

Since the derivative of  $x^2$  is  $2x$ , the tangent line has slope  $2x$  and so the perpendicular line has slope  $-\frac{1}{2x}$ . Hence the equation of the perpendicular line going through  $(a, a^2)$  is

$$y - a^2 = -\frac{1}{2x}(x - a)$$

or

$$y = \frac{1}{2x}a + a^2 - \frac{1}{2}$$