QUANTUM INSPIRED TUTORIALS MATH TEST 1 IN CONJUCTION WITH MASA

1. **QUESTION ONE**
   a. State whether each function bellow is even, odd or neither
      i. $x^3 + x^2$
      ii. $x^2 - |x|$
   b. State and prove any one of the De Morgans laws
   c. Let Z be a complex number x+iy, prove |Z|=1 if $Z + \frac{1}{Z} = K$
   d. Sketch and state the domain of $3 + \sqrt{-x+2}$
   e. The first term of an AP is 4, the 10th term is 31. Determine the sum of the first 10 terms of the AP.
2. **QUESTION TWO**
   a. Prove that $\sqrt{5}$ is irrational.
   b. Convert $2.5\overline{17}$ to the form a/b.
   c. Convert $2.\overline{3}$ to the form a/b using Geometric progression sum to infinity.
   d. Complete the square of $-x^2 + 2x + 5$, find the turning point and the minimum or maximum, hence sketch the function.
3. **QUESTION THREE**
   a. Decompose the following into partial fractions
      i. $\frac{2x^2-5x+7}{x^3-4x^2+5x-2}$
      ii. $\frac{2x^4+2x^3+7x^2+7x-15}{(x+1)(x^2+4)}$
   b. Simplify [(AnB)’n(A’UB)]’
   c. Prove that $f(x) = 2x + 1$ *and* $g(x) = \frac{x-1}{2}$ are inverses of each other
   d. Find the values of k for which the x-axis will be a tangent to the curve $f(x) = kx^2 + (1+k)x + k$
4. **QUESTION FOUR**
   a. Let * be binary on the set of real numbers and be defined by the operation $a * b = -2^{a-b}$, where a and b are real numbers.
      i. Is * binary on real numbers? Justify your answer
      ii. Is * commutative?
      iii. Evaluate -1*(4*9)
   b. $2x^2 + 5x - 3 = 0$ *has roots* α *and* β, *find an equation with roots* $\frac{1}{\alpha\beta^2}$ *and* $\frac{1}{\alpha^2\beta}$
   c. Solve for the valid values of x
      i. $\left|\frac{x-3}{x+4}\right| \leq 1$
      ii. $\sqrt{\frac{x+1}{x-3}}$
   d. Redefine and graph the function h(x) = |3x+1|+|2x-3|
   e. Sketch the following and state the domain for each
      i. $\frac{x^2-9}{x-2}$ ii. $\frac{3}{x^2-9}$

Question One

(a)

(i) $x^3 + x^2$

$f(x) = x^3 + x^2$

$f(-x) = (-x)^3 + (-x)^2$

$f(-x) = -x^3 + x^2$

$f(x) \neq f(-x)$, hence it is not even

$f(x) = x^3 + x^2$

$-f(x) = -x^3 - x^2$

$f(-x) \neq -f(x)$, the function is not odd

(ii) $f(x) = x^2 - |x|$ => $f(x) = x^2 - x$

$f(-x) = (-x)^2 - |-x|$

$f(-x) = x^2 - x$

$f(x) = f(-x)$ the function is even

$f(x) = x^2 - |x|$

$-f(x) = -x^2 + |x|$

$f(-x) \neq -f(x)$ the function is ~~not~~ not odd as well b # Proving Any De morgans laws

(i) $(A \cap B)' = A' \cup B'$

To prove that $(A \cap B)' = A' \cup B'$ we need to show that $(A \cap B)' \subset A' \cup B'$ ---(i) and that $A' \cup B' \subset (A \cap B)'$ ---(ii)

To prove (i) let $x \in (A \cap B)'$

$x \notin A \cap B$

$x \notin A$ or B

$x \in A'$ or B'

$x \in A' \cup B'$

Thus $(A \cap B)' \subset A' \cup B'$

To prove (ii) let $x \in A' \cup B'$

$x \in A'$ or B'

$x \notin A$ or B

$x \notin A \cap B$

$x \in (A \cap B)'$

Thus $A' \cup B' \subset (A \cap B)'$

$\therefore$ Both statements above (i) & (ii) have been proven true hence $(A \cap B)' = A' \cup B'$

(ii) $(A \cup B)' = A' \cap B'$

To prove that $(A \cup B)' = A' \cap B'$ we need to show that $(A \cup B)' \subset A' \cap B'$ ... (i) and also that $A' \cap B' \subset (A \cup B)'$

To prove (i) let $x \in (A \cup B)'$

$x \notin A \cup B$

$x \notin A$ and B

$x \in A'$ and B'

$x \in A' \cap B'$

Thuse $(A \cup B)' \subset A' \cap B'$

To prove (ii) let $x \in A' \cap B'$

$x \in A'$ and B'

$x \notin A$ and B

$x \notin A \cup B$

$x \in (A \cup B)'$

Thus $A' \cap B' \subset (A \cup B)'$

$\therefore$ Since both statements ~~holdings~~ mean that $(A \cup B)' = A' \cap B'$

just pick one!!

22 $z = x + iy$

(a) $\frac{1}{z}$ in the form $a+ib$

$\frac{1}{x+iy}$ kati, then your conjugate the bottom

$\frac{1}{x+iy}\left(\frac{x-iy}{x-iy}\right)$

$\frac{x-iy}{x^2-(iy)^2}$

$\frac{x-iy}{x^2+y^2}$

writing this in the form $a+ib$

$\frac{x-iy}{x^2+y^2} = \underline{\underline{\frac{x}{x^2+y^2} - \frac{iy}{x^2+y^2}}}$

(b) $z + \frac{1}{z} = k$

So here we know that $z = x+iy$

and that $\frac{1}{z} = \frac{x-iy}{x^2+y^2}$, ryt

before we splitted it into the form $a+ib$

therefore

$z + \frac{1}{z} = k$

$\frac{x+iy}{1} + \frac{x-iy}{x^2+y^2} = k$

$\frac{(x+iy)(x^2+y^2) + (x-iy)}{x^2+y^2} = k$

$\frac{x^3 + xy^2 + x^2yi + y^3i + x - iy}{x^2+y^2}$

so on the numerator part i'll group them like this

(x^3+xy^2) & (x^2yi+y^3i)

