$\boxed{12^{th}}$ ✓✓

Function

(5)

Sum of 2 or more non-ve

No. $= 0$ (given) then it is

Psbl only when all of them

equal to Zero.

Q $\sqrt{\underset{NN}{u}} + \underset{NM}{|w|} + \underset{NN}{v^2} = 0$

$\Rightarrow U = V = W = 0$ (Simultaneously)

ax^2+bx+c

Q If $\sqrt{\underset{\oplus}{\sqrt{x-1}}} + \underset{\oplus}{|x+1|} = 0$

then $x = ?$

दोनों साथ Zero.

$x-1=0$ & $x+1=0$

$x=1$ (And) $x=-1 \Rightarrow \boxed{x=\phi}$

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

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

$x = 1$ or -1

$1, -1$

$(x-1)=0$ OR $a+1=0$

$x=1,-1$

(6) YA Ki MAYA

$\boxed{5 \geqslant 5}$ ✓

$\boxed{3 \geqslant 1}$ ✓

3 is gr than OR equal to 1

(7) $\dfrac{a}{b} = -ve$ State about a & b?

a & b are of opp sign.

Q $2x+3y-8=0$

$3x-4y+5=0$

find x,y?

$\dfrac{x}{\begin{vmatrix} 3 & -8 \\ -4 & 5 \end{vmatrix}} = \dfrac{-y}{\begin{vmatrix} 2 & -8 \\ 3 & 5 \end{vmatrix}} = \dfrac{1}{\begin{vmatrix} 2 & 3 \\ 3 & -4 \end{vmatrix}}$

$\dfrac{x}{-17} = \dfrac{-y}{34} = \dfrac{1}{-17}$

$x = \dfrac{17}{17}$, $y = \dfrac{-34}{-17} = 2$

$= 1$

$(5)\ a^4+a^2+1=(a^2-a+1)(a^2+a+1)$

$$Q \int \frac{x^4+x^2+1}{x^2-x+1}\cdot dx$$

$$\int x^2+x+1\cdot dx$$

$$=\frac{x^3}{3}+\frac{x^2}{2}+x+c$$

(8) Formulas

① $(a^2-b^2)=(a-b)(a+b)$

② $\dfrac{x^2-1=(x-1)(x+1)}{}$

③ $x^3-1=(x-1)(x^2+x+1)$

④ $x^4-1=(x^2-1)(x^2+1)$

$\qquad =(x-1)(x+1)(x^2+1)$

$\qquad =(x-1)(x^3+x^2+x+1)$

$\cancel{x^3-1=6x+1)(x^2}$

$x^4-1=(x-1)(x^3+x^2+x+1)\ \Big\}$

$x^3-1=(x-1)(x^2+x+1)\ \Big\}$

$x^{17}-1=(x-1)(x^{16}+x^{15}+x^{14}+\cdots+x+1)$

$\therefore$

$$\int \frac{(x^{17}-1)}{(x-1)}\, dx$$

$$=\int x^{16}+x^{15}+x^{14}+\cdots+x+1\, dx$$

$$\frac{x^{17}}{17}+\frac{x^{16}}{16}+\frac{x^{15}}{15}+\cdots+\frac{x^2}{2}+x+c$$

Q $a \in [-4, 3]$ then $\boxed{a^2}$? $\quad y = x^2$

$\rightarrow y = x^2$

$\rightarrow y = (-4)^2 = 16$

$\rightarrow y = 3^2 = 9$

$x = -4$

$x = 3$

$a^2 \in [0, 16]$

graph

Q $a \in [-4, 3]$ then $\boxed{a^3}$? $\quad y = x^3$

$y = x^3$

$\rightarrow y = 3^3 = 27$

$x = -4$

$x = 3$

$\rightarrow y = (-4)^3 = -64$

$a^3 \in [-64, 27]$

Q $a \in [-4, 3]$

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

$x = -4$

$y = -\frac{1}{4}$

$x = 3$

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

$y \in \left(-\infty, -\frac{1}{4}\right] \cup \left[\frac{1}{3}, \infty\right)$

Q $a \in [3, 4]$ then $\left(\frac{1}{a}\right) \in ?$

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

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

$\to y = \frac{1}{4}$

$x = 3 \quad 4$

$\frac{1}{a} \in \left[\frac{1}{4}, \frac{1}{3}\right]$

Q $a \in [-3, 4]$ then $\boxed{\frac{1}{a^2}} \in$?

