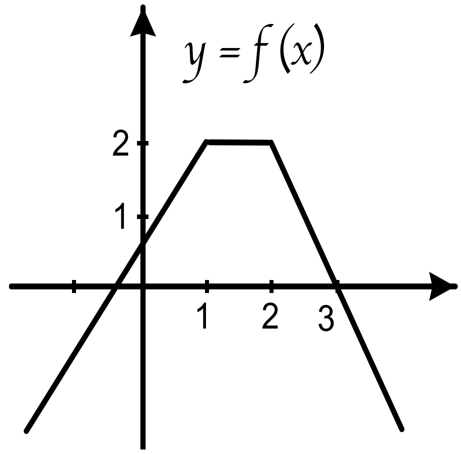
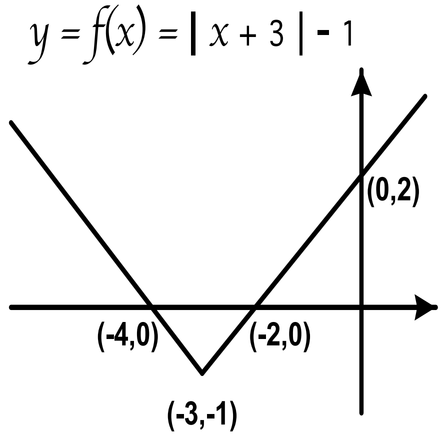
Solution of Recitation - 2.3 — Done by: A. Al-Shallali



Q1) (a) Domain $= (-\infty, \infty)$ (b) Range $= (-\infty, 2]$

(c) f is increasing on $(-\infty, 1]$, decreasing on $[2, \infty)$ and constant on $[1, 2]$

(d) the adjacent graph represents a function, because every vertical line intersects the graph at only one point.



Q2) (a) $f(x) = |x+3|-1 \implies f(-1) = |-1+3|-1 = 2-1 = 1$

(b) Domain $= (-\infty, \infty)$, range $= [-1, \infty)$

(c) If $y = 0$, then $|x+3| = 1 \implies x+3 = \pm 1 \implies$ $x = -4$, $-2 = x-$intercepts. If $x = 0$, then $y = 3-1 = 2 = y-$intercept.

(d) f is increasing on $[-3, \infty)$, decreasing on $(-\infty, -3]$

Q3) (a) The set $\{(1, \sqrt{2}), (2, \sqrt{2}), (3, \sqrt{2}), (3, -\sqrt{2}), (5, \sqrt{2})\}$ is a relation, but not function, because when $x = 3$, $y = \pm\sqrt{2}$

(b) The set $\{(-\sqrt{2}, 5), (-\sqrt{2}, 4), (-\sqrt{2}, 3), (-\sqrt{2}, 2)\}$ is also a relation, but not function, because when $x = -\sqrt{2}$, y has four values.

(c) $y = \sqrt{3-x}$ represents a function, because for each $x = a \in$ the domain, there is only one y value $(= \sqrt{3-a})$ in the range. (notice that $y^2 = 3-x$ is not function while $y = \sqrt{3-x}$ is)

(d) $x = |y| + 6$ does not represent a function, for $x = 7$, $y = \pm 1$ (while $y = |x| + 6$ is a function)

(e) Surely $x = -5$ is only a relation but not function, because when $x = -5$, y has many many values. (the equation of any h. line $y = b$ represents a function while a v. line $x = a$ doesn't)

Q4) Find the domain of (a) $f(x) = -\sqrt{|x|-5}$ (b) $f(x) = -\sqrt{\dfrac{7}{5-|x|}}$ (c) $f(x) = -\sqrt{\dfrac{7}{5+|x|}}$

(a) $|x| - 5 \geq 0 \implies |x| \geq 5 \implies x \leq -5$ or $x \geq 5 \implies$ domain $= (-\infty, -5] \cup [5, \infty)$

(b) $5 - |x| > 0 \implies |x| < 5 \implies -5 < x < 5 \implies$ domain $= (-5, 5)$

(c) $\dfrac{7}{5+|x|}$ is never negative, also $5 + |x| \neq 0 \implies$ domain $= (-\infty, \infty)$