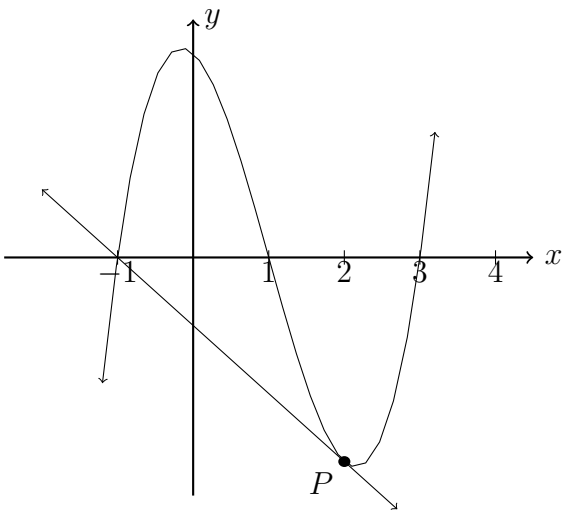
6.5 Do Now Quiz: Tangents, systems of equations, linear regression
Calculator practice D

1. A cubic function $f(x) = x^3 - 3x^2 - x + 3$ is shown on the axes below.



A tangent to the function at $x = 2$ is drawn with the point of tangency P.

(a) Find the coordinates of P. [1]

(b) Write down the derivative of the function, $f'(x)$. [2]

(c) Show that the gradient of the tangent line is -1. [1]

(d) Write down the equation of the tangent line. [2]

Working:

Answers:

(a) .....

(b) .....

(d) .....

2. Find the solutions for the system, the value(s) for x such that $f(x) = g(x)$. Sketch the graph to show working.

   (a) $f(x) = -2x^2 + 3x + 5$

   $g(x) = -2x + 1$ [3]

Working:

Answers:

(a) .....

3. Perform a linear regression on the data in the table, finding $y = ax + b$.

x	53	54	56	60	61	65
y	11.5	11.6	12.0	12.2	12.5	12.3

   (a) Write down the value of a, b. [3]

   (b) Write down the correlation coefficient r. [1]

   (c) Use your regression line to estimate y for $x = 58$. [2]

Working:

Answers:

(a)(i) .....

(ii) .....

(b) .....

(c) .....