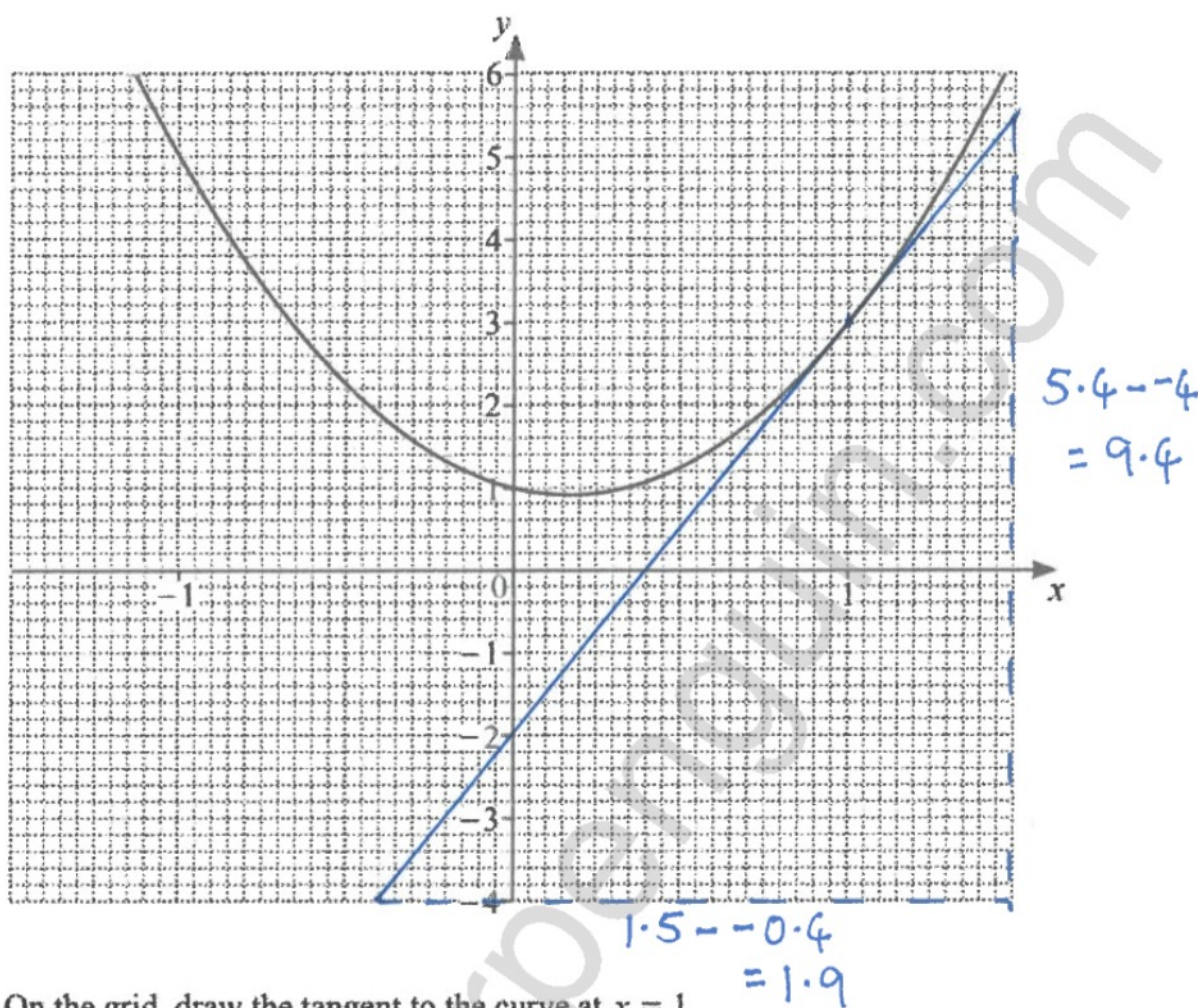


A Gradient of Tangents

(b)



(i) On the grid, draw the tangent to the curve at $x = 1$.