$\longrightarrow y =$

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

$\longrightarrow y = \frac{1}{(-3)^2} = \frac{1}{9}$

$\longrightarrow y = \frac{1}{4^2} = \frac{1}{16}$

$x = -3$

$x = 4$
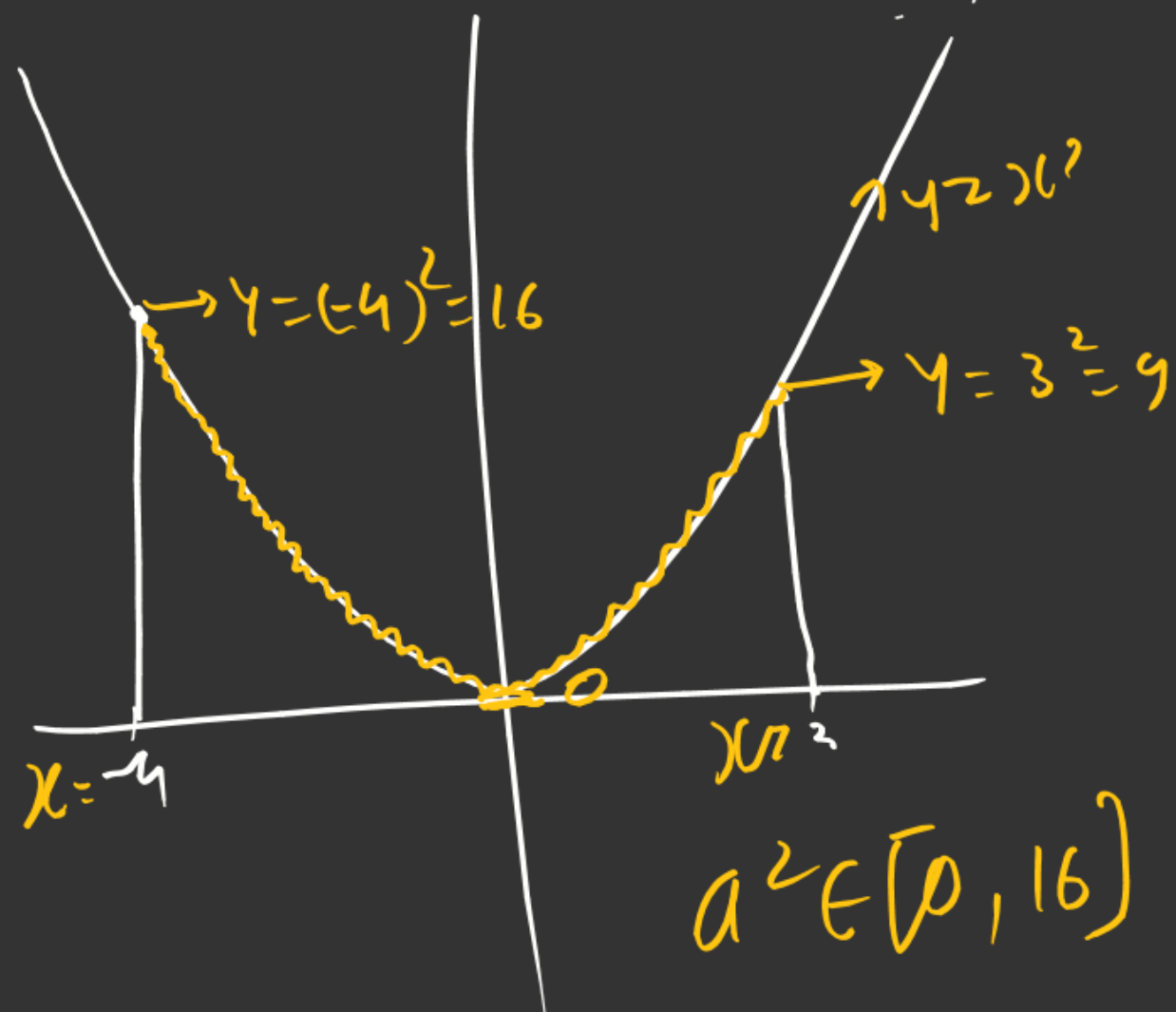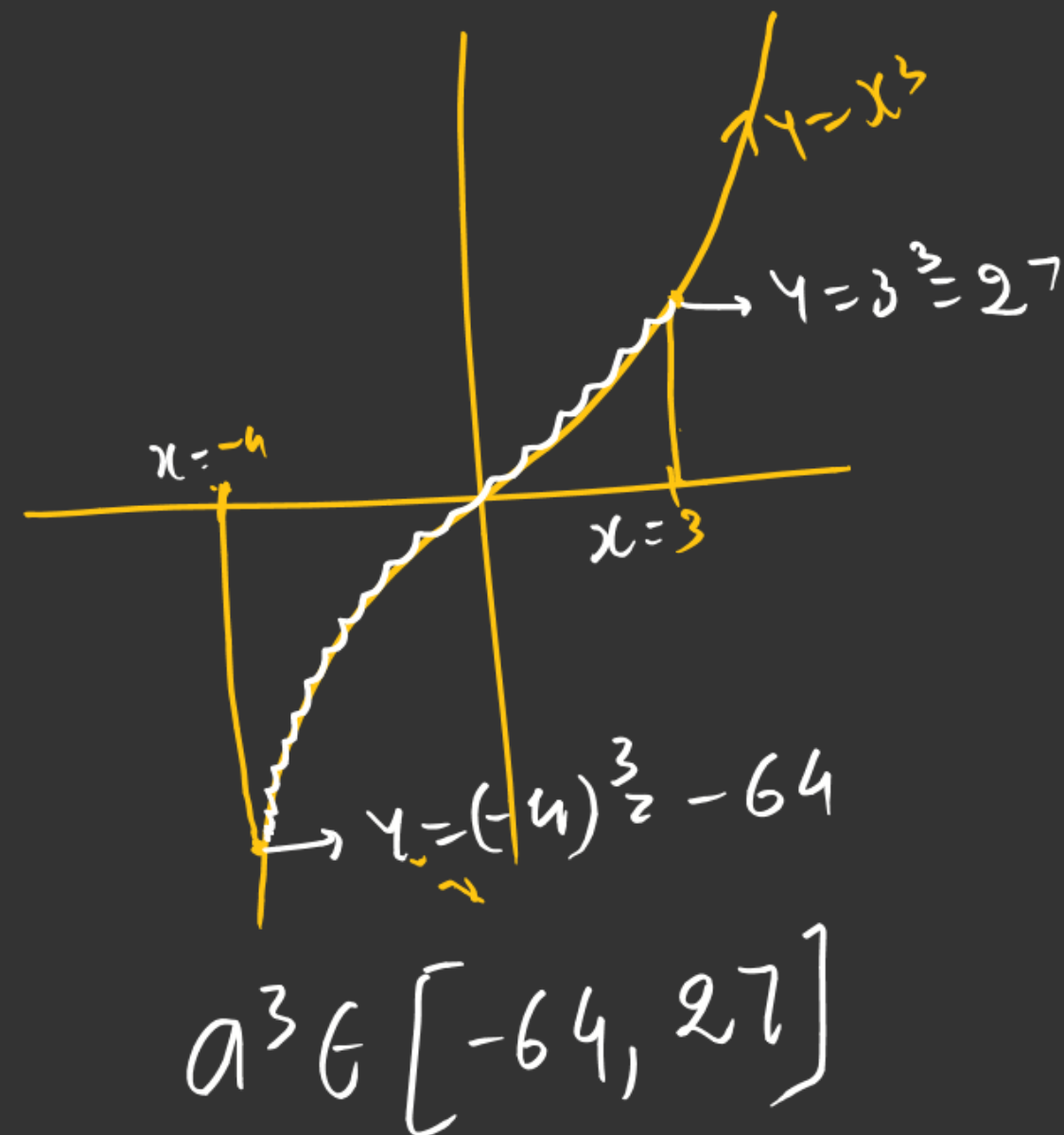