What i mean is this

$\frac{x^3+xy^2}{x^2+y^2} + \frac{x^2yi+y^3i}{x^2+y^2} + \frac{x-iy}{x^2+y^2}$

$\frac{x(x^2+y^2)}{x^2+y^2} + \frac{iy\cancel{(x^2+y^2)}}{x^2+y^2} + \frac{x-iy}{x^2+y^2}$

$x + iy + \frac{x-iy}{x^2+y^2}$

$x+iy + \frac{x}{x^2+y^2} - \frac{iy}{x^2+y^2}$

Collect the real part and

the imaginery part.

$$\underbrace{x + \frac{x}{x^2+y^2}}_{\text{Real part}} + \underbrace{iy - \frac{iy}{x^2+y^2}}_{\text{Imaginery part}}$$

now remember they told us that

K is a real number, and at your age you must know that real numbers don't have imaginery parts

∴ if ;

$$K = x + \frac{x}{x^2+y^2} + iy - \frac{iy}{x^2+y^2}$$

Getting the imagniery part

$$iy - \frac{iy}{x^2+y^2} = 0$$

$$iy\left(1 - \frac{1}{x^2+y^2}\right) = 0$$

$$iy = 0 \quad \text{or} \quad 1 - \frac{1}{x^2+y^2} = 0$$

$$y = 0 \qquad 1 = \frac{1}{x^2+y^2}$$

$$\frac{1}{1} = \frac{1}{x^2+y^2}$$

$$x^2+y^2 = 1$$

now remember that ~~z=x+iy~~ $z = x + iy$, and to find $|z|$ we say ;

$$|z| = \sqrt{x^2+y^2}$$

but $\boxed{x^2+y^2 = 1}$

$$|z| = \sqrt{1}$$

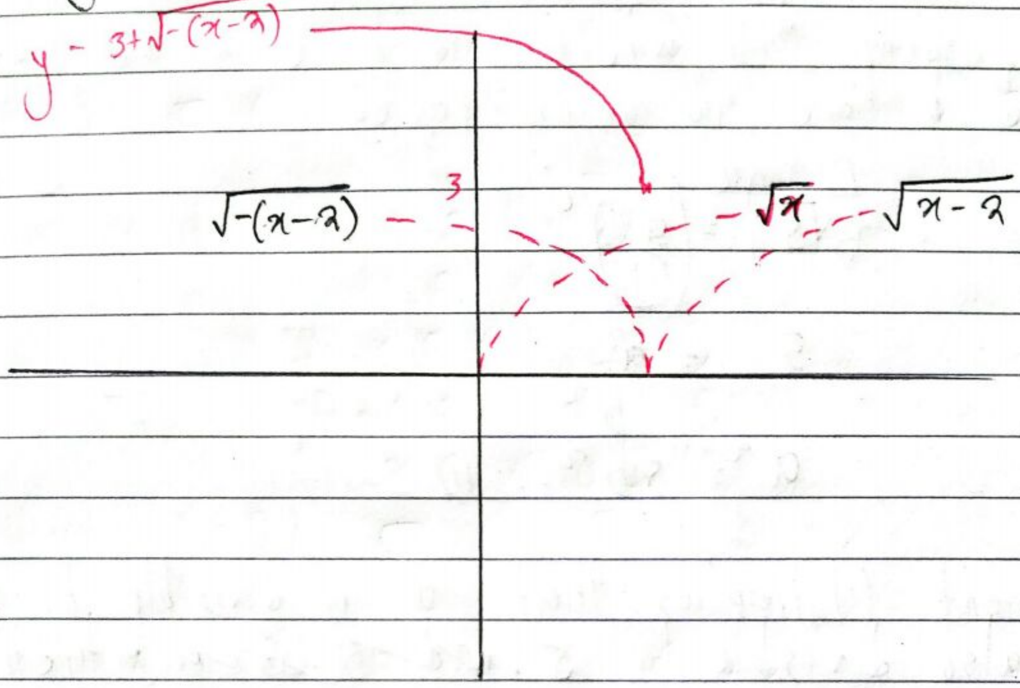
$$\therefore |z| = 1$$

hence proved

2	162
3	81
3	27
3	9
3	3
	1

d $y = 3 + \sqrt{-x + 2}$

$y = 3 + \sqrt{-(x-2)}$



(e) $a_n = a_1 + (n-1)d$

$a_1 = 4$, $a_{10} = 31$

$31 = 4 + (10-1)d$

$31 = 4 + 9d$

$9d = 27$

$d = 3$

$S_n = \frac{n}{2}[2a_1 + (n-1)d]$

$S_{10} = \frac{10}{2}[2(4) + (10-1)3]$

$S_{10} = 5[8 + 27]$ $\Rightarrow$ $S_{10} = 175$

Question Two $\frac{1}{4(x-2)} + \frac{3}{4(x+2)}$

(a.) $\sqrt{5}$

Assume that $\sqrt{5}$ is rational, such that it can be written in the form a/b where $a, b \in \mathbb{Z}$ and $b \neq 0$, and a and b have no comon factor

$$(\sqrt{5})^2 = \left(\frac{a}{b}\right)^2$$

$$5 = \frac{a^2}{b^2}$$

$$a^2 = 5b^2 \dots (i)$$

- Statement (i) implies that a^2 is divisible by 5 meaning a is also divisible by 5. ~~and 5 over~~ which can be written as $a = 5k$..

$$a^2 = 5b^2$$

$$(5k)^2 = 5b^2$$

$$\frac{25k^2}{5} = \frac{5b^2}{5}$$

$$5k^2 = b^2 \dots ii$$

- Statement (ii) shows that b^2 has a multiple of 5 which means even b has a factor of 5. This contradicts our assumption that a and b have no common factor.

