XII — Entrance Exam → B Math

Recall

WoM course.

Ideal Aims

- Emphasise writing and language skills
- Clarity of thought

Question → race → Answer

Improving writing - takes lot of practice → WRITE DOWN YOUR THOUGHTS

- Correct solution to a Problem may take many versions

Worksheet 1

[Set] — a co
descript
when

Consequence — no

Notation: $S = \{ * \}$

Two sets $A = B$ if they

Worksheet 1

Set – a collection of distinct objects with a precise description that provides a way of deciding when a given object is in it. ✓ objects in a set are its elements / members

Notation $x \in A$ to say x is an element of A

Consequence – no order in a set

Notation: $S = \{*, \square, \triangle\}$ then is the same as $\{\square, *, \triangle\}$
(they have the same elements)

Two sets $A = B$ if they have the same elements.

$A \subseteq B$ if every element of A is an element of B

Ex:- Power $A = B \iff A \subseteq B$ and $B \subseteq A$.

Convention:- ϕ - empty set. [That has no elements]
A set

$f: A \to B$ - A and B are two non-empty sets. A function f from A to B is a subset of $A \times B := \{(a,b) \mid a \in A, b \in B\}$ such that for all $a \in A$ there is a unique $b \in B$ associated to it.
(Co-domain)

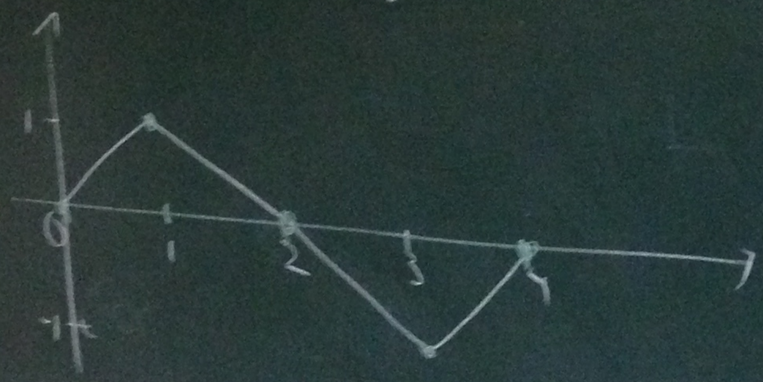
Notation: $f: A \to B$, $(a,b) \in f \iff b = f(a)$.

Range of $f = \{f(a) \mid a \in A\} = \{b \in B \mid \exists a \in A, f(a) = b\}$

1 (b)

(b) Do NOT Rewrite f - DIRECTLY from graph

$$f(x) = \begin{cases} x & \text{if } 0 \le x \le 1 \\ 2-x & \text{if } 1 \le x \le 3 \\ x-4 & \text{if } 3 \le x \le 4 \end{cases} \qquad f: [0,4] \to [-1,1]$$



(v)

(iv) Graph

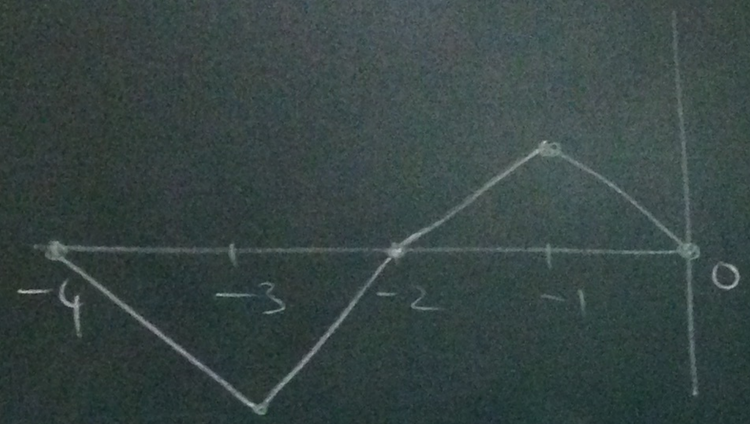
(Expand) Scale the x-a
by 4

1 (b)

(v) Graph of $f(-x)$ ← flips graph across y-axis

Domain $[-4, 0]$

Range $[-1, 1]$

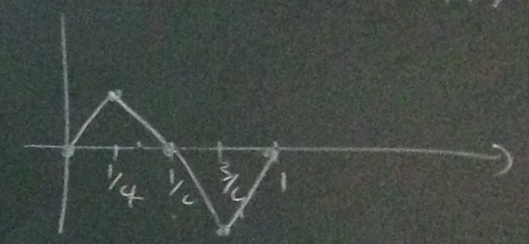


(iii) Graph of $f(4x)$

(shrinks) Scale the x-axis by $\frac{1}{4}$

Domain $[0, 1]$

Range $[-1, 1]$



(iv) Graph of $f\left(\frac{x}{4}\right) = f\left(\frac{1}{4} \cdot x\right)$

(Expand) Scale the x-axis by 4 ← Domain $[0, 16]$ Range $[-1, 1]$

(i)