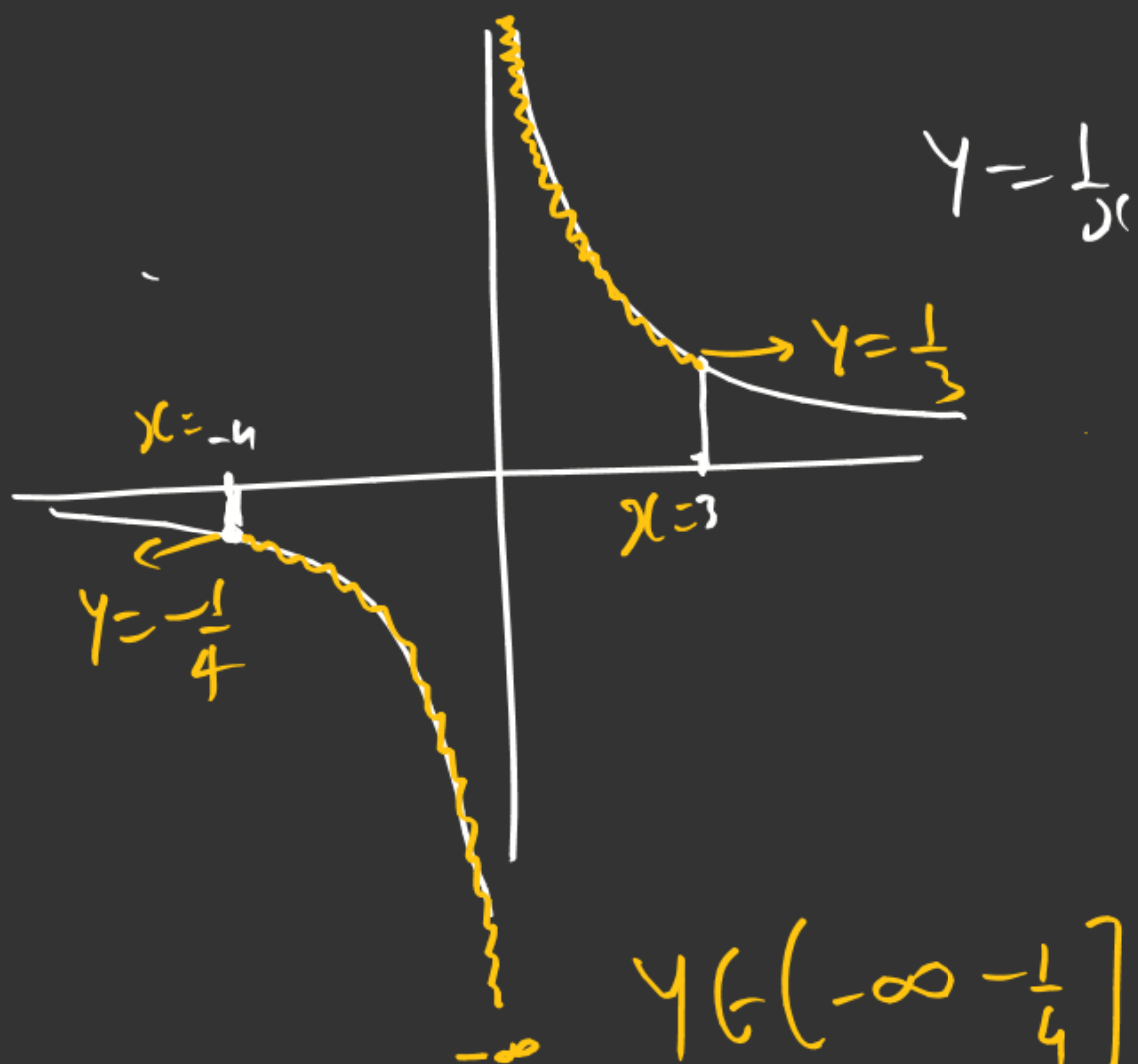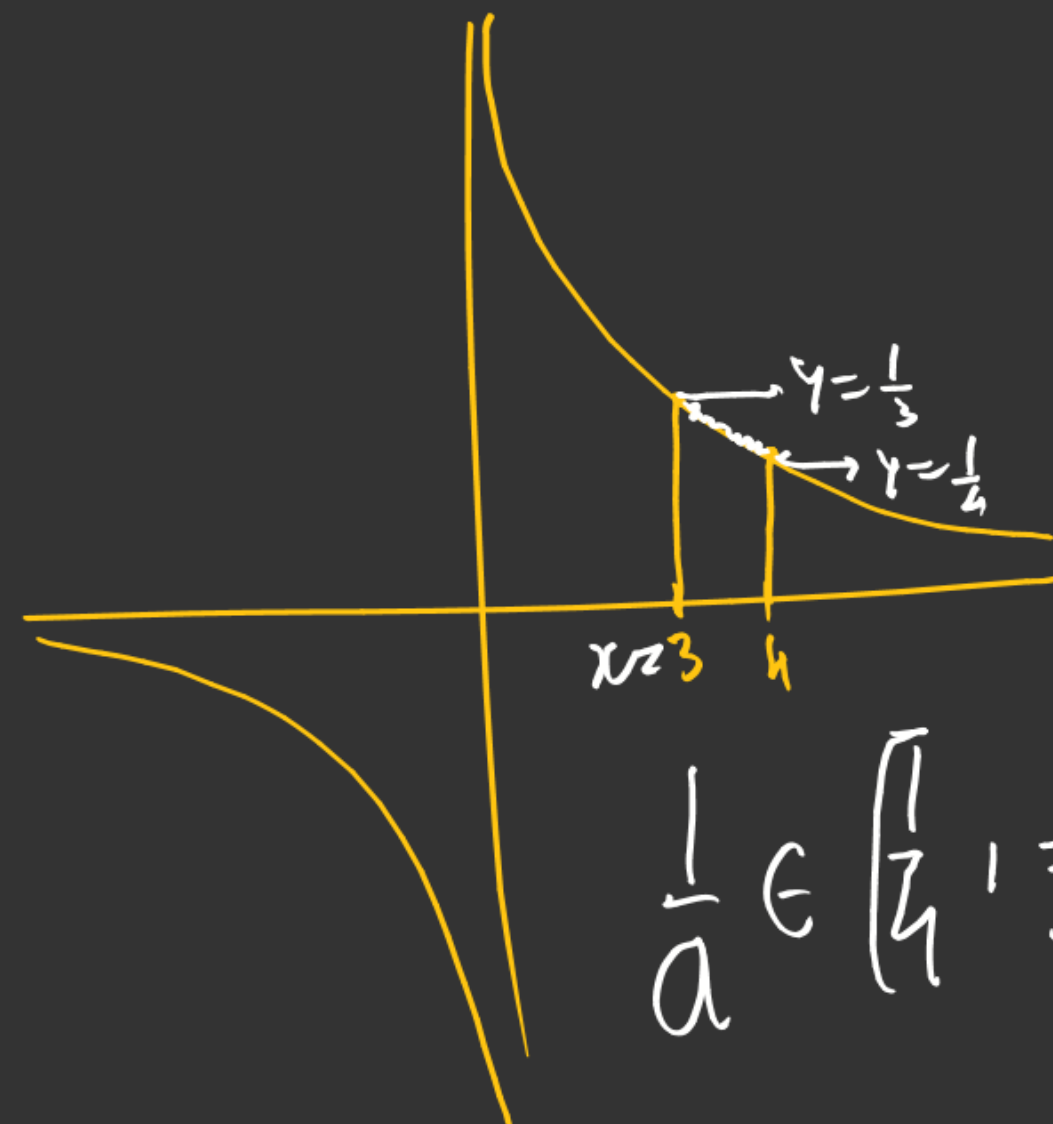