b

$2.5\overline{17}$

$x = 2.5\overline{17}$

$10x = 25.\overline{17}$

$1000x = 2517.\overline{17}$

$1000x - 10x = 2517.\overline{17} - 25.\overline{17}$

$\frac{\cancel{990}x}{\cancel{990}} = \frac{2492}{990}$

$x = \frac{2493}{990}$

c

$2.\overline{3} = 2 + 0.3 + 0.03 + 0.003$

$r = \frac{0.03}{0.3} = 0.1$

$a_1 = 0.3$

$S_\infty = \frac{a_1}{1-r}$

$= \frac{0.3}{1-0.1}$

$= \frac{0.3}{0.9}$

$= \frac{1}{3}$

$2 + \frac{1}{3} = 2\frac{1}{3} = \frac{7}{3}$

(d.) $-x^2+2x+5$

$-(x^2-2x-5)$

$-(x^2-2x+(-1)^2-(-1)^2-5)$

$-((x-1)^2-1-5)$

$-[(x-1)^2-6]$

$-(x-1)^2+6$

$x-1=0 \qquad y=6$

$x=1$

$Tp = (1,6)$

maximum ;. $y=6$

x-intercept

$y=-(x-1)^2+6=0$

$-(x-1)^2=-6$

$\sqrt{(x-1)^2}=\sqrt{6}$

$x-1=\pm\sqrt{6}$

$x=+\sqrt{6}+1$ or $-\sqrt{6}+1$

~~x~~ =

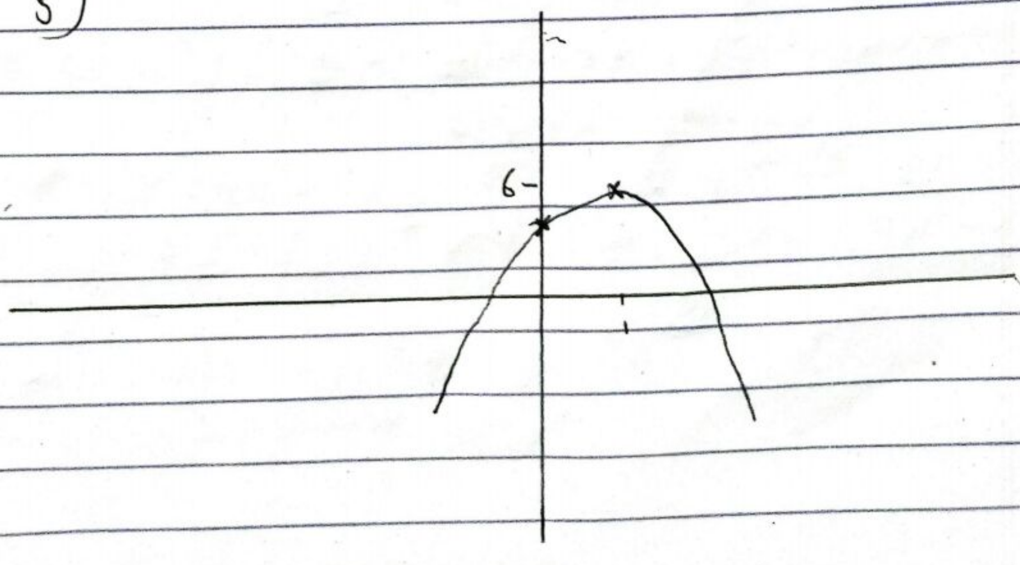
$y=-x^2+2x+5$

y intercept [x=0

$y=-(0)^2+2(0)+5$

$y=5$

$y(0,5)$



9 $\dfrac{2x^2 - 5x + 7}{x^3 - 4x^2 + 5x - 2}$

Denominator can be factored

$$\begin{array}{c|cccc} 1 & 1 & -4 & 5 & -2 \\ & & 1 & -3 & 2 \\ \hline & 1 & -3 & 2 & 0 \end{array}$$

$x^2 - 3x + 2$

$p = 2 \quad s = -3 \quad f = -1, -2$

$x^2 - x - 2x + 2 = 0$

$x(x-1) - 2(x-1) = 0$

$(x-1)(x-2) = 0$

$(x-1)(x-1)(x-2)$

$(x-1)^2(x-2)$

$$\frac{2x^2 - 5x + 7}{(x-1)^2(x-2)} = \frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{x-2}$$

$2x^2 - 5x + 7 = A(x-1)(x-2) + B(x-2) + C(x-1)^2$

$= A(x^2 - 3x + 2) + B(x-2) + C(x^2 - 2x + 1)$

$= Ax^2 - 3Ax + 2A + Bx - 2B + Cx^2 - 2Cx + C$

$2x^2 - 5x + 7 = Ax^2 + Cx^2 - 3Ax + Bx - 2Cx + 2A - 2B + C$

$2x^2 - 5x + 7 = (A + C)x^2 + (-3A + B - 2C)x + 2A - 2B + C$

$2x^2 = (A+C)x^2$

$A + C = 2 \ldots (i)$

$(-3A + B - 2C)x = -5x$

$$\begin{array}{l|l} -3A + B - 2C = -5 \ldots (iii) & 2 \\ 2A - 2B + C = 7 & 1 \end{array}$$

$$+\left|\begin{array}{l} -6A + 2B - 4C = -10 \\ 2A - 2B + C = 7 \end{array}\right.$$

$-4A - 3C = -3$

$4A + 3C = 3 \ldots (ii)$

$$\begin{array}{l|l} A + C = 2 & 3 \\ 4A + 3C = 3 & 1 \end{array}$$

$$-\left|\begin{array}{l} 3A + 3C = 6 \\ 4A + 3C = 3 \end{array}\right.$$

$-A = 3$

$\underline{A = -3}$

$A + C = 2$

$-3 + C = 2$

$\underline{C = 5}$

$2A - 2B + C = 7$

$2(-3) - 2B + 5 = 7$

$-2B = 8$

$\underline{B = -4}$

$$\frac{2x^2-5x+7}{(x-1)^2(x-2)} = \frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{x-2}$$

$$= \frac{-3}{x-1} + \frac{-4}{(x-1)^2} + \frac{5}{x-2)}$$

(ii) $\dfrac{2x^4 + 2x^3 + 7x^2 + 7x - 15}{(x+1)(x^2+4)}$

expanding the denominator

$(x+1)(x^2+4)$

$x^3 + 4x + x^2 + 4$

use long divison apaso !

