Section 2.3

Ex.2

(1) Yes. The result $\pm n$ is the unique element of R ~~as~~ assigned by the function f to the element a of $\mathbb{Z}$

(2) Yes. The reason is the same as (1)

(3) No. The elelent n can not be -2 and 2 ~~who~~ which are in the domain $\mathbb{N}$.

Ex.12.

(1) $f(n)=n-1$. Yes (One-to-one)

(2) $f(n)=n^2+1$. No. When $n=-1$, and $n=1$, $f(n)$ are the same.

(3) $f(n)=n^3$, Yes (one-to-one)

(4) $f(n)=\lceil n/2 \rceil$ No. When $n=-1$, $n=0$, $f(n)$ are the same.

Ex.14.

(1) $f(m,n)=2m-n$. ~~Yes~~ Onto

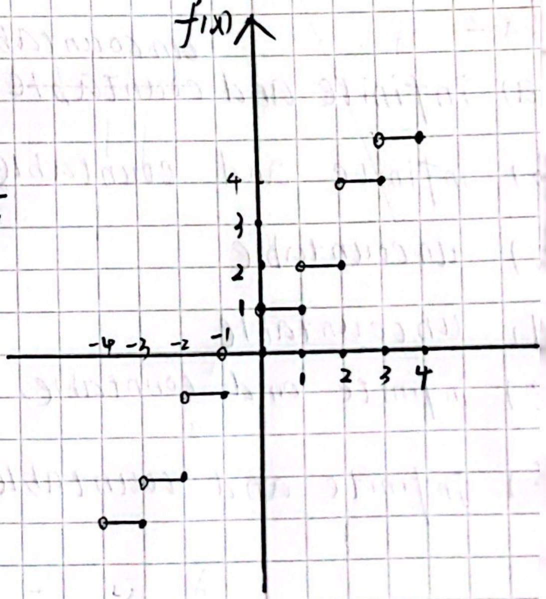
(2) $f(m,n)=m^2-n^2$. ~~No~~ Not onto

(3) $f(m,n)=m+n+1$ Onto

(4) $f(m,n)=|m|-|n|$ onto

(5) $f(m,n)=m^2-4$ Not onto

$$\begin{cases} -2 < x \le 0 = \lceil x \rceil - 1 \\ 0 < x \le 2 = \lceil x \rceil \\ 2 < x \le 4 = \lceil x \rceil + 1 \end{cases}$$



Ex.36.

$f \circ g = f(g(x)) = (x+2)^2+1 = x^2+4x+5$

$g \circ f = g(f(x)) = (x^2+1)+2 = x^2+3$

Ex.66.

~~Grag~~ Graph: $f(x)=\lceil x \rceil + \lfloor x/2 \rfloor$

section 2.6

Ex. 26.

$A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

a) $A \vee B = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ $A \wedge B = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$

$A \odot B = \begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$

Ex 28.

$A = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \\ 1 & 0 \end{bmatrix}$

$A \odot B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \\ 1 & 1 \end{bmatrix}$