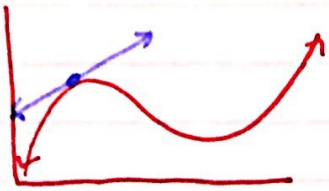
# Eqns of Tangent Lines!

<u>tangent line</u>: a line that goes through 1 point on the original function; it's slope is the same as the original function's slope AT THAT POINT!



REVIEW: write an eqn of a line that goes through the point $(-1,3)$ and has a slope of 2.

point-slope form → $(y - y_1) = m(x - x_1)$

$y_1$ ↓ y-value, $m$ ↓ slope, $x_1$ ↓ x-value

$y - 3 = 2(x+1)$

$y - 3 = 2x + 2$

$y = 2x + 5$ → slope-intercept form

Review: $(4,-7)$, $m = -3$

$y + 7 = -3(x - 4)$

$y + 7 = -3x + 12$

$y = -3x + 5$

Ex. Find the equation of the line tangent to the graph of $f(x) = x^2 + 3$ at the point $(-2,7)$.

① Find the derivative.

$f'(x) = 2x$

② Sub in the given x-value to find the slope.

$f'(-2) = 2(-2) = -4$

$m = -4$ slope of the tangent line at $(-2,7)$

③ use point-slope form to write an equation!

$y - 7 = -4(x + 2)$ → $y - 7 = -4x - 8$ → $y = -4x - 1$