$$
\begin{array}{r|l}
 & 2x \\
\hline
x^3 + x^2 + 4x + 4 & 2x^4 + 2x^3 + 7x^2 + 7x - 15 \\
 & -(2x^4 + 2x^3 + 8x^2 + 8x) \downarrow \\
 & -x^2 - x - 15
\end{array}
$$

finally ;

$$\frac{2x^4 + 2x^3 + 7x^2 + 7x - 15}{x^3 + 4x + x^2 + 4} = 2x + \underbrace{\frac{-x^2 - x - 15}{x^3 + x^2 + 4x + 4}}$$

get this part & work with it

$$\left.\frac{-x^2 - x - 15}{(x+1)(x^2+4)} = \frac{A}{x+1} + \frac{Bx + C}{x^2+4}\right] \times (x+1)(x^2+4)$$

$$-x^2 - x - 15 = A(x^2+4) + (Bx + C)(x+1)$$

$$= Ax^2 + 4A + Bx^2 + Bx + Cx + C$$

$$-x^2 - x - 15 = (A + B)x^2 + (B + C)x + 4A + C$$

$-x^2 = (A+B)x^2$

$A+B = -1$

$B = -1 - A \ldots (i)$

$-x = (B+C)x$

$-1 = B+C$

$-1 = -1 - A + C$

$0 = -A + C$

$A = C \quad \ldots (ii)$

$-15 = 4A + C$

$-15 = 4A + A$

$-15 = 5A$

$A = -3$

$\therefore A = C$

$C = -3$

$B = -1 - A$

$B = -1 - (-3)$

$B = 2$

$$\frac{-x^2 - x - 15}{(x+1)(x^2+4)} = \frac{-3}{x+1} + \frac{2x-3}{x^2+4}$$

$$\frac{2x^4 + 2x^3 + 7x^2 + 7x - 15}{(x+1)(x^2+4)} = 2x + \frac{-3}{x+1} + \frac{2x-3}{x^2+4}$$

b $[(A \cap B)' \cap (A' \cup B)]'$

$[(A' \cup B') \cap (A' \cup B)]'$

$[A' \cup (B' \cap B)]'$

$[A' \cup \emptyset]'$

$[A']' \Rightarrow \underline{A}$

(c) $f(x) = 2x + 1$ $\qquad g(x) = \frac{x-1}{2}$

$$fog(x) = 2\left(\frac{x-1}{2}\right) + 1$$

$$= x - 1 + 1$$

$$fog(x) = x$$

$$gof(x) = \frac{(2x+1) - 1}{2}$$

$$= \frac{2x}{2}$$

$$gof(x) = x$$

$\therefore$ since $fog(x) = gof(x) = x$ these functions are inverses of each other

$f(x) = kx^2 + (1+k)x + k$

$a = k \qquad b = 1+k \qquad c = k$

$b^2 - 4ac = 0$

$(1+k)^2 - 4(k)(k) = 0$

$1 + 2k + k^2 - 4k^2 = 0$

$-3k^2 + 2k + 1 = 0$

$p = -3 \qquad s = 2 \qquad f = -1, 3$

$-3k^2 - k + 3k + 1$

$-k(3k+1) + 1(3k+1)$

$(3k+1)(-k+1) = 0$

$3k+1 = 0 \qquad -k+1 = 0$

$\underline{\underline{k = -\frac{1}{3}}} \qquad \underline{\underline{k = 1}}$

a $a * b = -2^{a-b}$

(i) let $a = 1$ and $b = \frac{1}{2}$

$$1 * \frac{1}{2} = -2^{1-\frac{1}{2}}$$
$$= -2^{\frac{1}{2}}$$
$$= -\sqrt{2}$$

$-\sqrt{2}$ is an irrational number but its real hence $*$ is a binary operation on a set of real numbers

(ii) $a * b = b * a$

$1 * 2 = 2 * 1$

$-2^{1-2} = -2^{2-1}$

$-2^{-1} = -2^{1}$

$-\frac{1}{2} \neq -2$

$\therefore$ since $a * b \neq b * a$ then $*$ is no commutative

(iii) $-1 * (4 * 9)$

$4 * 9 = -2^{4-9}$

$= -2^{-5}$

$= -\frac{1}{2^5}$

$4 * 9 = -\frac{1}{32}$

$-1 * -\frac{1}{32} = -2^{-1-(-\frac{1}{32})}$

$= -2^{-1+\frac{1}{32}}$

$= -2^{-\frac{31}{32}}$

$-1 * -\frac{1}{32} = -\frac{1}{2^{31/32}}$

$\therefore -1 * (4 * 9) = -\frac{1}{2^{31/32}}$

b $2x^2 + 5x - 3$

$\alpha + \beta = -\frac{b}{a}$ $\alpha\beta = \frac{c}{a}$

$= -\frac{5}{2}$ $\alpha\beta = -\frac{3}{2}$

Sum of roots

$\frac{1}{\alpha\beta^2} + \frac{1}{\alpha^2\beta}$

$\rightarrow \frac{\alpha^2\beta + \alpha\beta^2}{(\alpha\beta^2)(\alpha^2\beta)}$

$\rightarrow \frac{\alpha\beta(\alpha+\beta)}{(\alpha\beta)^3}$

$\rightarrow \left(-\frac{3}{2}\right)\left(-\frac{5}{2}\right) \div \left(-\frac{3}{2}\right)^2$