[1]

(ii) Use your tangent to estimate the gradient of the curve at $x = 1$.

$$\text{gradient} = \frac{\text{change in } y}{\text{change in } x} = \frac{9.4}{1.9} = 4.95$$

4.95

[2]

(iii) Write down the equation of your tangent in the form $y = mx + c$.

(between 4.4 and 5.6)
is ok

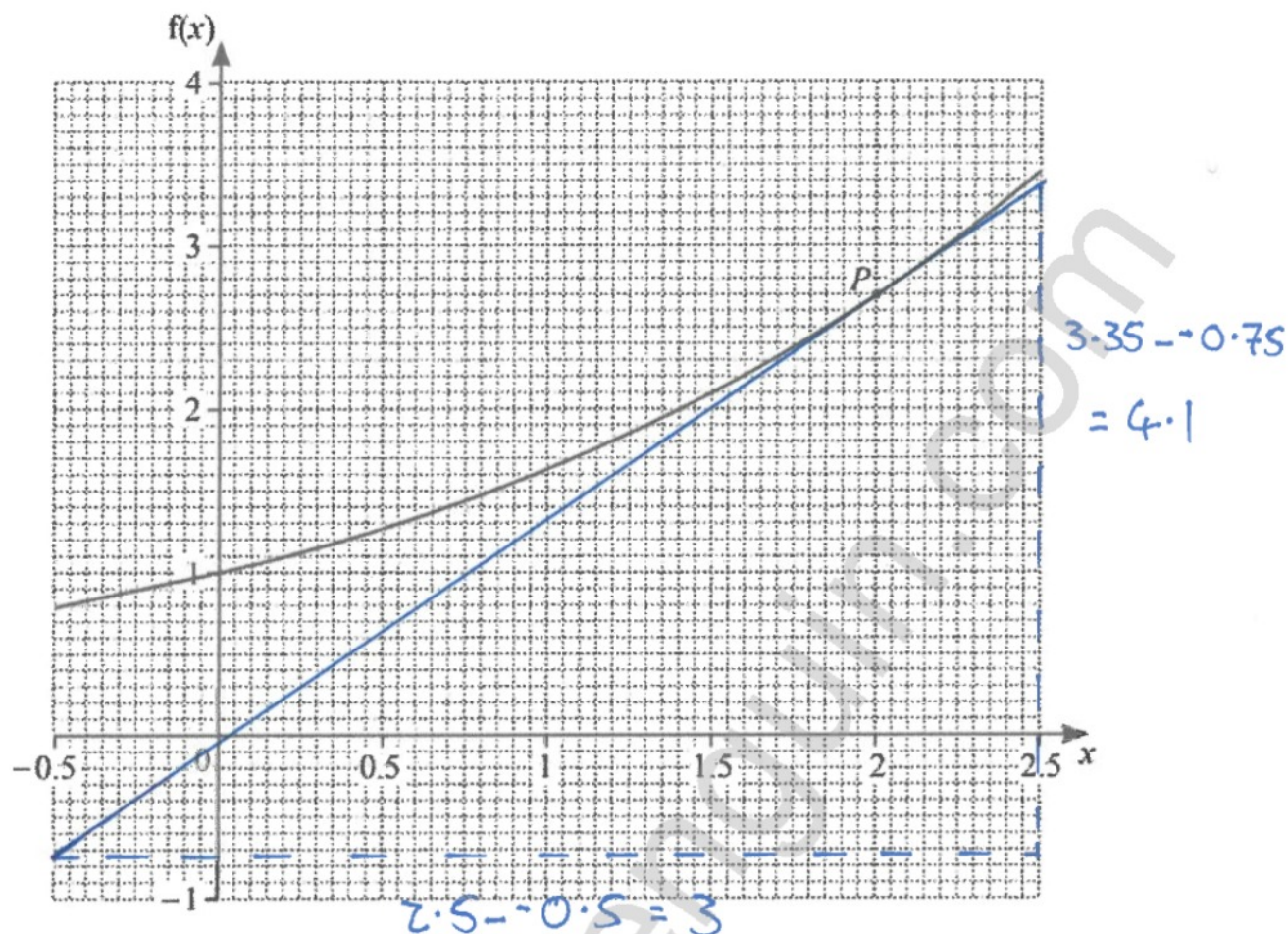
crosses y-axis at -2, so $y = 4.95x - 2$

$$y = 4.95x - 2$$

[2]

