Nama : Felester (OSDDT17F2039)

No.

Date

Tutorial 2

12/20

Question 1:

Given that the Universal set $\xi = \{x : 28 \leq x \leq x \leq 70, x \text{ is an integer}\}$

Set $L = \{x : x \text{ is a perfect square}\}$,

Set $M = \{x : x \text{ is a multiple of 4}\}$

Set $N = \{x : x \text{ is a number such that one of its digits is 2}\}$

(a) Sketch the venn Diagram for the set ξ, L, M and N.

(b) Find all the elements of $n(M \cap N)$ and $n(L \cup M)$

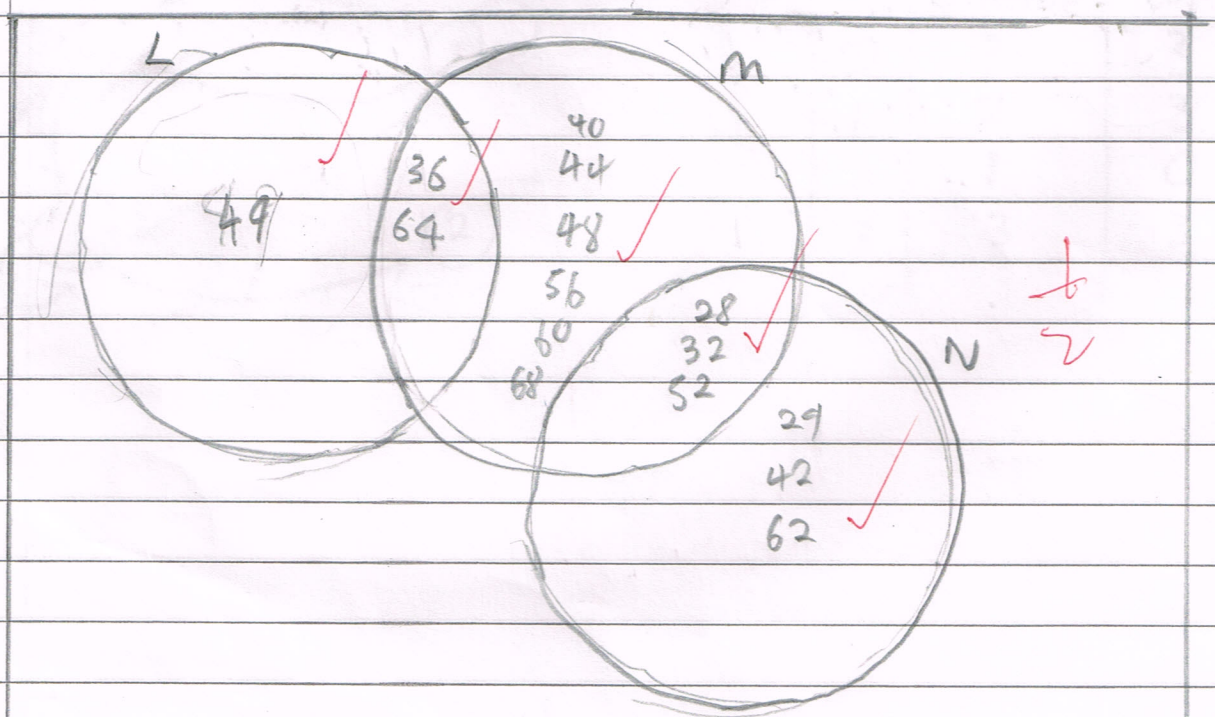
Answer :

a) $\xi = \{28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70\}$

$L = \{36, 49, 64\}$

$M = \{28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68\}$

$N = \{28, 29, 32, 42, 52, 62\}$



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b) $M \cap N = \{28, 32, 52\}$

$n(M \cap N) = 3$

$L \cup M = \{28, 32, 52, 40, 44, 48, 68, 56, 60, 64, 36, 49\}$

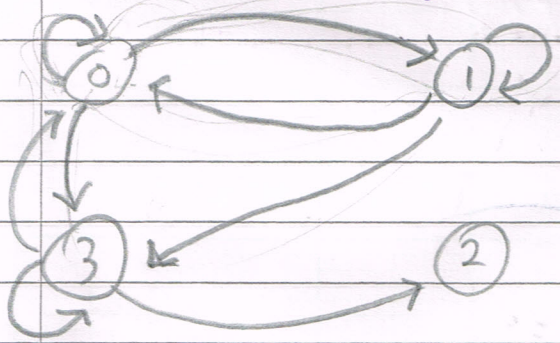
$n(L \cup M) = 12$

Question 2:

Given $A = \{0, 1, 2, 3\}$ and the relation R on A is defined as follows:

$R = \{(0,0), (0,1), (0,3), (1,0), (1,1), (1,3), (3,0), (3,2), (3,3)\}$

a) Draw the directed graph of R relation.



	Indegree	Outdegree
0	3	3
1	2	3
2	1	0
3	3	3

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(b) Determine whether the given relation is equivalence on {0, 1, 2, 3} or not by ~~justi~~ justifying your answer.

:= R is not reflexive because the elements of ~~2R2~~ is not connected.

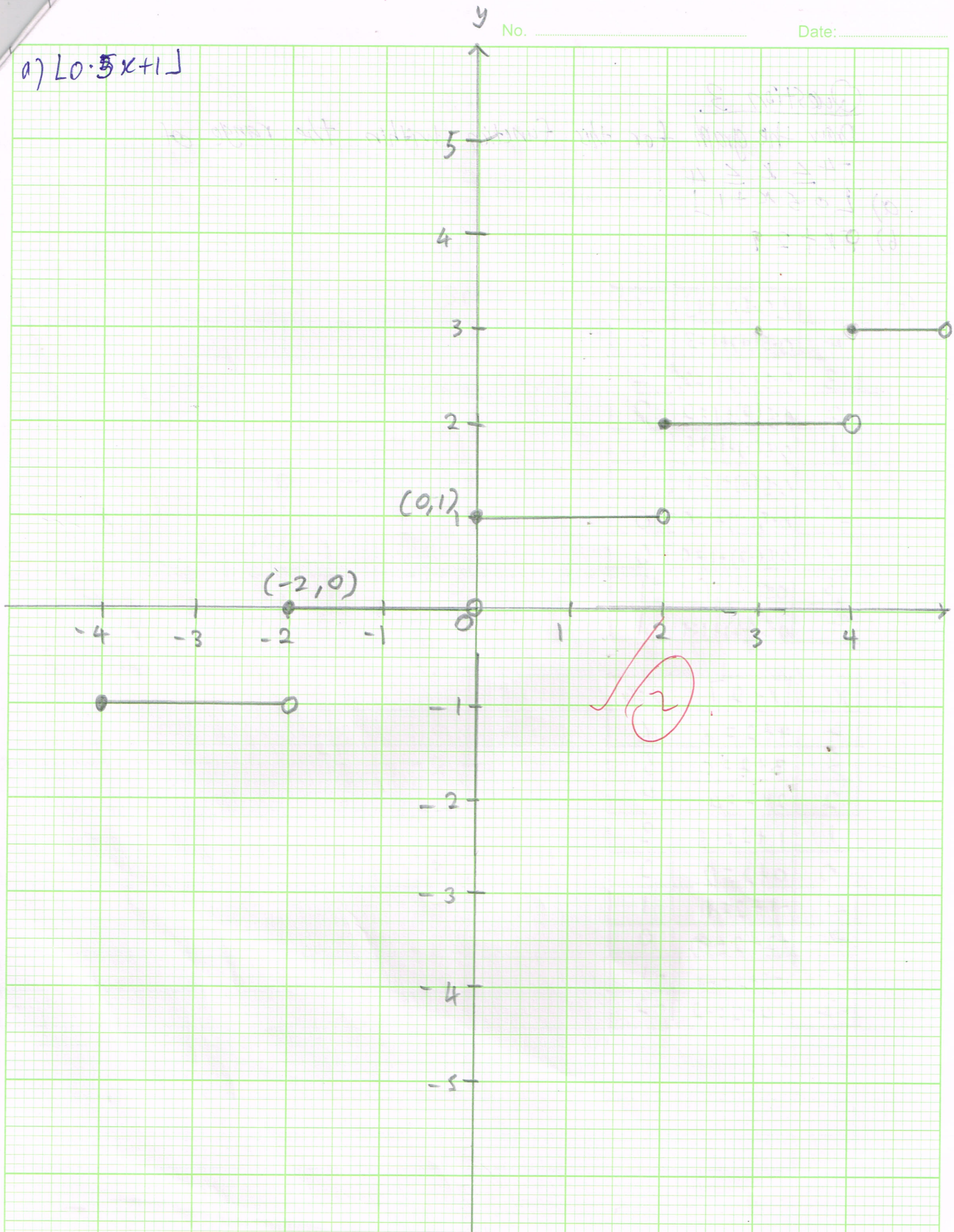
= R is not symmetric because '3R2 but 2R3'

= R is not transitive because '3R3, 3R2 but 2R2

= 'R' is not an equivalence relation because R is not transitive and not reflexive.