$\rightarrow \frac{15}{\cancel{4}_1} \times \frac{\cancel{4}^1}{9}$

$\rightarrow \frac{5}{3}$

product of roots

$\frac{1}{\alpha\beta^2} + \frac{1}{\alpha^2\beta}$

$\rightarrow \frac{1}{\alpha^3\beta^3}$

$\rightarrow \frac{1}{(\alpha\beta)^3}$

$\rightarrow \frac{1}{\left(-\frac{3}{2}\right)^2}$

$\rightarrow \frac{1}{\frac{9}{4}}$

$\rightarrow = \frac{4}{9}$

$x^2 - \left(\frac{5}{3}\right)x + \left(\frac{4}{9}\right)$

$x^2 - \frac{5}{3}x + \frac{4}{9} = 0$

C,1 $\left|\frac{x-3}{x+4}\right| \leq 1$

$\frac{x-3}{x+4} \leq 1$ or $\frac{x-3}{x+4} \geq -1$

$\frac{x-3}{x+4} - \frac{1}{1} \leq 0$

$\frac{x-3-(x+4)}{x+4} \leq 0$

$\frac{x-3-x-4}{x+4} \leq 0$

$\frac{-7}{x+4} \leq 0$

$\frac{x-3}{x+4} + \frac{1}{1} \geq 0$

$\frac{x-3+(x+4)}{x+4} \geq 0$

$\frac{2x+1}{x+4} \geq 0$

kilitiko

$x+4=0$
$x=-4$

kilitiko

$2x+1=0$
$x=-\frac{1}{2}$

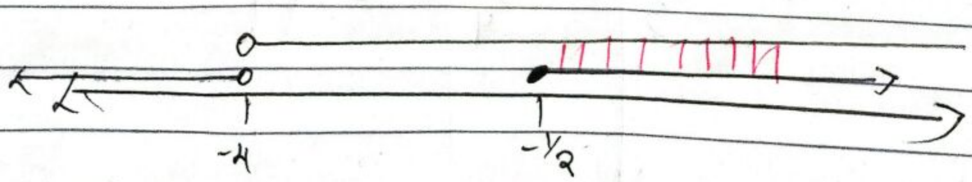
$x+4=0$
$x=-4$

	$x<-4$	$x>4$
$x+4$	$-$	$+$
-7	$-$	$-$
	$+$	$-$ ✓

Range	$x<-4$	$-4<x<-\frac{1}{2}$	$x>-\frac{1}{2}$
Test value	-5	-1	0
$2x+1$	$-$	$-$	$+$
$x+4$	$-$	$+$	$+$
	$+$ ✓	$-$	$+$ ✓

$x>-4$

$x<-4$ or $x \geq -\frac{1}{2}$



$x \geq -\frac{1}{2}$

(e) $\dfrac{x^2-9}{x-2}$

V.A

$x-2=0$

$x=2$

x - intercept [y=0]

$0=\dfrac{x^2-9}{x-2}$

$x^2-9=0$

$x^2=9$

$x=3$ or $x=-3$

$(3,0)$ or $(-3,0)$

Slant Asymptote

$$\begin{array}{r|l} & x+2 \\ \hline x-2 & x^2+0x-9 \\ & -(x^2-2x) \\ & \quad 2x-9 \\ & \quad -(2x-4) \\ & \qquad -5 \end{array}$$

$y=x+2$

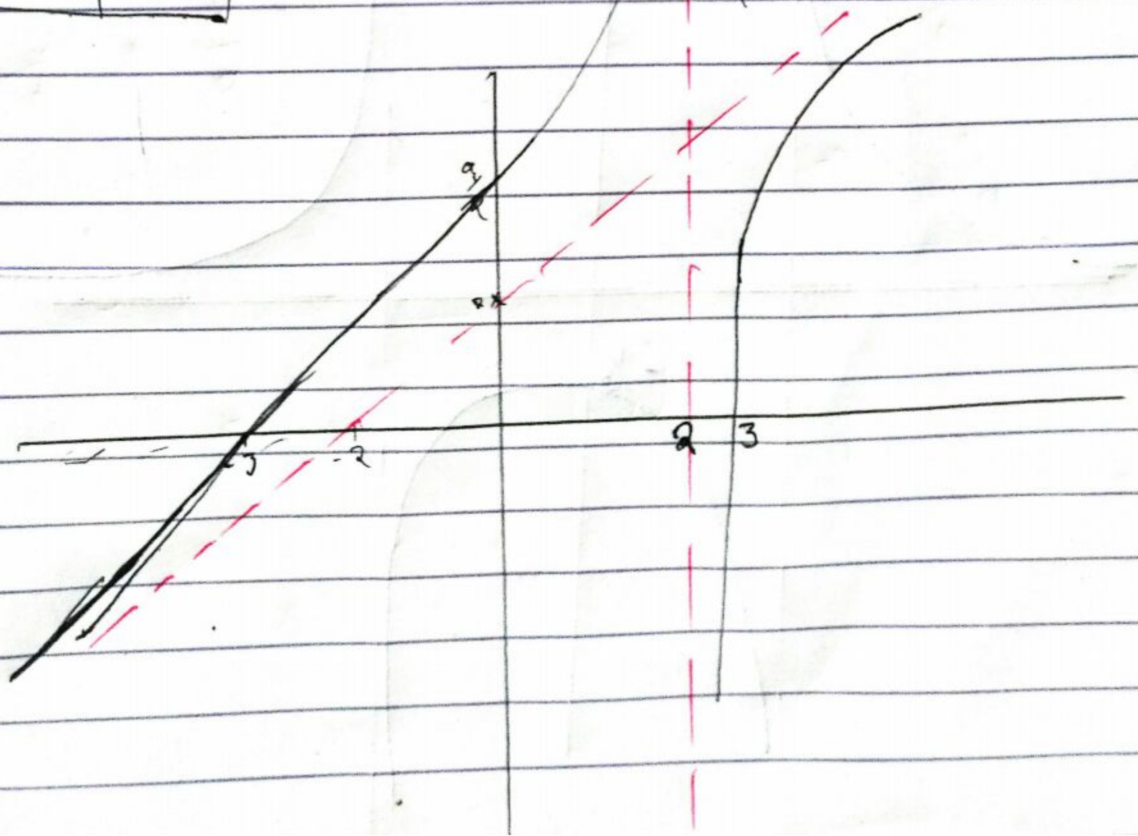
x	0	-2
y	2	0

y - intercept [x=0]