↑
between -1.8 and
-2.2

(b)



The diagram shows the graph of another function.

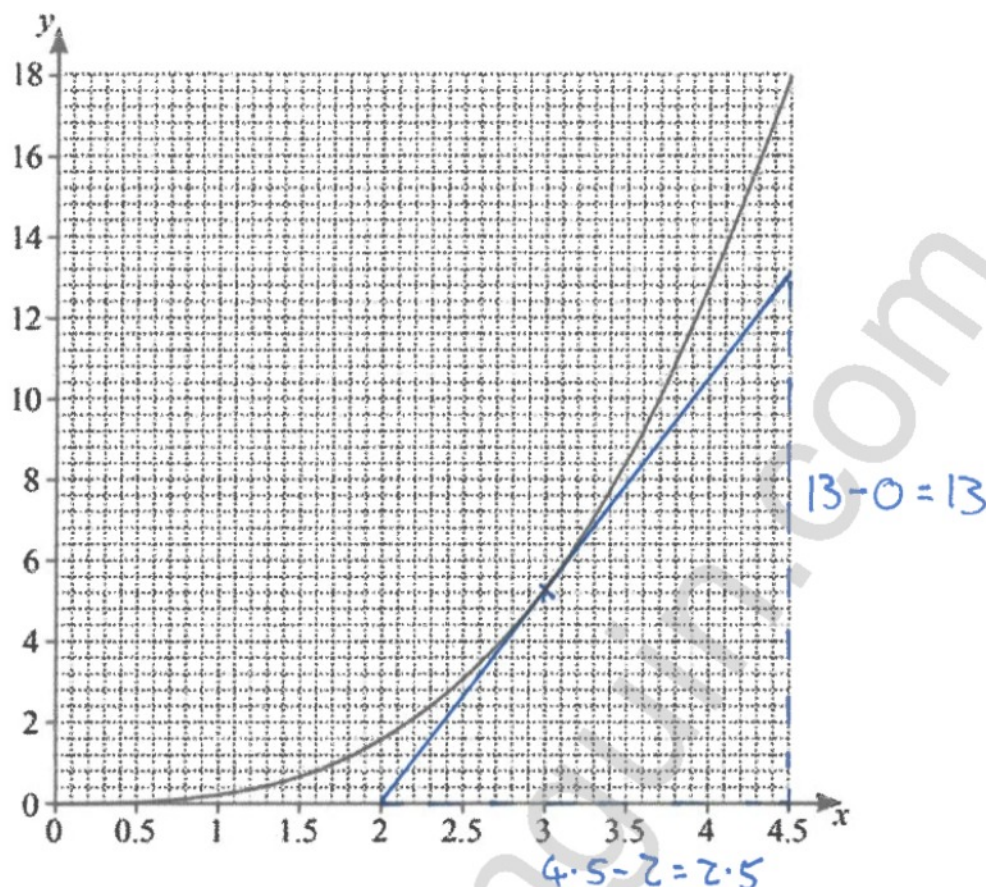
By drawing a suitable tangent, find an estimate for the gradient of the function at the point P .

$$\begin{aligned}\text{gradient} &= \frac{\text{change in } y}{\text{change in } x} \\ &= \frac{4.1}{3} = 1.37\end{aligned}$$

