

1. Use the Intermediate Value Theorem to prove that the equation $7^x = x^2$ has at least one (real) solution. (To get full credit, you should verify that the IVT applies and state where you use it.)

Proof: Let $f(x) = 7^x - x^2$, which is continuous because exponential and polynomial funcs are cts.

$$f(0) = 7^0 - 0^2 = 1 > 0$$

$$f(-1) = 7^{-1} - (-1)^2 = \frac{1}{7} - 1 = -\frac{6}{7} < 0$$

So by the IVT, $f(x)$ has a root, (between $-1, 1$) which is also then a solution to $7^x = x^2$. ◻

Notes on

Common Mistakes:

• $7^{-1} = \frac{1}{7}$ (not -7). Recall $x^{-n} = \frac{1}{x^n}$