Quiz 9

Find the absolute maximum and absolute minimum and the places where they occur for the function

$$f(x) = x^3 - 3x + 5, \quad -2 \leq x \leq 3.$$

Solution: Compute the first derivative $f'(x) = 3x^2 - 3$. Then find the stationary points by solving $f'(x) = 0$. This gives $x = \pm 1$. Next, compare the values of f at these two points with its values at the endpoints, -2 and 3. Thus $f(-2) = 3, f(-1) = 7, f(1) = 3$, and $f(3) = 23$. Therefore, the absolute minimum of f is 3 and it occurs twice, at -2 and 1, and the absolute maximum is 23 which occurs at 3.