

Unit 4 Group Work 1
PCHA 2022-23 / Dr. Kessner

No calculator! Have fun!

1. Let

$$f(x) = \begin{cases} x & \text{if } x < 0 \\ 2 - (x - 1)^2 & \text{if } x \geq 0 \end{cases}$$

a) Sketch the graph of $f(x)$.

b) On what intervals is f increasing and/or decreasing? Is f bounded? Does it have any local or global maxima or minima?

c) Does f have any discontinuities? Where, and what type?

d) Describe the end behavior of f using limits.

2. Consider the same function from the previous problem.

$$f(x) = \begin{cases} x & \text{if } x < 0 \\ 2 - (x - 1)^2 & \text{if } x \geq 0 \end{cases}$$

Sketch the graphs of the following transformed functions:

- $p(x) = f(-x)$
- $q(x) = f(|x|)$
- $r(x) = |f(|x|)|$
- $s(x) = |f(-x)|$
- $t(x) = -f(-|x|)$