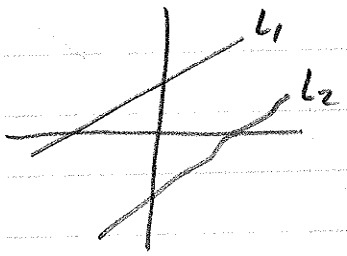
Cirrito 2.3.2 Q3, 4 from Lesson 7

Q3 systems have <u>No</u> soln

<u>clarification</u> : systems means ⇒ 2 functions on one graph

: No soln means ⇒ no intersection

<u>visualization</u>



⇒ parallel lines

(i) $3x - my = 4 \Rightarrow \therefore 3x - 4 = my \Rightarrow \frac{3}{m}x - \frac{4}{m} = y$

$x + y = 12 \Rightarrow \therefore y = -x + 12 \Rightarrow$ slope $= -1$

so we need $\frac{3}{m} = -1$ (slopes equal)

and $12 \neq -4/m$

so if $3/m = -1$ thus $m = -3$

(iii) $(4x - 2y = 12) \times -3$ alternate method ⇒ use elimination

$(3x + my = 2) \times 4$

$-12x + 6y = -36$

$+ \quad 12x + 4my = 8$

$(6 + 4m)y = -26$

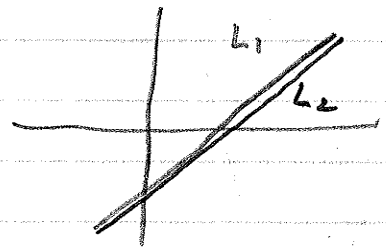
$\therefore y = \frac{-26}{6+4m}$

if we are to have <u>No</u> solution

$6 + 4m = 0$ so $m = -3/2$

Finito 2.3.2 Q4 from Lesson 7

background: infinite soln sets ⇒ 2 lns that intersect at EVERY point



2 overlapping lines

(i) $4x + my = a$ L_1
$2x + y = 4$ L_2

notice if we double L_2 ⇒ $4x + 2y = 8$
compare to L_1 ⇒ $4x + my = a$

if lns OVERLAP ⇒ $L_2 = L_1$

$\therefore 2y = my \Rightarrow m = 2$
$\therefore 8 = a$

(iii) $3x + my = a$ L_1
$2x - 4y = 6$ L_2 ⇒ $L_2 \times 3/2$

$3/2\, L_2$: $3x - 6y = 9$
L_1 : $3x + my = a$

$\therefore m = -6$
$a = 9$

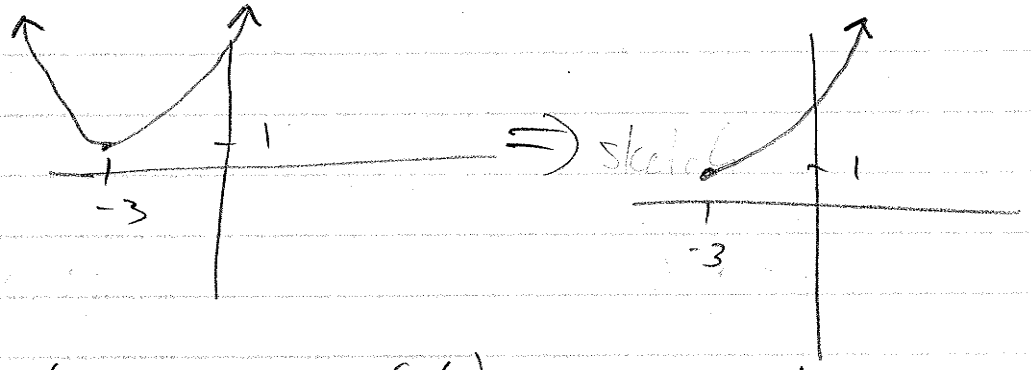
Cirrito §5.2 Q13 From Lesson 7

Q13 asking to find Domain in which $f(x)$ increases & is one to one

(a) $f(x) = x^2 + 6x + 10$ axis of symm $x = -b/a$

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

$f(-3) = (-3)^2 + 6(-3) + 10 = 1 \therefore V(-3, 1)$



$\therefore$ if $x > -3$ $f(x)$ is one to one and $f(x)$ is increasing

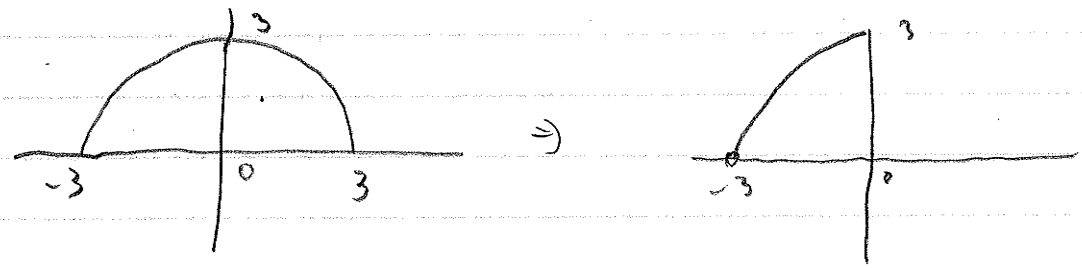
(b) $f(x) = \sqrt{9 - x^2}$ ⇒ quick rearrangement

$y = \sqrt{9 - x^2}$

$y^2 = 9 - x^2$

$x^2 + y^2 = 9$ → circle, radius 3

$\therefore f(x) = \sqrt{9 - x^2}$ is a semi circle with x-intercepts at $(-3, 0)$ & $(3, 0)$



So to be increasing and one to one

$D: \{x \in \mathbb{R} \mid -3 \leq x < 0\}$