No. Date:

a) $\lfloor 0.5x+1 \rfloor$



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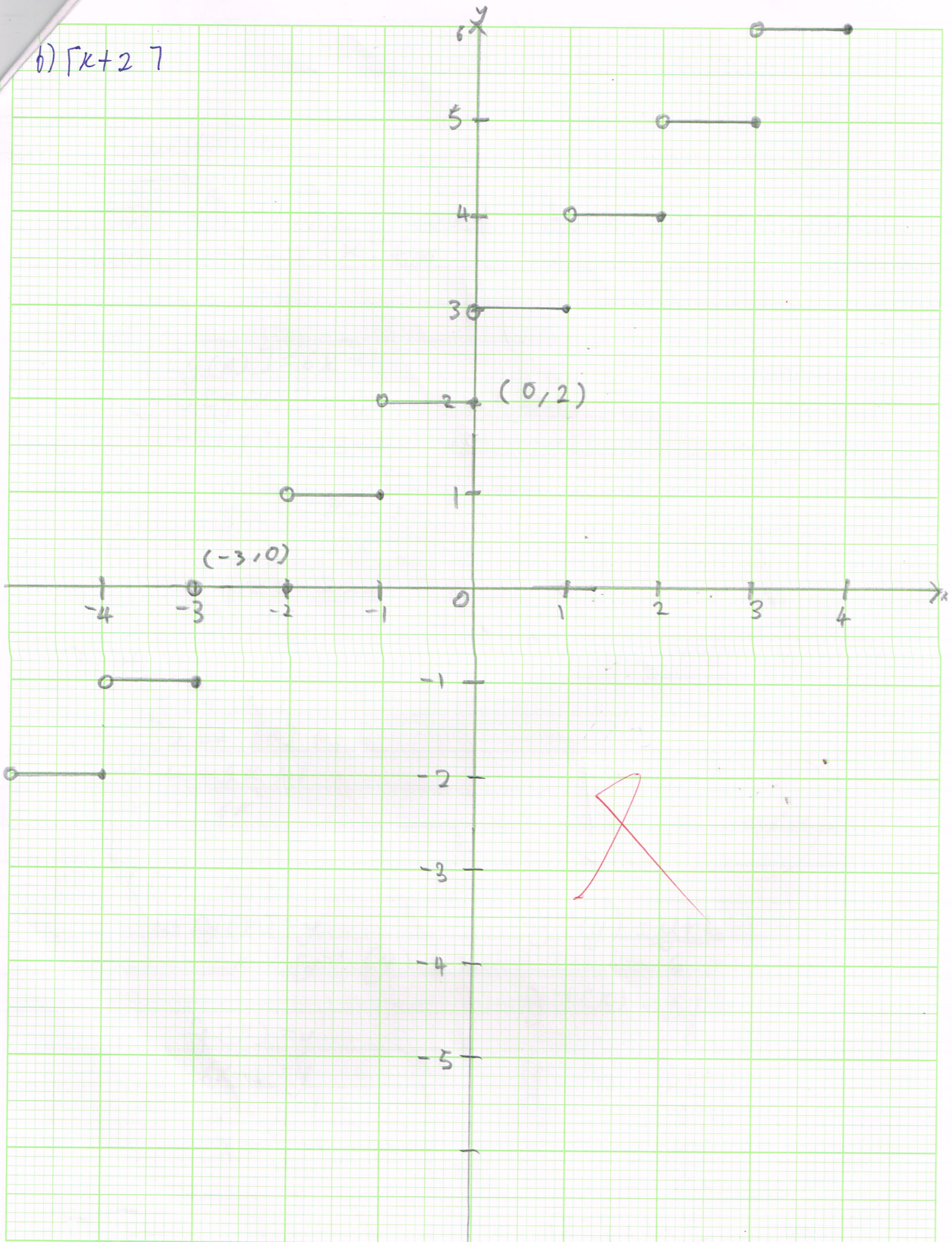
b) $\lceil x+2 \rceil$



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Date _____

Question 4.