1.37

[3]

between 1.3 and 1.4



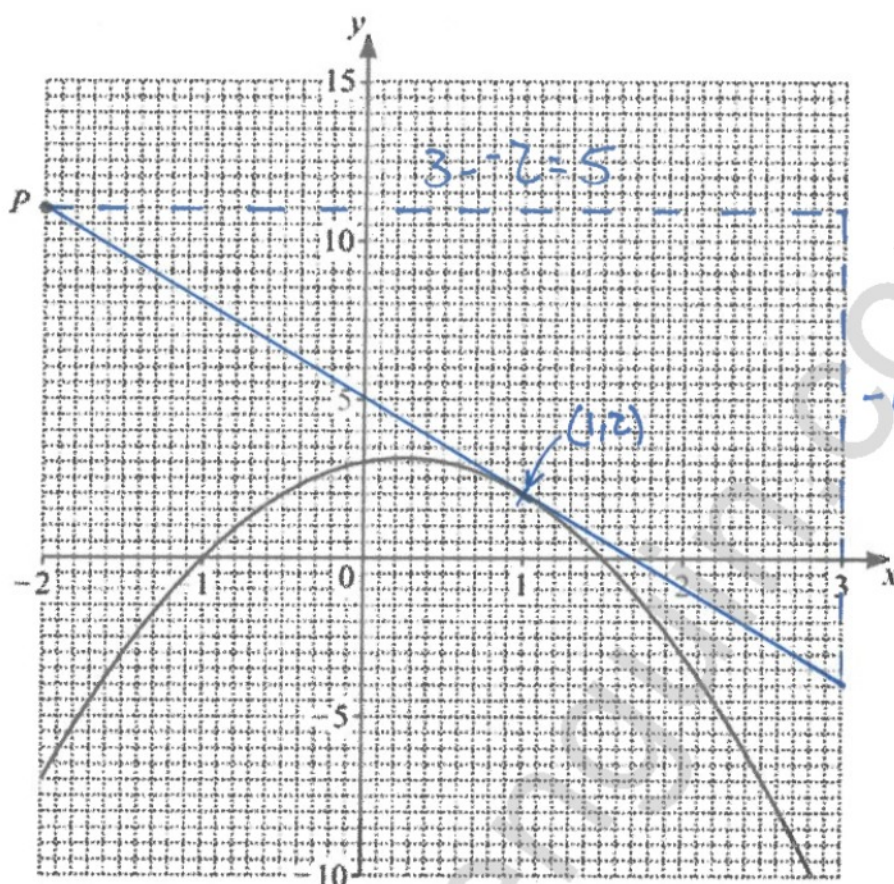
The graph of $y = f(x)$ is drawn on the grid.

- (a) Draw the tangent to the graph at the point $x = 3$. [1]
- (b) Use your tangent to find an estimate for the gradient of the curve at the point $x = 3$.

$$\text{gradient} = \frac{13}{2.5} = 5.2$$

$$\frac{5.2}{\text{between } 4.8 \text{ and } 5.8} \quad [2]$$

- 11 The diagram shows the graph of $y = f(x)$ and the point $P(-2, 11)$.



The tangent from P touches the graph of $y = f(x)$ at the point (a, b) .
The values of a and b are integers.

- (a) By drawing this tangent, find the value of a and the value of b .

$a = \dots\dots\dots 1 \dots\dots\dots, b = \dots\dots\dots 2 \dots\dots\dots$ [2]

- (b) Find the equation of the tangent.
Give your answer in the form $y = mx + c$.

gradient $= \frac{-15}{5} = -3$

Sub. $(1, 2)$:

$y = -3x + c$

$2 = -3(1) + c$

$2 = -3 + c$

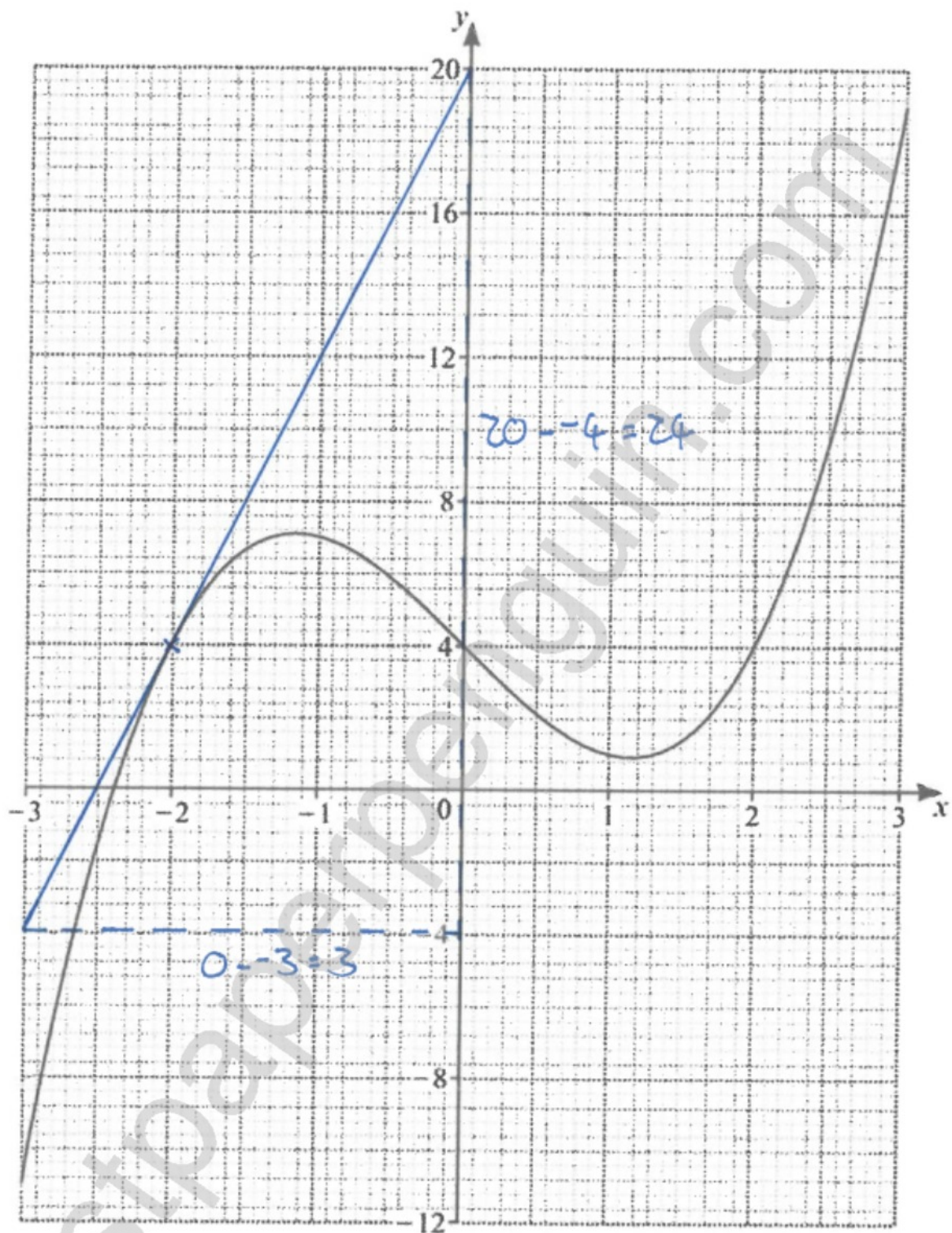
$+3 \quad +3$

$5 = c$

$y = -3x + 5$

$y = \dots\dots\dots -3x + 5 \dots\dots\dots$ [3]

- 5 (a) The diagram shows the graph of $y = f(x)$ for $-3 \leq x \leq 3$.



- (ii) By drawing a suitable tangent, find an estimate of the gradient of the graph at the point $(-2, 4)$.

$$\text{gradient} = \frac{16}{3} = 5\frac{1}{3}$$

8

between 6 and 10

[3]