$y=\dfrac{(0)^2-9}{(0)-2}$

$y=9/2$

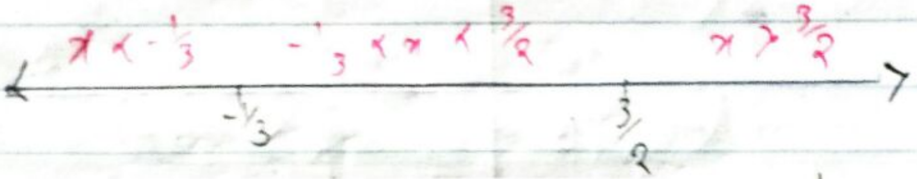
$(0, 9/2)$



(iii) $h(x) = |3x+1| + |2x-3|$

$3x+1 = 0$ $\qquad$ $2x-3=0$

$x = -\frac{1}{3}$ $\qquad$ $x = \frac{3}{2}$



$$h(x) = \begin{cases} |3x+1| + |2x-3| & \text{if } x < -\frac{1}{3} \\ |3x+1| + |2x-3| & \text{if } -\frac{1}{3} \leq x \leq \frac{3}{2} \\ |3x+1| + |2x-3| & \text{if } x > \frac{3}{2} \end{cases}$$

$$h(x) = \begin{cases} -(3x+1) - (2x-3) & \text{for } x < -\frac{1}{3} \\ (3x+1) - (2x-3) & \text{for } -\frac{1}{3} \leq x \leq \frac{3}{2} \\ (3x+1) + (2x-3) & \text{for } x > \frac{3}{2} \end{cases}$$

$$h(x) = \begin{cases} -3x-1-2x+3 & \text{for } x < -\frac{1}{3} \\ 3x+1-2x+3 & \text{for } -\frac{1}{3} \leq x \leq \frac{3}{2} \\ 3x+1+2x-3 & \text{for } x > \frac{3}{2} \end{cases}$$

$$h(x) = \begin{cases} -5x+2 & \text{for } x < -\frac{1}{3} \\ x+4 & \text{for } -\frac{1}{3} \leq x \leq \frac{3}{2} \\ 5x-2 & \text{for } x > \frac{3}{2} \end{cases}$$

$y = -5x+2$

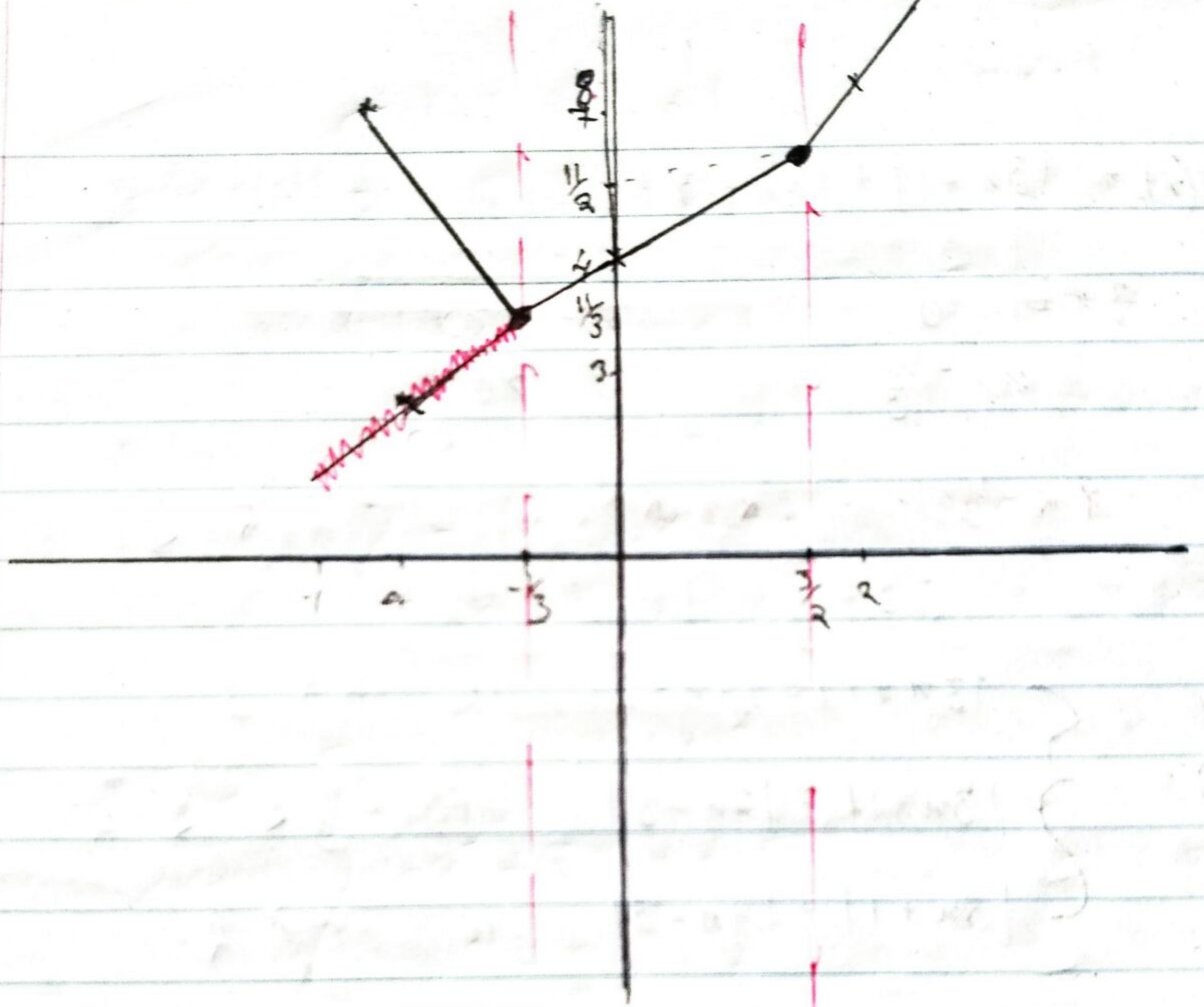
x	-1	$-\frac{1}{3}$
y	7	$\frac{11}{3}$

$y = x+4$

x	$-\frac{1}{3}$	0	$\frac{3}{2}$
y	$\frac{11}{3}$	4	$\frac{11}{2}$

$y = 5x-2$

x	$\frac{3}{2}$	2
y	$\frac{11}{2}$	8



$\frac{11}{2}$
4
$\frac{11}{3}$
3
-1
$-\frac{1}{3}$
$\frac{3}{2}$
2

(e) $\dfrac{x^2 - 9}{x - 2}$

V.A

$x - 2 = 0$

$x = 2$

Slant Asymptote

$$\begin{array}{r|l} & x + 2 \\ \hline x - 2 & x^2 + 0x - 9 \\ & -(x^2 - 2x) \downarrow \\ & \quad 2x - 9 \\ & \quad -(2x - 4) \\ & \qquad -5 \end{array}$$