The functions fg and f are given by $fg: x \to 6x-1$ and $f: x \to 2-3x$. find:

(a) g

$f[g(x)] = 6x-1$

$2-3[g(x)] = 6x-1$

$-3[g(x)] = 6x-1-2$

$= 6x-3$

$g(x) = \frac{6x-3}{-3}$

$g(x) = 2x+1$

(b) gf

$g[f(x)]$

$= 2[2-3x]+1$

$= 4-6x+1$

$= 5-6x$

(c) $(fg)^{-1}(3)$

Let $fg(x) = y$

$x = fg^{-1}(y)$

$fg(x) = y$

$6x-1 = y$

$6x = y+1$

$x = \frac{y+1}{6}$

$fg^{-1}(y) = \frac{y+1}{6}$

$fg^{-1}(x) = \frac{x+1}{6}$

$fg^{-1}(3) = \frac{3+1}{6}$

$= \frac{4}{6}$

$= \frac{2}{3}$

$fg^{-1}(3) = \frac{2}{3}$

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Date:

12/20

Tutorial 2 (Maths)

Name : Helary Laurine

DDT2B

05DDT17F 2003

Question 1

Given that the universal set $\xi = \{x : 28 \leq x \leq 70, x \text{ is an integer}\}$

Set $L = \{x : x \text{ is a perfect square}\}$

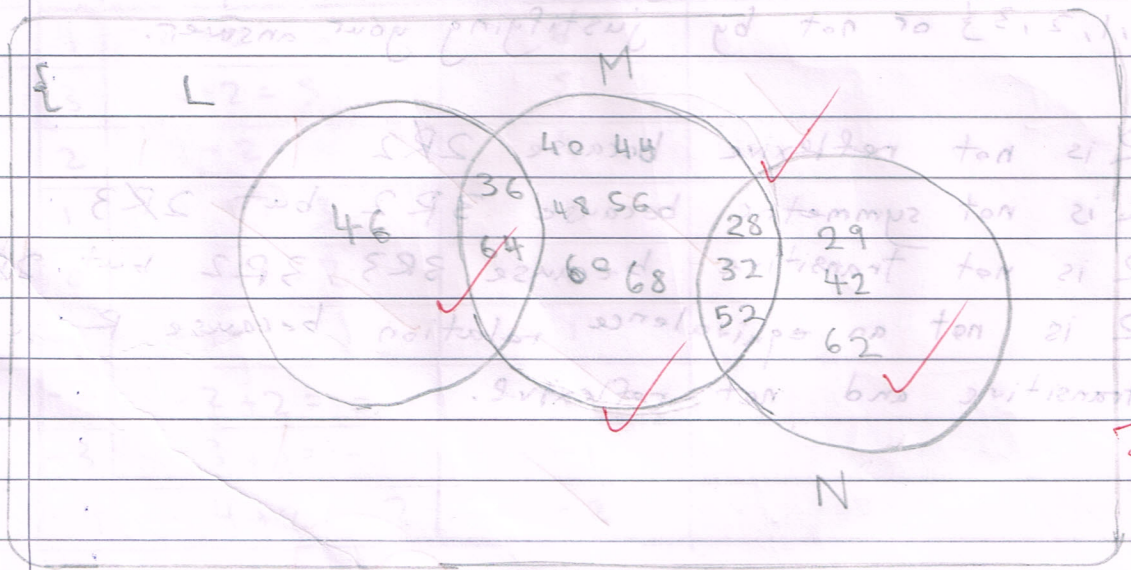
Set $M = \{x : x \text{ is a multiple of } 4\}$

Set $N = \{x : x \text{ is a number such that one of its digit is } 2\}$

a) Sketch the venn diagram for the set $\{L, M \text{ and } N$.

a) $\xi = \{28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70\}$

- $L = \{36, 49, 64\}$
- $M = \{28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68\}$
- $N = \{28, 29, 32, 42, 52, 62\}$



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Find all the elements of $n(M \cap N)$ and $n(L \cup M)$

