

LECTURE 7: PRACTICE PROBLEMS

(1) Show that $x^{11} - x^2 - 2x + 1$ has a root in the interval $(1, 2)$.

(2) Show there exists a positive number whose square is 3.

(3) Show there exists a number which is 1 less than its cube.

(4) Write the equation of the line tangent to $f(x) = x^2 - x - 6$ at the point $(4, 6)$.

(5) For the function $f(x) = \sqrt{x}$, does $f'(0)$ exist?

(6) Let $f(x) = x^2$ and $g(x) = 1 - x^2$. Only using the graphs of these functions, rank the following from greatest to least: $f'(-1), f(1), g'(0)$.

(7) Write the equation of the line tangent to $f(x) = \frac{1}{\sqrt{x}}$ at the point $(1, 1)$.

(8) Show that for $f(x) = |x|$, $f'(0)$ is not defined (hint: you have to show a certain limit doesn't exist, and you can do this by comparing directional limits).