Quiz

1. Evaluate
$$\lim_{\theta \to 0} \frac{\theta}{\tan \theta}$$
   if it exists. If it does not, explain why.

2. The tangent to the curve $y = x^2$ at $x = 10$ intersects the x-axis. Find this intersection point.

3. Let
$$f(x) = \begin{cases} x + 1 & x < 0 \\ 1 - x^2 & x \geq 0. \end{cases}$$
   Is f differentiable at $x = 0$? Why / why not?

4. Does $(pq)' = p'q'$ for all polynomials $p(x), q(x)$? If not, give a pair of polynomials $(a(x), b(x))$ for which $(ab)' \neq a'b'$.

5. A polynomial $p(x)$, as well as its derivative $p'(x)$ and second derivative $p''(x)$ are plotted below. Match p, p', p'' with A, B, C.