b) $M \cap N = \{28, 32, 52\}$

$n(M \cap N) = 3$

$L \cup M = \{28, 32, 52, 40, 44, 48, 68, 56, 60, 64, 36, 49\}$

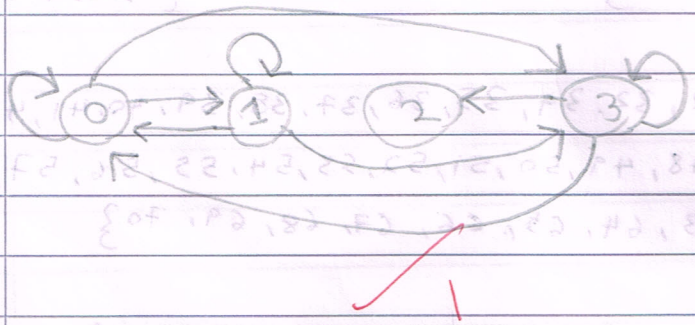
$n(L \cup M) = 12$

Question 2

Given $A = \{0, 1, 2, 3\}$ and the relation R on A is defined as follows :-

$R = \{(0,0), (0,1), (0,3), (1,0), (1,1), (1,3), (3,0), (3,2), (3,3)\}$

a) Draw the directed graph of R relation



	in degree	out degree
0	3	3
1	2	3
2	1	0
3	3	3

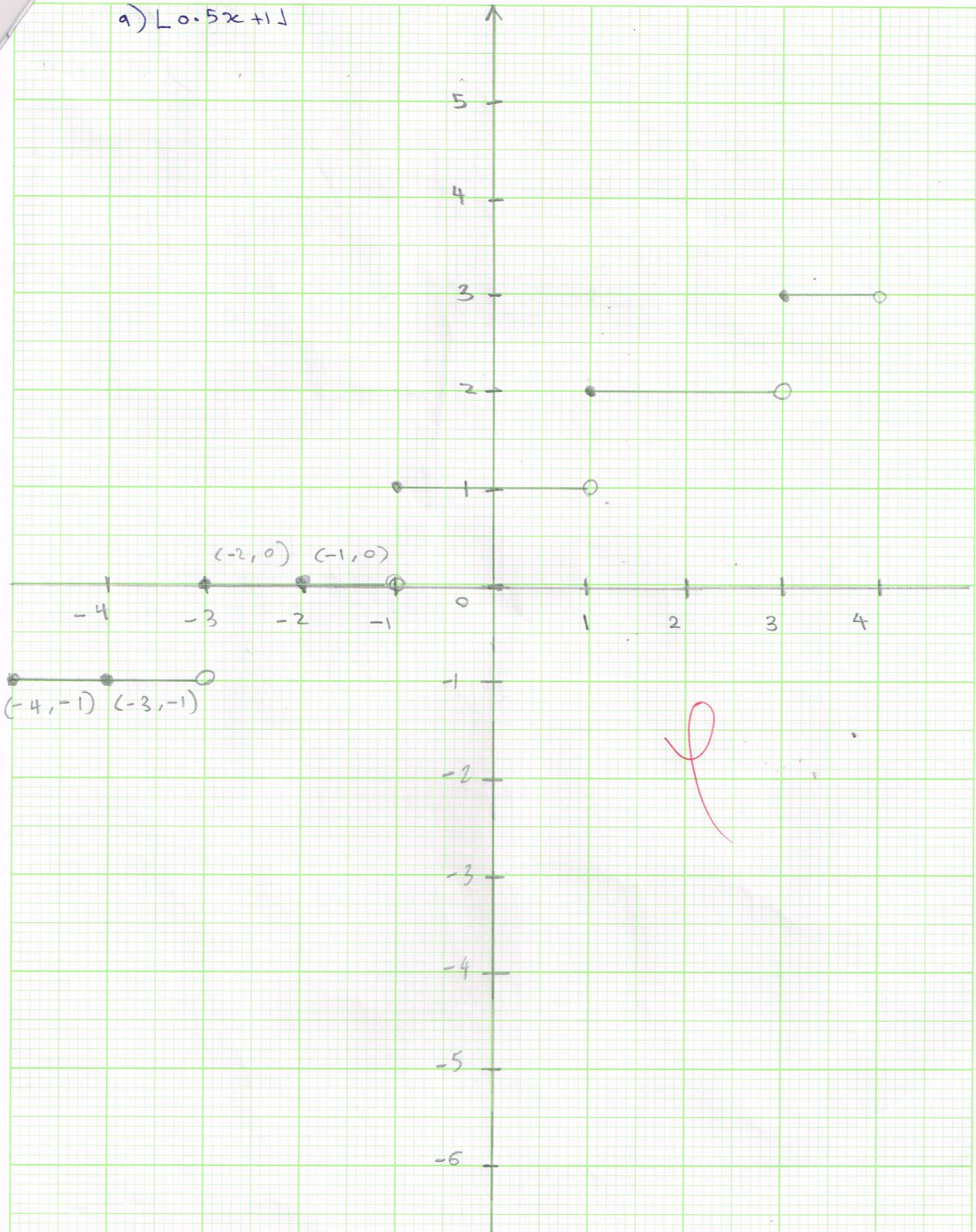
b) Determine whether the given relation is equivalence on $\{0, 1, 2, 3\}$ or not by justifying your answer.

- R is not reflexive because $2 \not R 2$
- R is not symmetric because $3 R 2$ but $2 \not R 3$
- R is not transitive because $3 R 3$, $3 R 2$ but $3 \not R 2$
- R is not an equivalence relation because R is not transitive and not reflexive.

