

11.9 Pre-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. $f(x) = x^2 + 5x$

$$f'(x) = 2x + 5$$

2. $f(x) = x^4 - 2x^3 + 7x^2 - 11$

$$f'(x) = 4x^3 - 6x^2 + 14x$$

Evaluate the function and its derivative at a given point

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

(a) Find $f(2)$

$$= 2(2^2) - (2) + 3$$
$$= 9$$

(b) Find $f'(2)$

$$f'(x) = 4x - 1$$
$$f'(2) = 4(2) - 1 = 7$$

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

- (a) Write down the coordinates of the point P .

$$(1, -1)$$

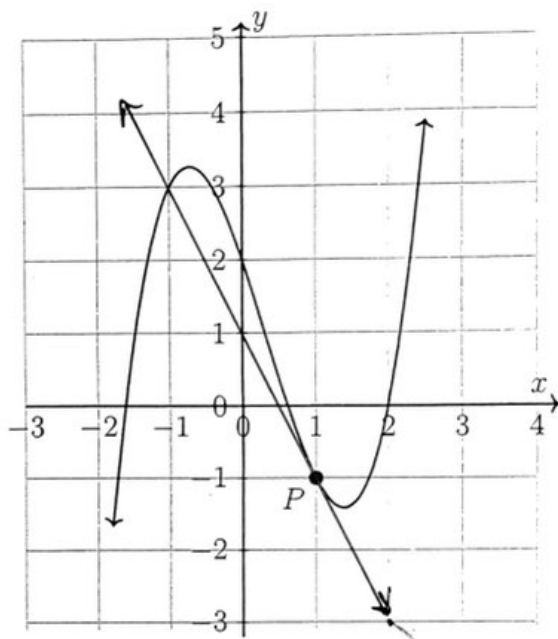
- (b) Find the slope of the tangent line at P .

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

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

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

- (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 $(1, 5)$. Draw the lines.

$$y' = -2x + 3$$

$$f'(1) = -2(1) + 3 = 1$$

tangent: $y - 5 = 1(x - 1)$

normal: $y - 5 = -1(x - 1)$