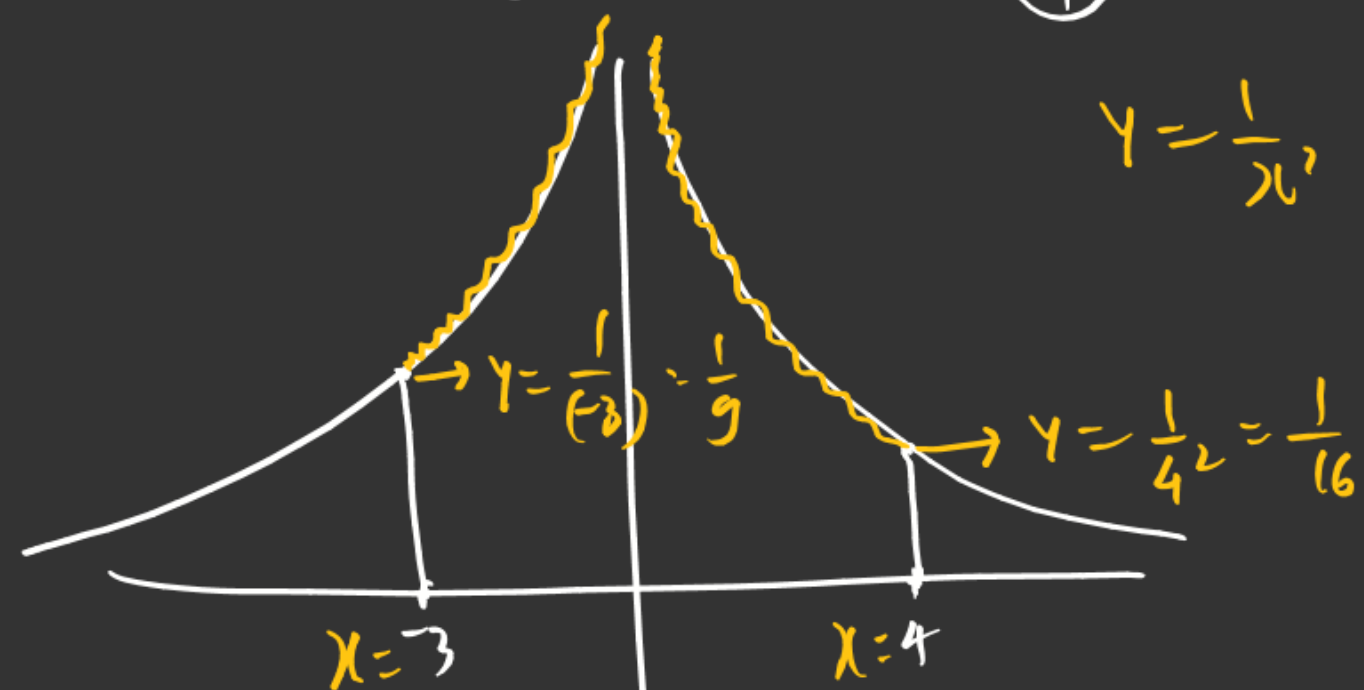
$\frac{1}{a^2} \in \left[\frac{1}{16}, \infty \right)$