Q3

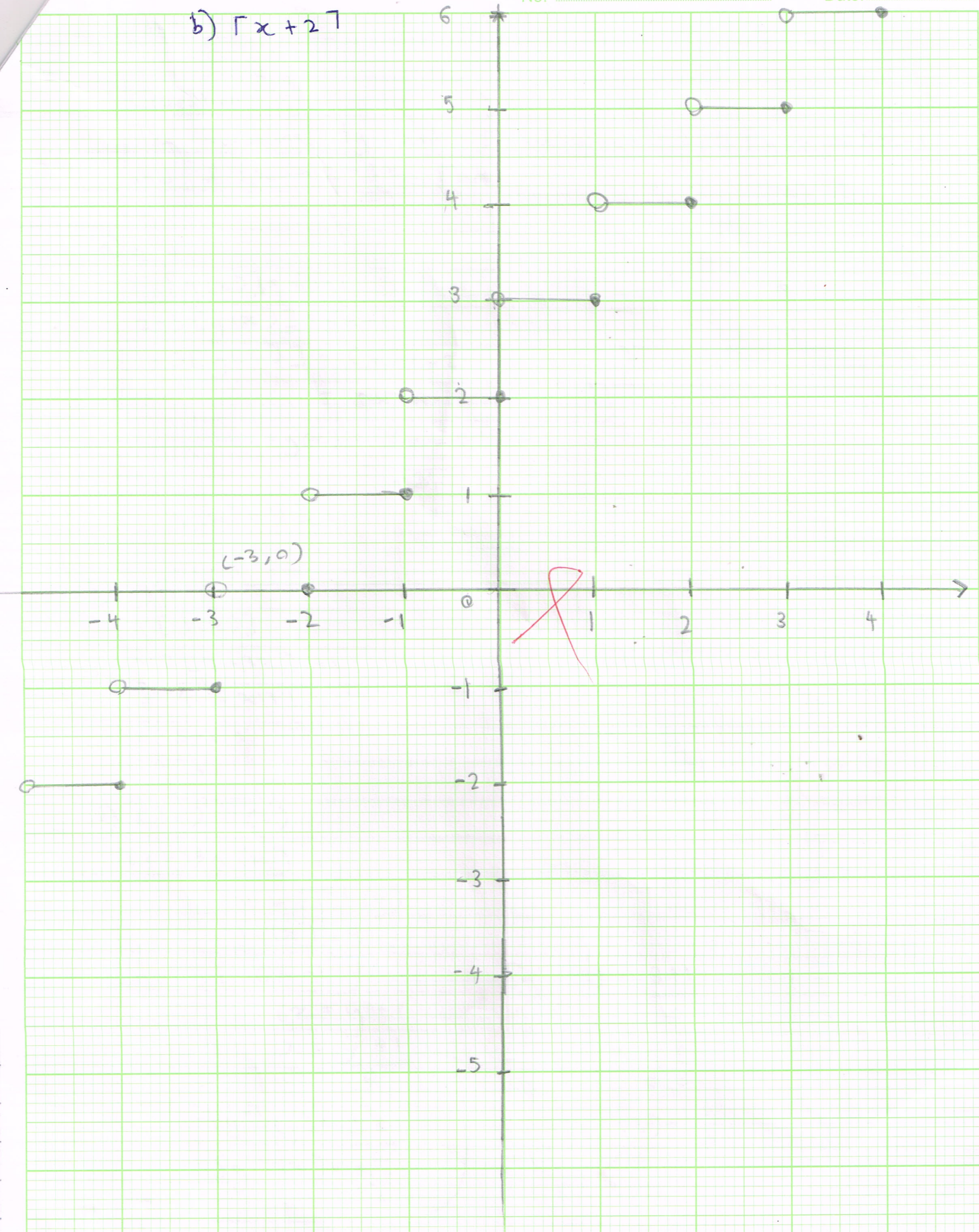
No. Date:

a) $\lfloor 0.5x + 1 \rfloor$



No. Date:

b) $\lceil x+2 \rceil$



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Date: _____

Question 4

The functions fg and F one given by $Fg: x \to 6x-1$ and $f: x \to 2-3x$. Find

a) g

$F[g(x)] = 6x-1$

$2-3[g(x)] = 6x-1$

$-3[g(x)] = 6x-1-2$

$= 6x-3$

$g(x) = \frac{6x-3}{-3}$

$g(x) = 2x+1$

b) gf

$g[f(x)]$

$= 2[2-3x]+1$

$= 4-6x+1$

$= 5-6x$

c) $(fg)^{-1}(3)$

Let $fg(x) = y$

$x = fg^{-1}(y)$

$fg(x) = y$

$6x-1 = y$

$6x = y+1$

$x = \frac{y+1}{6}$

$fg^{-1}(y) = \frac{y+1}{6}$

$fg^{-1}(x) = \frac{x+1}{6}$

$fg^{-1}(3) = \frac{3+1}{6}$

$= \frac{4}{6} \frac{2}{3}$

$fg^{-1}(3) = \frac{2}{3}$

DANNIELLA MELLINIE
05DDT17F2005

Subject: TUTORIAL 2.

