

12.2 Re-Quiz: Tangent and normal lines to a function

Use your own notebook, but no calculators or computers

Find the derivative of each polynomial function

1. $f(x) = x^4 + 5x^2$

$$f'(x) = 4x^3 + 10x$$

2. $g(x) = 2x^3 + 7x^2 - x - 11$

$$g'(x) = 6x^2 + 14x - 1$$

Evaluate the function and its derivative for a given value of x

3. Given $f(x) = 4x^2 + 2x$

(a) Find $f(-1)$ $= 4(-1)^2 + 2(-1)$
 $= 2$

(b) Find $f'(x)$ $= 8x + 2$

(c) Find $f'(-1)$ $= 8(-1) + 2$
 $= -6$

4. The graph shows the polynomial function $y = -x^3 - 2x^2 + 2x + 3$. Its derivative is $\frac{dy}{dx} = -3x^2 - 4x + 2$.

(a) Write down the coordinates of P .

$$(1, 2)$$

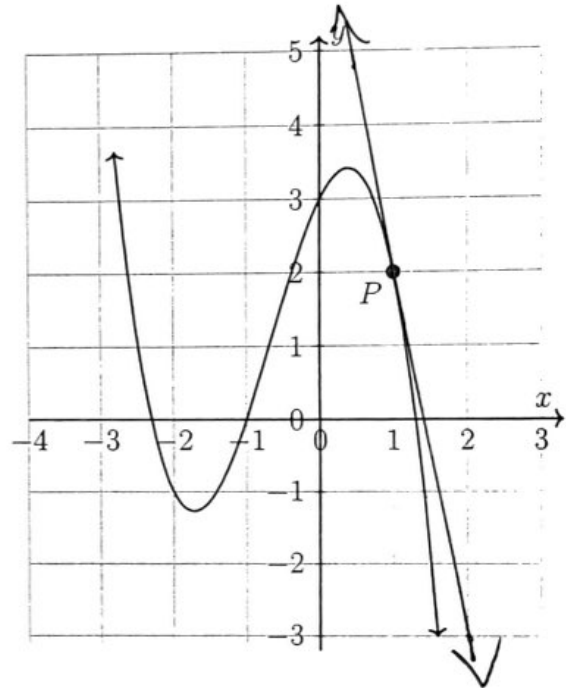
(b) Find the slope of the tangent at P .

$$\left. \frac{dy}{dx} \right|_{x=1} = -3(1)^2 - 4(1) + 2 = -5$$

(c) Write down the equation of the tangent line through P .

$$y - 2 = -5(x - 1)$$

(d) Draw the tangent line on the graph accurately with a straight edge.



5. The function $y = x^2 - 3x + 2$ is graphed on the grid below. Find its derivative and the equations of the tangent and normal lines through point $(3, 2)$. Draw the lines.

$$y' = 2x - 3$$

$$x = 3$$

$$y'_{x=3} = 2(3) - 3 = 3$$

tangent:

$$y - 2 = 3(x - 3)$$

normal

$$y - 2 = -\frac{1}{3}(x - 3)$$