Domain

Range

4

3

3

0

(ii)

shift

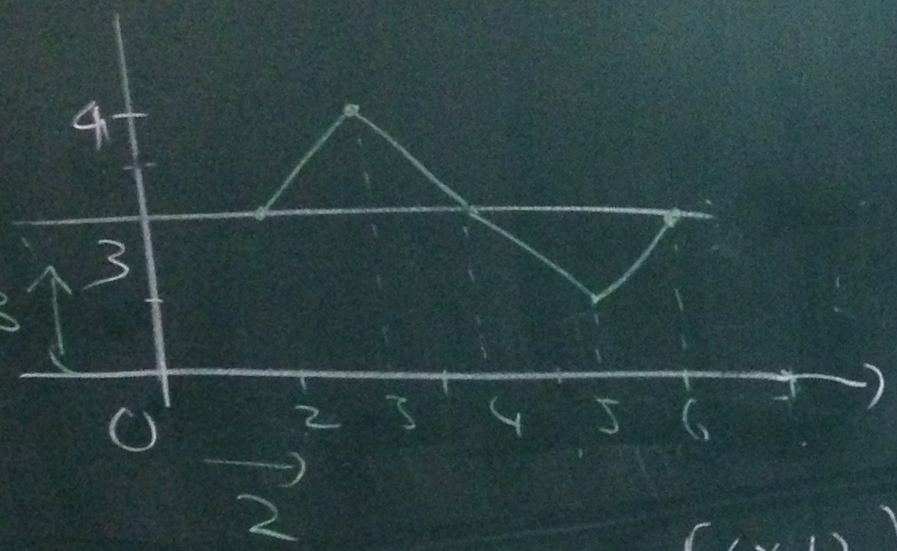
(i) Graph of $3+f(x-2)$

→ shift to right by 2 in x-axis

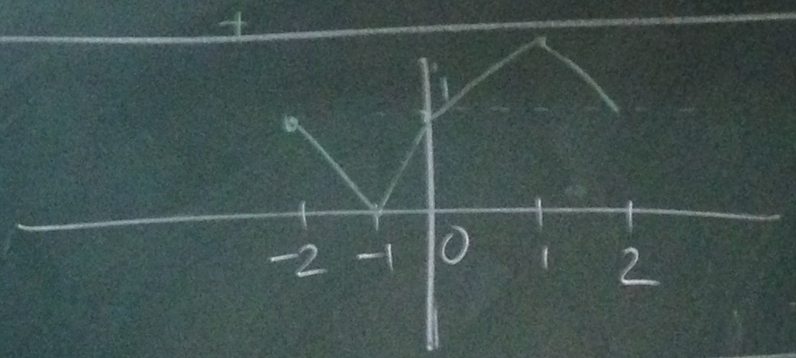
→ shift up in y-axis by 3

Domain = [2, 6]

Range = [2, 4]



(ii) Graph of $1-f(x+2)$

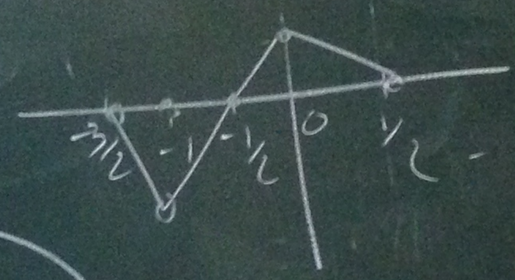


• shift left by 2 • flip about x-axis • raise it by 1 on y-axis

(vi) Graph of $f(1-2x) = f(-2(x-\frac{1}{2}))$

Domain $[-\frac{3}{2}, \frac{1}{2}]$

Range $[-1, 1]$



shift right

shrink x-axis

flips about y-axis

(iii) $\sqrt{2f(x+3)}$

$y \in [0,4)$ $Z = \sqrt{2f(y)}$ is

well defined if $f(y) \geq 0$

$y \in [0,4)$ such that $f(y) \geq 0$

is $y \in [0,2] \cup \{4\}$

Suppose $x+3 = y \Rightarrow x = y-3$

$y \in [0,2] \cup \{4\}$

$\Rightarrow y-3 \in [-3,-1] \cup \{1\}$

$\Rightarrow x \in [-3,-1] \cup \{1\}$

Domain of $\sqrt{2f(x+3)}$

is $[-3,-1] \cup \{1\}$