

MATH191: Problem Sheet 1

Due Monday 1st October

1. For each of the following four sets, state whether or not each of the numbers -1 , 0 , 0.5 , 1 , and π belongs to the set. a) $[0, 1]$; b) $(0, 1]$; c) $(0, 1)$; d) $(-\infty, 1)$.

(Set out your answer by putting a tick or a cross in each box in a **copy** of the table below, depending on whether or not the given element belongs to the given set.)

	-1	0	0.5	1	π
$[0, 1]$					
$(0, 1]$					
$(0, 1)$					
$(-\infty, 1)$					

2. Sketch the graphs, and state the maximal domain, range and zeros of each of the following functions:

a) $f(x) = x^2 - 2$; b) $f(x) = \frac{1}{1+x}$; c) $f(x) = |x+1|$; d) $|x| - 2$.

3. State the maximal domain and find the zeros of the following rational functions:

a) $f(x) = \frac{x+2}{x-3}$; b) $f(x) = \frac{(x-1)(x-2)}{x^2-4}$.

4. Determine whether each of the following functions is even, odd, or neither:

a) $f(x) = x^2 + 3$; b) $f(x) = \frac{x^2 + 2}{x + 1}$; c) $f(x) = x^{13} - 19x^5 + \frac{1}{18}x$.

I will collect solutions at the lecture on Monday 1st October. Any solutions which are not handed in then, or by 5pm that day in the envelope outside Office 120 in the Maths Building Theoretical Physics Wing will not be marked.