

# MIT#166 Homework #1 Key

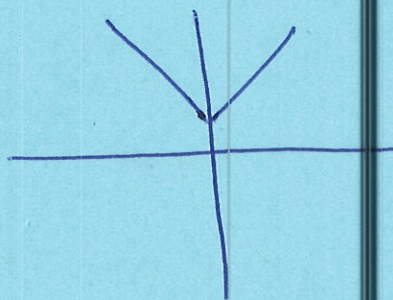
①

- a. not a function  $(0, 2), (0, 1)$
- b. not a function  $(4, -3), (4, 3)$  (for example)
- c. not a function  $(0, -2), (0, 1)$
- d. function
- e. function
- f. function

2.  $f(x) = |x| + 1$

D:  $(-\infty, \infty)$

R:  $[1, \infty)$



3. a. D:  $(-\infty, 0) \cup (0, \infty)$  i.e.  $x \neq 0$   
 R:  $(-\infty, 0) \cup (0, \infty)$  i.e.  $y \neq 0$

Symmetry: odd

decreasing  $(-\infty, 0) \cup (0, \infty)$

no extrema (relative or otherwise)

b.  $f(x) = x\sqrt{1-x^2}$

$1-x^2 \geq 0 \Rightarrow x^2 \leq 1$

$x \geq -1, x \leq 1$

$-1 \leq x \leq 1$

D:  $[-1, 1]$

R:  $[-\frac{1}{2}, \frac{1}{2}]$

Symmetry: odd

decreasing  $(-1, -\frac{1}{\sqrt{2}}) \cup (\frac{1}{\sqrt{2}}, 1)$

increasing  $(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}})$

relative min at  $(-\frac{1}{\sqrt{2}}, \frac{1}{2})$

relative max at  $(\frac{1}{\sqrt{2}}, \frac{1}{2})$