

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise. If you finish early, you may leave with my approval.

1. (0 points) What values of  $m$  and  $b$  make the following function continuous:

$$f(x) = \begin{cases} x^2 - 7 & x < -2 \\ mx + b & -2 \leq x \leq 2 \\ 5 & x > 2 \end{cases}$$

2. (0 points) Is the following function continuous at  $x = 0$ ?

$$f(x) = \begin{cases} \frac{x-6}{x-3} & x < 0 \\ 2 & x = 0 \\ \sqrt{4+x^2} & x > 0 \end{cases}$$

**3.** (*0 points*) Show that there is at least one solution to  $x^5 - 2x^3 - 2 = 0$

**4.** (*0 points*) Show that there are at least two real zeroes of the function  $f(x) = x^3 - 5x^2 + 3x + 6$