x = 1$ (2)

2. Find the value of the gradient of the curve $y = (x + 1)^2$ at the point $(4, 25)$ (2)

3. Find the value of the gradient of the curve $y = \frac{8x+x^3}{4\sqrt{x}}$ (2)

4. Find the equation of the tangent to the curve $y = 3 - x^2$ at the point $(-3, -6)$ (4)

Solutions

1.

$y = 3x^2 + x - 5$ $\frac{dy}{dx} = 6x + 1$	M1
At $x = 1$, $\frac{dy}{dx} = 6(1) + 1 = 7$	M1

2.

$y = (x + 1)^2 = (x + 1)(x + 1)$ $y = x^2 + 2x + 1$	M1
$\frac{dy}{dx} = 2x + 2$	M1
When $x = 4$, $\frac{dy}{dx} = 2(4) + 2 = 10$	M1

3.

$y = \frac{8x+x^3}{4\sqrt{x}} = \frac{8x}{4x^{\frac{1}{2}}} + \frac{x^3}{4x^{\frac{1}{2}}} = 2x^{0.5} + \frac{1}{4}x^{2.5}$	M1
$\frac{dy}{dx} = x^{-0.5} + \frac{5}{8}x^{1.5}$	M1

4.

$y = 3 - x^2$ $\frac{dy}{dx} = -2x$	M1
When $x = -3$, $\frac{dy}{dx} = -2(-3) = 6$	M1
Equation of line crossing $(-3, -6)$ $-6 = 6(-3) + c$ $-6 = -18 + c$ $c = 12$	M1
$y = 6x + 12$	M1