No:

Date:

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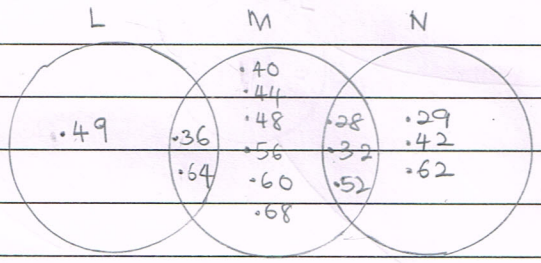
Question 1.

Set L = {36, 49, 64}

Set M = {28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68}

Set N = {28, 29, 32, 42, 52, 62}



30 41 54 67
31 43 55 69
33 45 57 70
34 46 58
35 47 59
36 49 61
37 50 63
38 51 65
39 53 66

✓ 1

b) n (M ∩ N)

M ∩ N = {28, 32, 52}

= 3 ✓

✓ 3

n (L ∪ M)

L ∪ M = {49, 36, 64, 40, 44, 48, 56, 60, 68}

= 9 ✗

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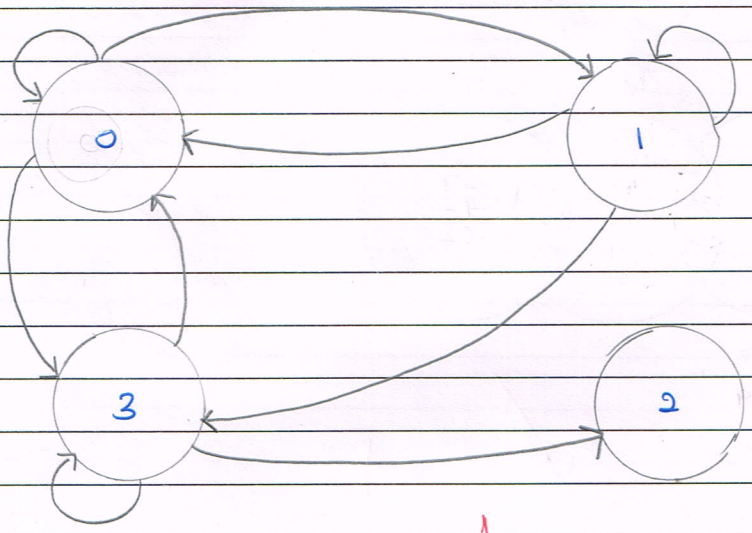
Question 2.

1.a) Diagram :

$R = \{(0,0), (0,1), (0,3), (1,0), (1,1), (1,3), (3,0), (3,2), (3,3)\}$



b) Reflexive :

- R is not reflexive because $2 \not R 2$.
- ~~R is reflexive because 0R0, 1R1 and 2R3~~

Symmetric :

- R is not symmetric because $3 R 2$ but $2 \not R 3$ and $1 R 3$ but $3 \not R 1$
- ~~R is symmetric because 0R1 and 1R0, 0R3 and 3R0.~~

Transitive :

- ~~R is transitive because whenever 0R1, and 1R3 then 0R3 and whenever 1R0 and 0R3 then 1R3~~
- ~~R~~ is not transitive because $3R0$ and $0R1$ but $3 \not R 1$

∴ R is not equilbalance because R is not reflexive, symmetric and transitive.