$y = x + 2$

x	0	-2
y	2	0

x - intercept [y=0]

$0 = \dfrac{x^2 - 9}{x - 2}$

$x^2 - 9 = 0$

$x^2 = 9$

$x = 3$ or $x = -3$

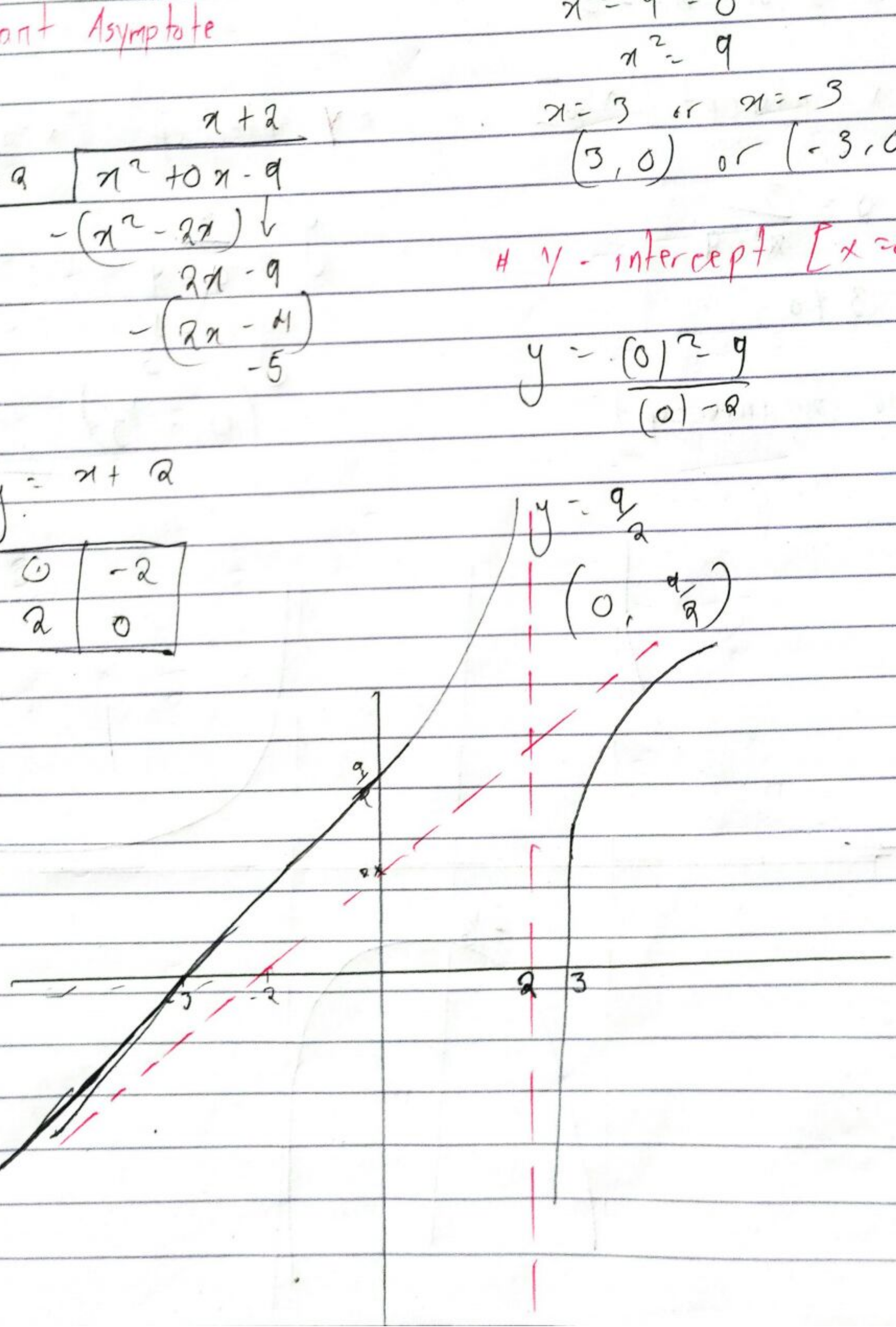
$(3, 0)$ or $(-3, 0)$

y - intercept [x=0]

$y = \dfrac{(0)^2 - 9}{(0) - 2}$

$y = \dfrac{9}{2}$

$\left(0, \dfrac{9}{2}\right)$



(iii) $\frac{3}{x^2-9}$

V. A

$x^2 - 9 = 0$

$x^2 = 9$

$x = \pm 3$

$x = 3$ or $x = -3$

H. A

$y = 0$

x-intercept [y=0]

