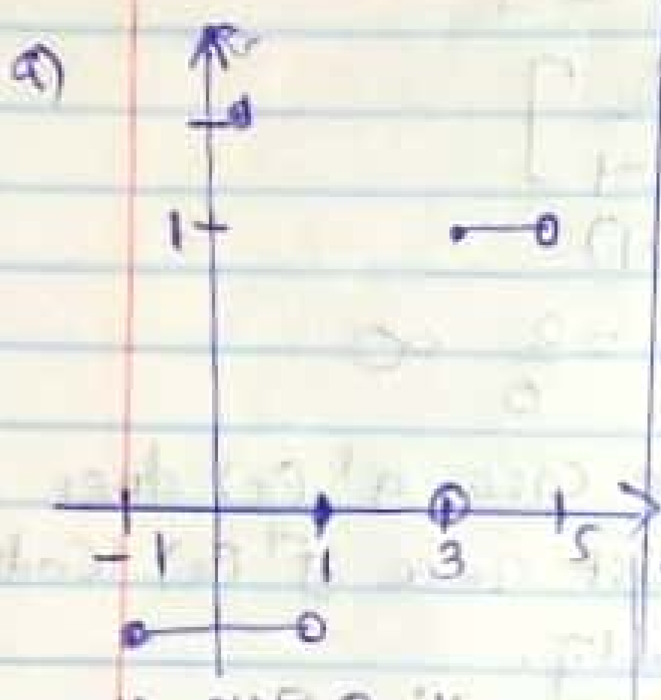
Problem 5

$g: R \to R$

$$g(x) = \left[\frac{x-1}{2}\right]$$

a)



If g(x) is positive

if $x = 3$

$$g(x) = \left[\frac{3-1}{2}\right]$$

$$\frac{2}{2}$$

$$= 1$$

At $x = -1$

$$g(x) = \left[\frac{-1-1}{2}\right]$$

$$= \frac{-2}{2}$$

$g(x) = -1$.

Therefore g(x) is (1, -1).

b) Yes g is on to R because for any real number g there exist rational and irrational number. On real number line both -1 and 1 can be accomodated.

1) does the solution $g^{-1}(x)$ exist.

$$g(x) = \left[\frac{x-1}{2}\right]$$

$$g^{-1}(x) = \left[\frac{2}{x-1}\right]$$

At $g(1, -1)$

$$\frac{2}{1-1} = \frac{2}{0}\ \infty$$

for this case, $g^{-1}(x)$ does not exist since $g^{-1}(x)$ tends to infinity.

Problem 6

$g: A \to B$

$f: B \to C$

$f \circ g$ is 1-1

g is 1-1

$f(a,b)\begin{pmatrix}1\\-1\end{pmatrix} = \begin{pmatrix}1\\-1\end{pmatrix}$

$a = 1$

$-b = -1$

$\frac{-1b}{-1} = \frac{-1}{-1}$

$b = 1$

$f(a,b) = (1,1)$

It is not must for f to be (1,-1).
Since f is (1,1).

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Problem 7

For any positive real numbers x, y

$$|x \cdot y| = \begin{cases} xy & \text{if } xy \geq 0 \\ -xy & \text{if } xy \leq 0 \end{cases}$$

$|x \cdot y| \leq |x|\,|y|$

Absolute value of x is $-x$ and absolute value of y is $-y$

Multiplying them the negative sign cancels out hence xy is positive.

Both x and y and non-negative therefore if

xy if $xy \geq 0$ *

I will disapprove the result since both x and y are non negative therefor $xy \geq 0$

therefore $|x \cdot y| \leq |x|\,|y|$ is wrong.

$|x \cdot y| \geq |x|\,|y|$

Problem 8

$g : A \to B$

$f : B \to C$.

$A = B = C = \{1, 2, 3, 4\}$

$g = \{(1,2)\ (2,3), (3,2), (4,4)$

$f = \{(1,2)\ (2,4)\ (3,2)\ (4,3)$.

in matrix form.

a) $fg = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 4 & 2 & 3 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 2 & 4 \end{bmatrix}$

$fg = \begin{bmatrix} 10 & 20 & 30 & 40 \\ 22 & 33 & 22 & 44 \end{bmatrix}$

b) $g \cdot f = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 2 & 4 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 4 & 2 & 3 \end{bmatrix}$

$g \cdot f = \begin{bmatrix} 10 & 20 & 30 & 40 \\ 22 & 44 & 22 & 33 \end{bmatrix}$

c) f^g

c) $g \cdot g$

$= \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 2 & 4 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 2 & 4 \end{bmatrix}$

$= \begin{bmatrix} 10 & 20 & 30 & 40 \\ 22 & 33 & 22 & 44 \end{bmatrix}$

d) $g[g \cdot g]$

But $[g \cdot g] = \begin{bmatrix} 10 & 20 & 30 & 40 \\ 22 & 33 & 22 & 44 \end{bmatrix}$

$= \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 2 & 4 \end{bmatrix} \begin{bmatrix} 10 & 20 & 30 & 40 \\ 22 & 33 & 22 & 44 \end{bmatrix}$

$= \begin{bmatrix} 100 & 200 & 300 & 400 \\ 242 & 363 & 242 & 484 \end{bmatrix}$.

Problem 9.

a) $a_n = 7$

$n = 7$

$a_7 = a + (7-1)d$

$a_7 = a + 6d.$

b)

$a_n = 2 - (-1)^n$

$a_n = 2 + 1^n$

$a_n = \log 2 + n \log 1$

c) $5, 7, 9, 11, 13$

$a = 5$

$d = 2$

$a_n = 5 + (n-1)2.$

$a_n = 5 + 2n - 2$

$a_n = 3 + 2n.$

d) $5, 5, 5, 5, 5$

$a_n = ar^n$

$r = \frac{5}{5} = 1$

$r = a$

$a_n = 5 \times 1^n$

$a_n = 5^n$

$a_n = n \log 5.$

e)

$7, 3, 7, 3, 7, 3$

$a = 7$

$d = 4$

$a_n = 7 + (n-1)4$

$a_n = 7 + 4n - 4$

$a_n = 7 - 4 + 4n$

$a_n = 3 + 4n.$

a) Find $\sum_{i=1}^{1000} i$

$i = 1000$ But $1 = i$

$n \log 1 = \log 1000$

$i \log 1 = \log 1000$

$i = \frac{\log 1000}{\log 1}$

$i = \infty$

$\sum_{i=1}^{6} ((-2)^i - 2^i$

But $i = 1$

$\sum_{i=1}^{6} ((-2)^1 (-2)^1$

$\sum_{i=1}^{6} 4.$

$6P_4.$

P- permutation.

$\frac{6!}{4!}$

$= \underline{\underline{30}}$