

MIT#166 Homework #1 Key

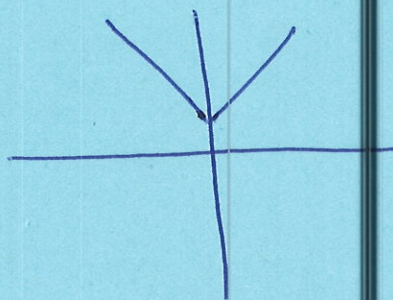
①

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