$0 = \frac{3}{x^2-9}$

$3 \neq 0$

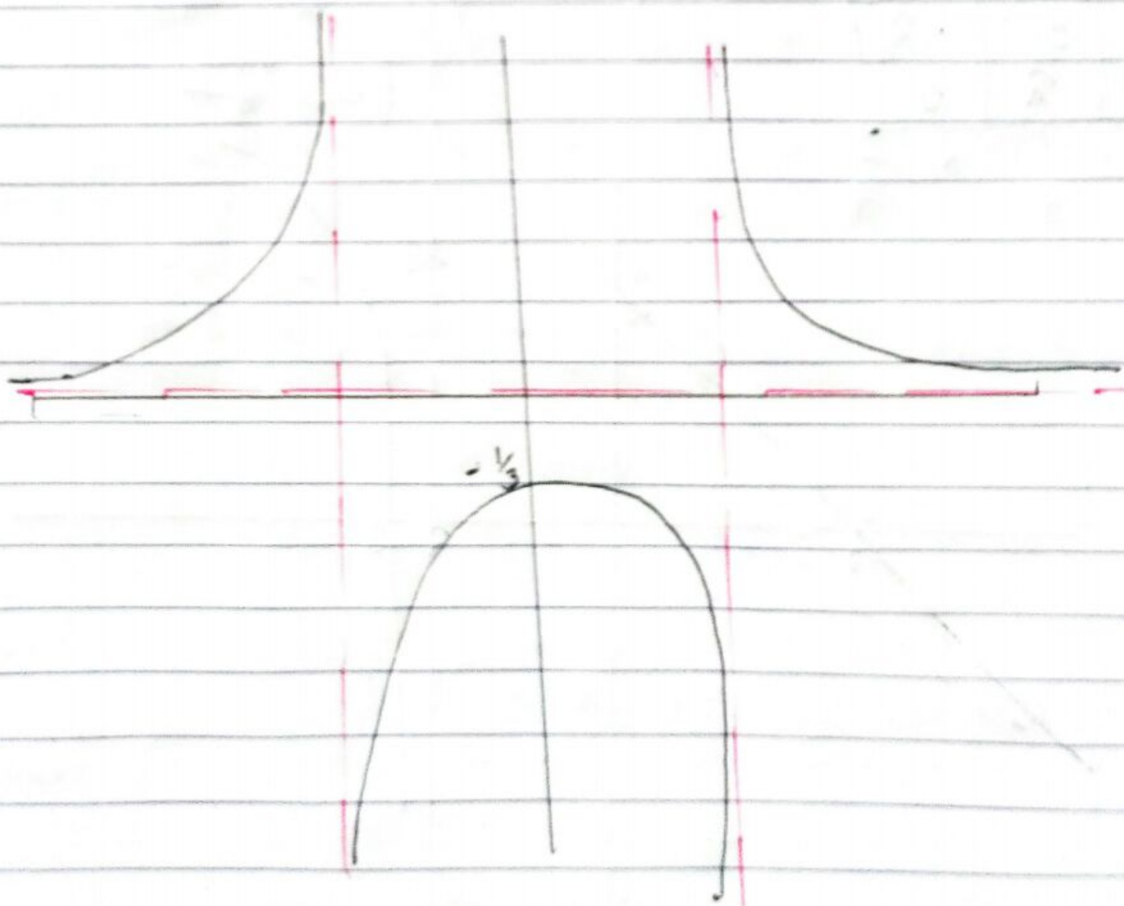
no x-intercept

y-intercept [x=0]

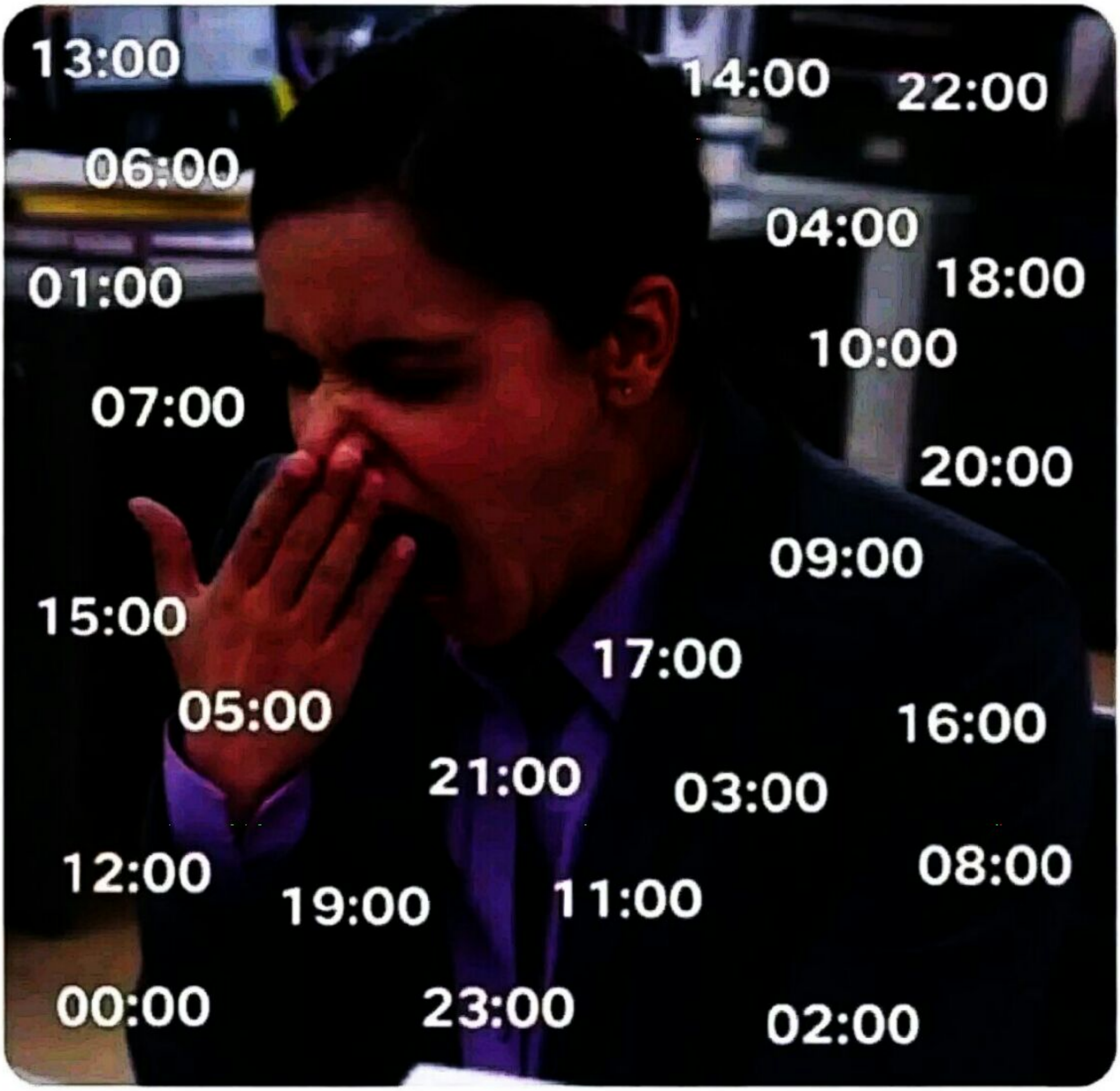
$y = \frac{3}{0-9}$

$y = -\frac{1}{3}$

$(0, -\frac{1}{3})$



Me: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