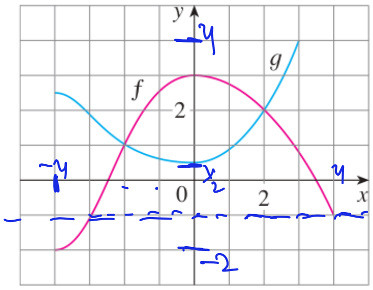
Section 1.1

(4)



(a) As we can see from the graphs $f(-4) = -2$ and $g(3) = 4$

(b) The graphs of f and g intersect at $(2, 2)$ and $(-2, 1)$
$\Rightarrow$ x values for which $f(x) = g(x)$ are $x = 2$ and $x = -2$

(c) $f(x) = -1$ $\Rightarrow$ we draw $y = -1$ (horizontal) line and see its points of intersection with graph of f.

$(-3, -1)$ and $(4, -1)$ $\Rightarrow$ $\boxed{x = -3, 4}$ are solutions of $f(x) = -1$

(d) f is decreasing on $(0, 4)$.

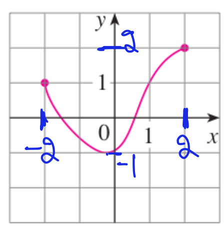
(e) Domain of $f = [-4, 4]$, Range of $f = [-2, 3]$

(f) Domain of $g = [-4, 3]$, Range of $g = [\frac{1}{2}, 4]$

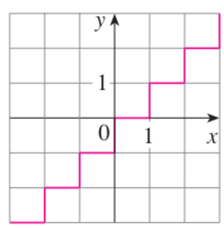
(8) Yes, it is graph of a function.

Domain $= [-2, 2]$

Range $= [-1, 2]$



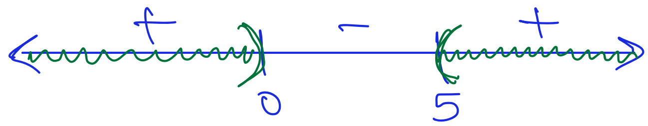
(10) Not a function, as we can see For input $x = 1$ (or any other integer) there are multiple outputs.



(35) $h(x) = \dfrac{1}{\sqrt[4]{x^2-5x}}$ $\Rightarrow x^2-5x \geq 0$ and $\sqrt[4]{x^2-5x} \neq 0$

$\Rightarrow x^2-5x \geq 0$ and $x^2-5x \neq 0$

$\Rightarrow x^2-5x > 0$



$\Rightarrow x \in (-\infty, 0) \cup (5, \infty)$

$\Rightarrow$ Domain $= (-\infty, 0) \cup (5, \infty)$

(42) $f(x) = \begin{cases} 3 - \frac{1}{2}x & \text{if } x < 2 \\ 2x - 5 & \text{if } x \geq 2 \end{cases}$

$f(-3)$: $-3 < 2$ so we apply first definition.

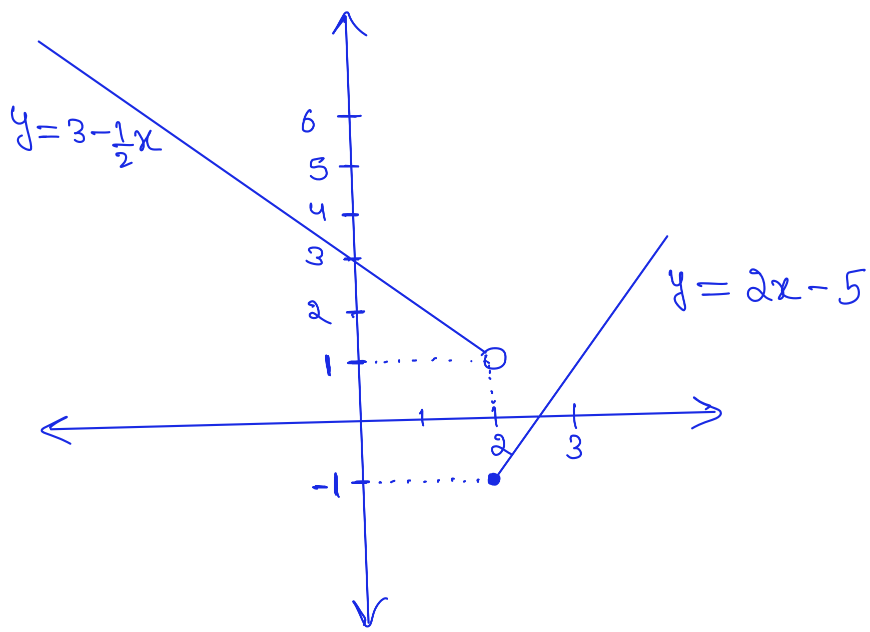
$\Rightarrow f(-3) = 3 - \frac{1}{2}(-3) = 3 + \frac{3}{2} = \frac{9}{2}$

$f(0)$: $0 < 2$ so we apply first definition.

$\Rightarrow f(0) = 3 - \frac{1}{2}(0) = 3$

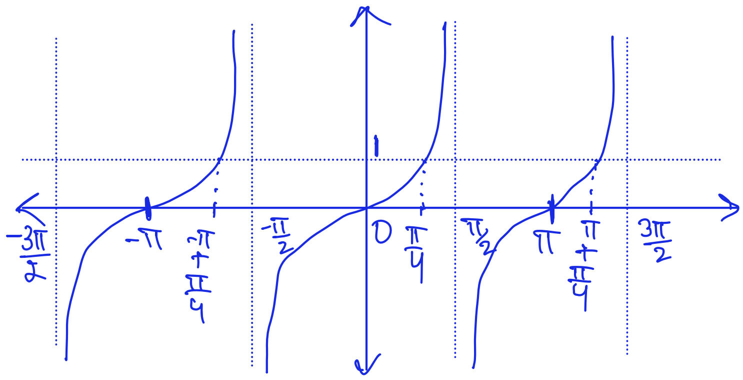
$f(2)$: $2 \geq 2$ so we apply second definition.

$\Rightarrow f(2) = 2(2) - 5 = 4 - 5 = -1$



Section 1.2

⑥ $g(x) = \dfrac{1}{1 - \tan x}$



Domain of Tan function $= \mathbb{R} \setminus \{ n\pi + \frac{\pi}{2} : n \in \mathbb{Z} \}$

$\Rightarrow$ Domain of g = (Domain of Tan function) $\setminus$ {values of x for which $\tan x = 1$}

set minus

$\tan x = 1 \Rightarrow x = n\pi + \frac{\pi}{4}, \; n \in \mathbb{Z}$

integers

$\Rightarrow$ Domain of $g = \mathbb{R} \setminus \{ n\pi + \frac{\pi}{2}, n\pi + \frac{\pi}{4} : n \in \mathbb{Z} \}$