Know these graphs.

**Facts** The equation for a line through \((a, b)\) with slope \(m\) is \(y - b = m(x - a)\).

The graph of \(f(x) + b\) is the graph of \(f\) raised up (down if negative) \(b\) units. Changing the value changes the vertical position.

The graph of \(f(x - a)\) is the graph of \(f\) shifted right (left if negative) \(a\) units. Replacing the argument \(x\) changes the horizontal position in the direction opposite what one would expect.

6'. \(f(x) = (x - 1)^2 + 1\). Graph, draw the tangent at \((2, 2)\), give the equation for the tangent line. \(f'(x) = 2(x - 1)\).

Tangent slope: \(m = f'(2) = 2(2 - 1) = 2\).

Tangent equation:
\[
\begin{align*}
y - b &= m(x - a) \\
y - 2 &= 2(x - 2) \\
y - 2 &= 2x - 4 \\
y &= 2x - 2
\end{align*}
\]

Graph: Start with \(x^2\),
shift right, then up.
Draw a tangent at \((2, 2)\).

9. \(f(x) = x^3 + 1\). Graph, draw the tangent at \((-1, 0)\), give the equation for the tangent line. \(f'(x) = 3x^2\).

Tangent slope: \(m = f'(2) = 2(2 - 1) = 2\).

Tangent equation:
\[
\begin{align*}
y - b &= m(x - a) \\
y - 0 &= 2(x - (-1)) \\
y &= 2x + 2
\end{align*}
\]

Graph: Start with \(x^3\),
shift up.
Draw a tangent at \((-1, 0)\).