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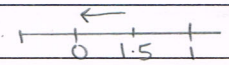
Question 3

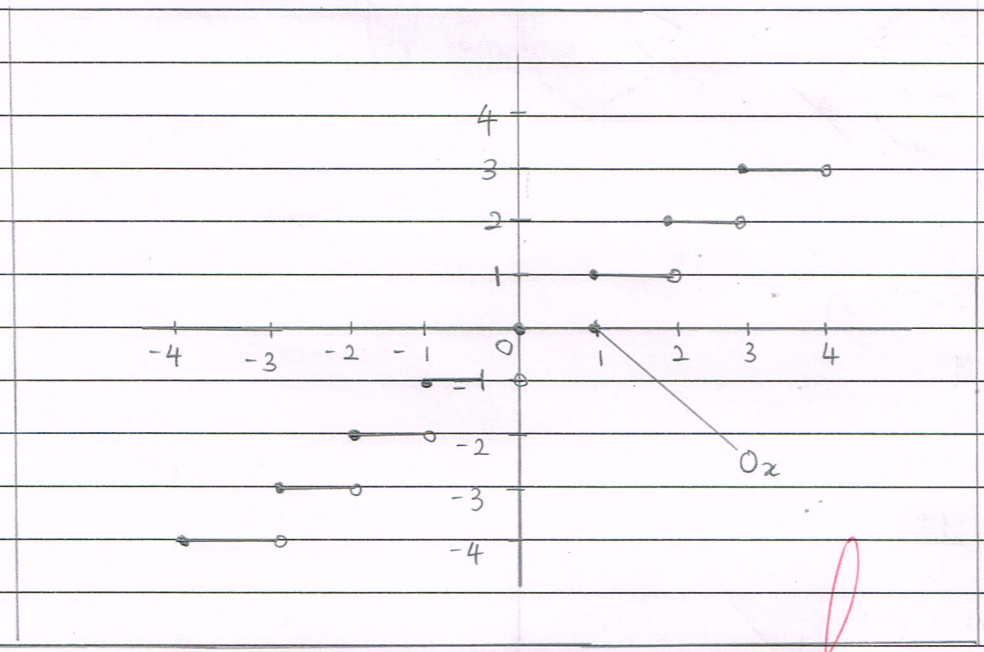
a) $\lfloor 0.5x + 1 \rfloor$

$0.5 + 1 = 1.5$

$\lfloor 1.5 \rfloor = 0$



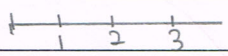
So, when x is 1.5, then $\lfloor 1.5 \rfloor = 0$



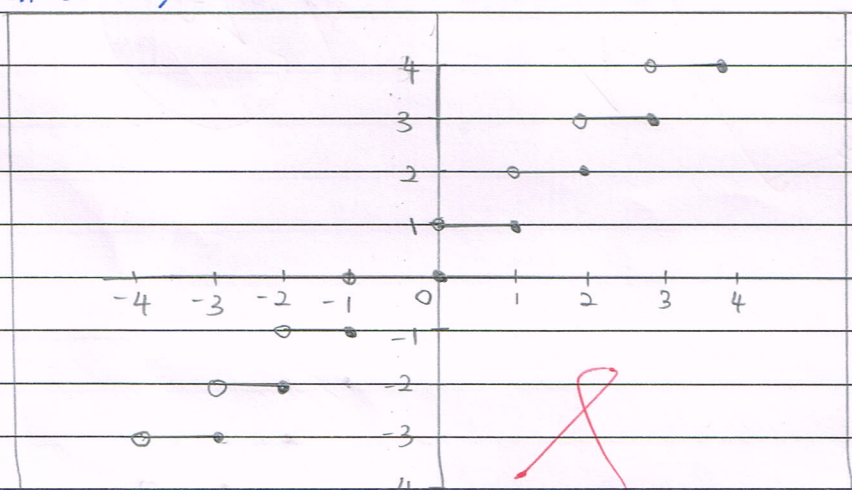
b) $\lceil x + 2 \rceil$

$x + 2 = 2$

$\lceil 2 \rceil = 2$



So, when $x = 2$, then $\lceil 2 \rceil = 2$



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Date: . .

Question 4

The functions fg and f are given by $fg: x \to 6x-1$ and $f: x \to 2-3x$. Find x.

a) g

$f(g(x)) = 6x-1$

$2-3(g(x)) = 6x-1$

$-3(g(x)) = 6x-1-2$

$= 6x-3$

$g(x) = \frac{6x-3}{-3}$

$g(x) = 2x+1$

b) gf

$g(f(x))$

$= 2(2-3x)+1$

$= 4-6x+1$

$= 5-6x$

c) $(fg)^{-1}(3)$

Let $fg(x) = y$

$x = fg^{-1}(y)$

$fg(x) = y$

$6x-1 = y$

$6y = y+1$

$x = \frac{y+1}{6}$

$fg^{-1}(y) = \frac{y+1}{6}$

$fg^{-1}(x) = \frac{x+1}{6}$

$fg^{-1}(3) = \frac{3+1}{6}$

$= \frac{4}{6}$

$fg^{-1}(3) = \frac{2}{3}$