① $a \in [-3, 4]$ then $a^2 \in$

② $a \in [-3, 4]$ then $a^3 \in$

③ $a \in [-3, 4]$ then $\frac{1}{a} \in$

④ $a \in [-3, 4]$ then $\frac{1}{a^2} \in$

(9) A) $ax^2 + bx + c > 0$ if - - - - - ?

$a > 0$ & $\boxed{D < 0}$

(B) $ax^2 + bx + c < 0$ if - - - - - ?

$a < $ & $\boxed{D < 0}$

Q $\quad 3x^2 + 4x + 5 = 0$ then $x = ?$

$\boxed{\begin{array}{c} a = 3 \\ >0 \end{array}}, \ b = 4, \ c = 5$

$D = b^2 - 4ac$

$= 4^2 - 4 \times 3 \times 5$

$= 16 - 60$

$= -44 < 0$

$a > 0 \ \& \ D < 0$

$\Rightarrow 3x^2 + 4x + 5 > 0$

$\therefore \ 3x^2 + 4x + 5 = 0$

$\boxed{\text{Not PSBL for any } x}$

$\Rightarrow$ No real Root

10) $\underline{\text{Graph of Q Eqn.}}$

Q $Y = \boxed{x^2 + x + 1}$'s Graph
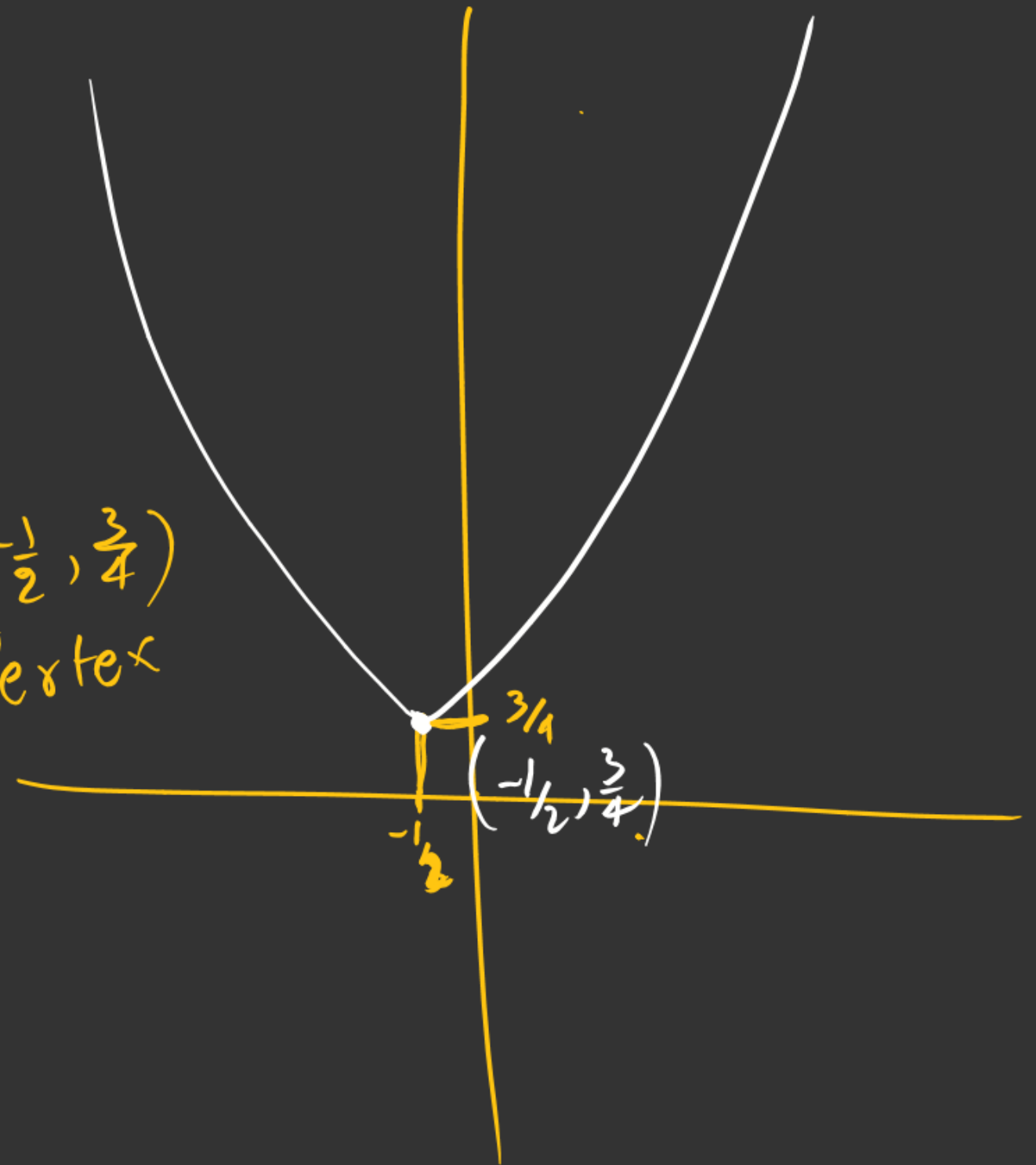
1) $\frac{dy}{dx} = 2x + 1 = 0$

