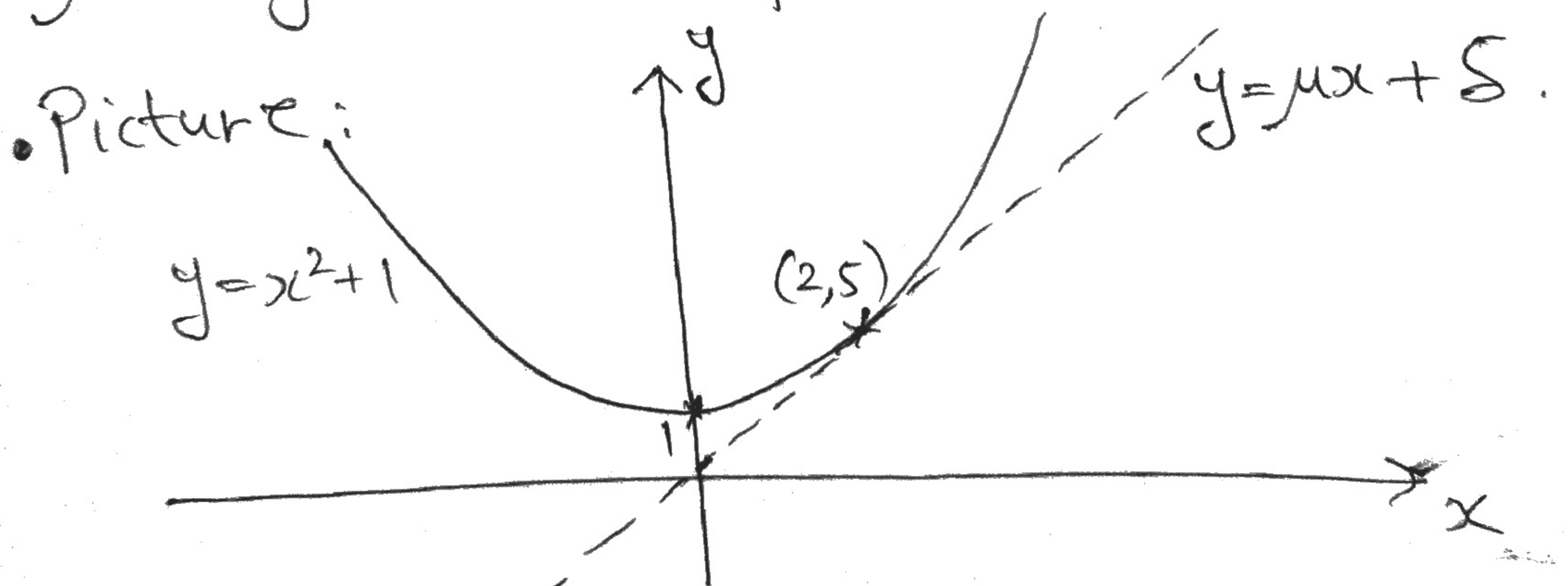


Tangent of curve $y=f(x)$ at some point $x=c$:

Q. Find the equation of the tangent line of $y=x^2+1$ at $x=2$.

Ans: • First note at $x=2$ on the curve $y=x^2+1$, $y=5$. i.e. we have the co-ordinate $(2,5)$.

• A tangent is a straight line so has the form $y=\mu x + \delta$, where μ = gradient or slope, δ = y-axis intercept.



• the slope μ is given by the slope of $f(x)$ at $x=2$ i.e. we need to find

$$f'(2) = \left. \frac{df}{dx} \right|_{x=2}.$$

If $f(x) = x^2 + 1$ then $f'(x) = 2x$.

Hence $f'(2) = 2 \cdot 2 = 4$

Therefore we know $\mu = 4$.

So $y = 4x + \delta$.

- To find δ we use the co-ordinate $(2, 5)$ as we know the tangent line must pass through this point.

so if $y = 5$ when $x = 2$, then

$$5 = 4 \times 2 + \delta.$$

$$\therefore -3 = \delta.$$

- Finally we have tangent line

$$y = 4x - 3.$$

More accurate picture:

