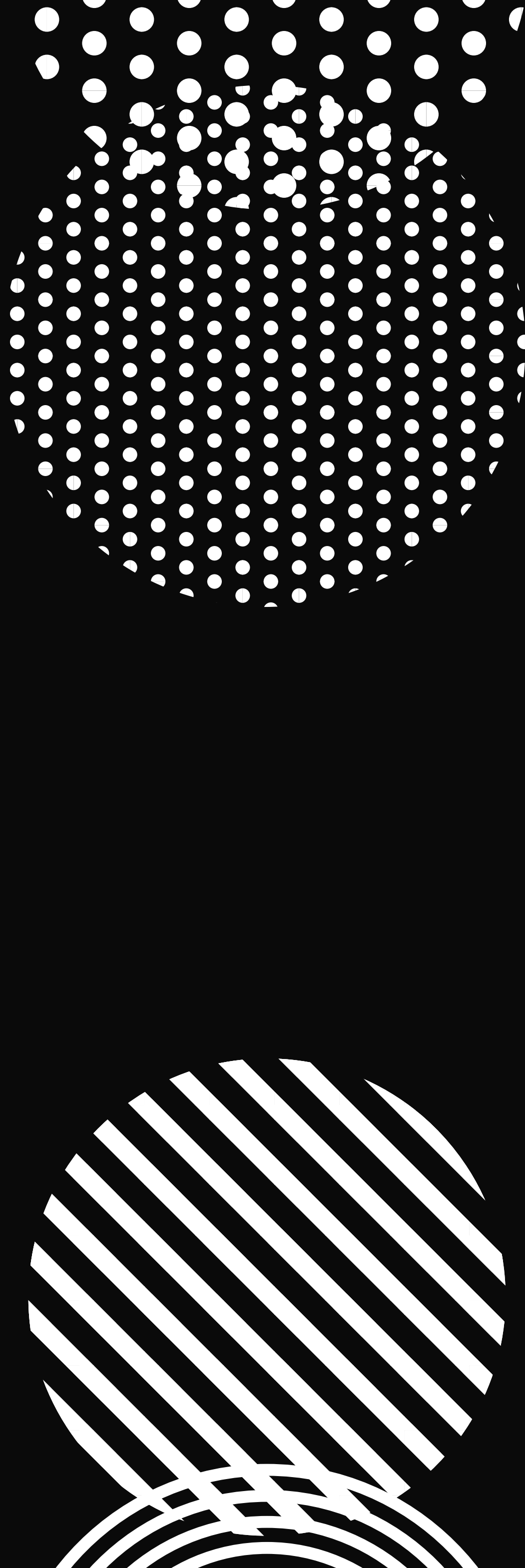


$A = \{x \in \mathbb{R} \mid -x^2 + 5x - 5 \geq 1\}$

$B = \{x \in \mathbb{R} \mid 2 < x \leq 3\}$

-2

$-(4) - 10 - 5 \geq 1$

$-4 - 10 - 5 \geq 1$ x

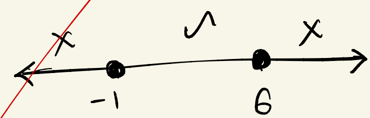
$-x^2 + 5x - 5 = 1$

$x^2 - 5x + 5 = -1$

$x^2 - 5x + 6 = 0$

$(x-6)(x+1) = 0$

$x = 6$ (or) $x = -1$



$-4 + 10 - 5 \geq 1$ ✓

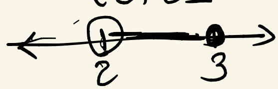
$-49 + 35 - 5 \geq 1$ x

$[-1, 6]$

$A = \{x \in \mathbb{R} \mid -1 \leq x \leq 6\}$

$(2, 3]$

$B = \{x \in \mathbb{R} \mid 2 < x \leq 3\}$



$A \cup B = \{x \in \mathbb{R} \mid -1 \leq x \leq 6\}$ $[-1, 6]$

$A \cap B = \{x \in \mathbb{R} \mid 2 < x \leq 3\}$ $(2, 3]$

$A \setminus B = \{x \in \mathbb{R} \mid -1 \leq x \leq 2 \text{ (or) } 3 < x \leq 6\}$

$[-1, 2]$

$A \setminus \mathbb{Z} = \{x \in \mathbb{R} \mid -1 < x < 0 \text{ (or) } 0 < x < 1$

(or) ..... $\}$

$R \setminus A = (-\infty, -1] \cup (6, \infty)$

$A = \{x \in R \mid \left(\frac{1}{3}\right)^{(1-12x)x} < 3\}$

$\left(\frac{1}{3}\right)^{(1+12)-1} < 3$

$\left(\frac{1}{3}\right)^{-13} < 3$

$3^{13} < 3$ X

$4x + 1$

$3x - 1$

$-4x$

$+3x$

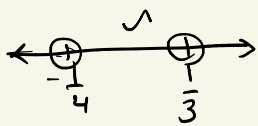
$\left(\frac{1}{3}\right)^{(1-12x)x} = 3$

$3^{(-1+12x)x} = 3$

$-x + 12x^2 = 1$

$12x^2 - x - 1 = 0$

$(4x+1)(3x-1) = 0$



$x = -\frac{1}{4}$ (or) $x = \frac{1}{3}$

$A = \{x \in R \mid -\frac{1}{4} < x < \frac{1}{3}\}$

$\left(-\frac{1}{4}, \frac{1}{3}\right)$

$R \setminus A : (-\infty, -\frac{1}{4}] \cup [\frac{1}{3}, +\infty)$

$N \setminus A : N \setminus \{0\}$

a) $\log_{10} x \geqslant 0$

$x \geqslant 10^0, \; x \geqslant 1$

b) $\ln x \leqslant -1$

$x \leqslant e^{-1}$

c) $\ln(x^2 - 5x + 7) > 0$

$x^2 - 5x + 7 > e^0$

$x^2 - 5x + 7 > 1$

$x^2 - 5x + 6 > 0$

$(x-2)(x-3) > 0$

$(x-2) < 0$ (or) $(x-3) > 0$

$x < 2$ (or) $x > 3$

1.7. $A = \{x \in (0, +\infty) \mid \log x \leqslant 2\}$

$\log x \leqslant 2$

$x \leqslant 10^2 = 100$

$A = (0, 100]$

0 = infimum

0 = not minimum, $0 \notin A$

$100 =$ supremum and maximum

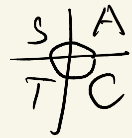
1.9 $A = \{x \in [0, +\infty) \mid \sqrt[4]{x} \geq 2\}$

$A = [16, +\infty)$

bounded from below

no supremum and maximum

$16 =$ infimum and minimum



a). $\cos x \leq \frac{1}{2}$

$60^\circ \leq x \leq 300^\circ$

$$\frac{\pi}{3} + 2k\pi \leq x \leq \frac{5\pi}{3} + 2k\pi$$

b) $\cos x + \sin x \cdot \tan x > 1$

$$\cos x + \frac{\sin^2 x}{\cos x} > 1, \quad \cos x \neq 0$$

$x \neq \frac{\pi}{2} + \pi k, k \in \mathbb{Z}$

$$\frac{\cos^2 x + \sin^2 x}{\cos x} > 1$$

$$\frac{1}{\cos x} > 1$$

$$\frac{1}{\cos x} - 1 > 0$$

$$\frac{1 - \cos x}{\cos x} > 0$$

two cases

I. $1 - \cos x > 0 \wedge \cos x > 0$

$\cos x < 1 \wedge \cos x > 0$

$x \in \left(-\frac{\pi}{2} + 2\pi k, \frac{\pi}{2} + 2\pi k\right) \setminus \{2\pi k \mid k \in \mathbb{Z}\}$

II. $1 - \cos x < 0 \wedge \cos x < 0$

not possible, $\cos x > 1$

1.14. $$\frac{x^6 + 1}{4x^4 - 4x^2 + 1} > 0$$

1.10 $$\sqrt{\frac{x^2 + x - 2}{x - 5}} \leqslant 1$$

$$\frac{x^2+x-2}{x-5} \geqslant 0$$

I $(x+2)(x-1) \geqslant 0 \ \wedge (x-5) \geqslant 0$

$(x \leqslant -2 \text{ (or) } x \geqslant 1) \wedge \ x \geqslant 5$ ✓

II $(x+2)(x-1) \leqslant 0 \ \wedge \ (x-5) \leqslant 0$

$(x \geqslant -2 \text{ (or) } x \leqslant 1) \wedge \ x \leqslant 5$

no sol$^{\underline{2}}$:

$x \in [-2, 1] \cup [5, +\infty)$

$$\frac{x^2+x-2}{x-5} \leqslant 1$$

↙

two cases

1.10. $\sqrt{\frac{x^2+x-2}{x-5}} \le 1$ $\quad x \ne 5$

$\frac{x^2+x-2}{x-5} \ge 0 \quad \wedge \quad \sqrt{\frac{x^2+x-2}{x-5}} \le 1 \iff \frac{x^2+x-2}{x-5} \le 1$

$$\underbrace{x \in [-2,1] \cup (5,+\infty) \quad \cap \quad x \in (-\infty, 5)}_{x \in [-2,1]}$$

1.14. $\frac{x^6+1}{4x^4-4x^2+1} > 0$

1.13. $\frac{x^4+1}{x^3+6x^2+12x+1} \ge 0$

I. $1-\cos x > 0 \wedge \cos x > 0$

$\cos x < 1 \wedge \cos x > 0$

$x \in \left(-\frac{\pi}{2}+2\pi k, \frac{\pi}{2}+2\pi k\right) \setminus \{2\pi k \mid k \in \mathbb{Z}\}$