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

$Y = \left(-\frac{1}{2}\right)^2 + \left(-\frac{1}{2}\right) + 1 = \frac{3}{4}$

$\left(-\frac{1}{2}, \frac{3}{4}\right)$

Vertex

② $\boxed{a = 1 \atop +ve}, b = 1, c = 1$

Upward Parabola

$\left(-\frac{1}{2}, \frac{3}{4}\right)$

$\frac{3}{4}$

$-\frac{1}{2}$

Q $y = \boxed{3x^2} + 4x + 5$

① $\boxed{a = 3}$, $b = 4$, $c = 5$
  $\boxed{+}$

  Upward Parabola

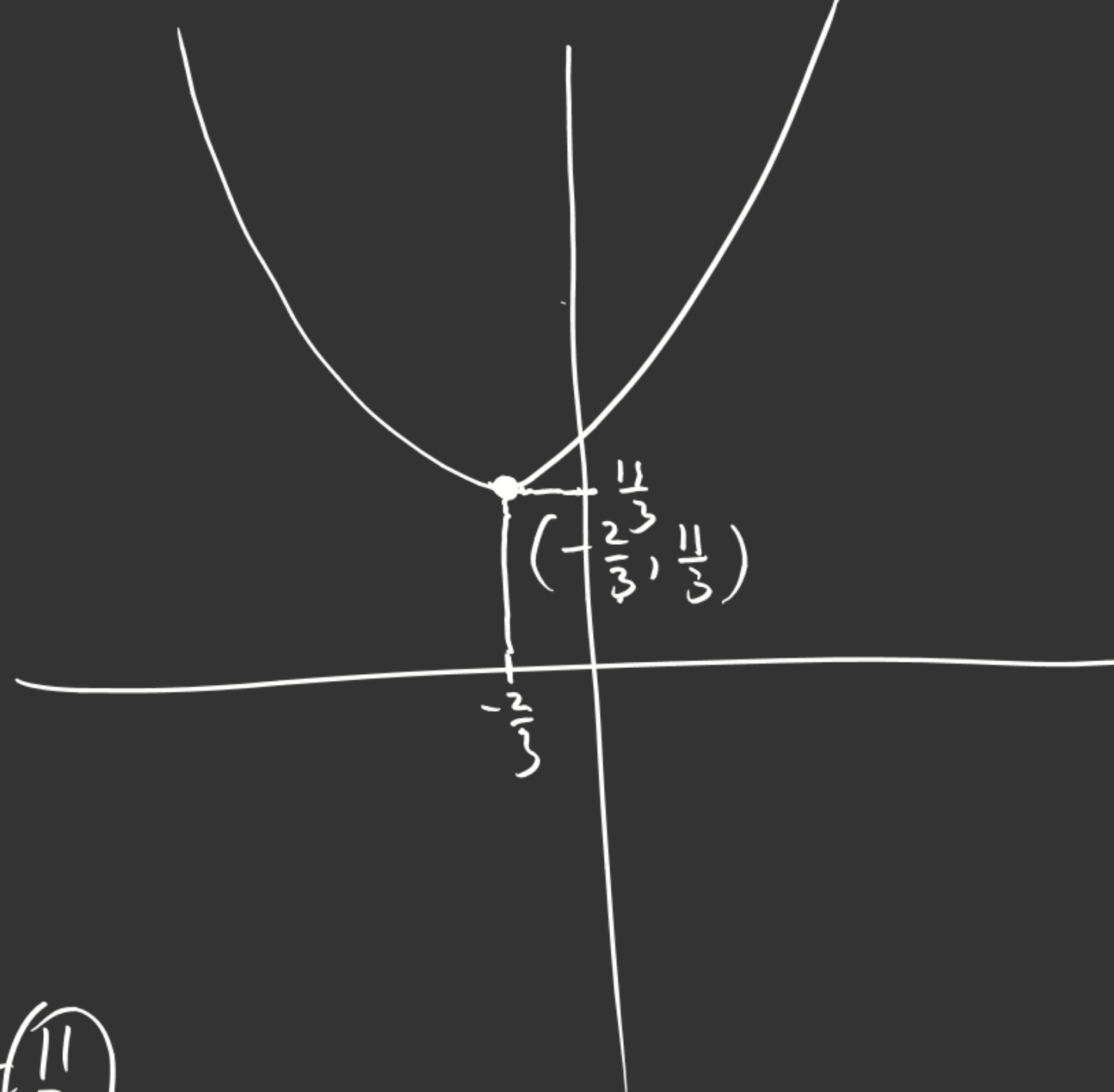② $\dfrac{dy}{dx} = 3 \times 2x + 4 \times 1 + 0$

  $= 6x + 4 = 0$

  $x = -\dfrac{4}{6} = \boxed{-\dfrac{2}{3}}$

  $y = 3\left(-\dfrac{2}{3}\right)^2 + 4 \times -\dfrac{2}{3} + 5$

  $= \dfrac{4}{3} - \dfrac{8}{3} + 5 = \dfrac{4 - 8 + 15}{3} = \boxed{\dfrac{11}{3}}$

  $\left(-\dfrac{2}{3}, \dfrac{11}{3}\right)$

$\dfrac{11}{3}$

$\left(-\dfrac{2}{3}, \dfrac{11}{3}\right)$

$-\dfrac{2}{3}$

Q $Y = -x^2 + x + 1$ का Graph ?

① $\boxed{a = -1}$ $b = 1, c = 1$

     $-ve$

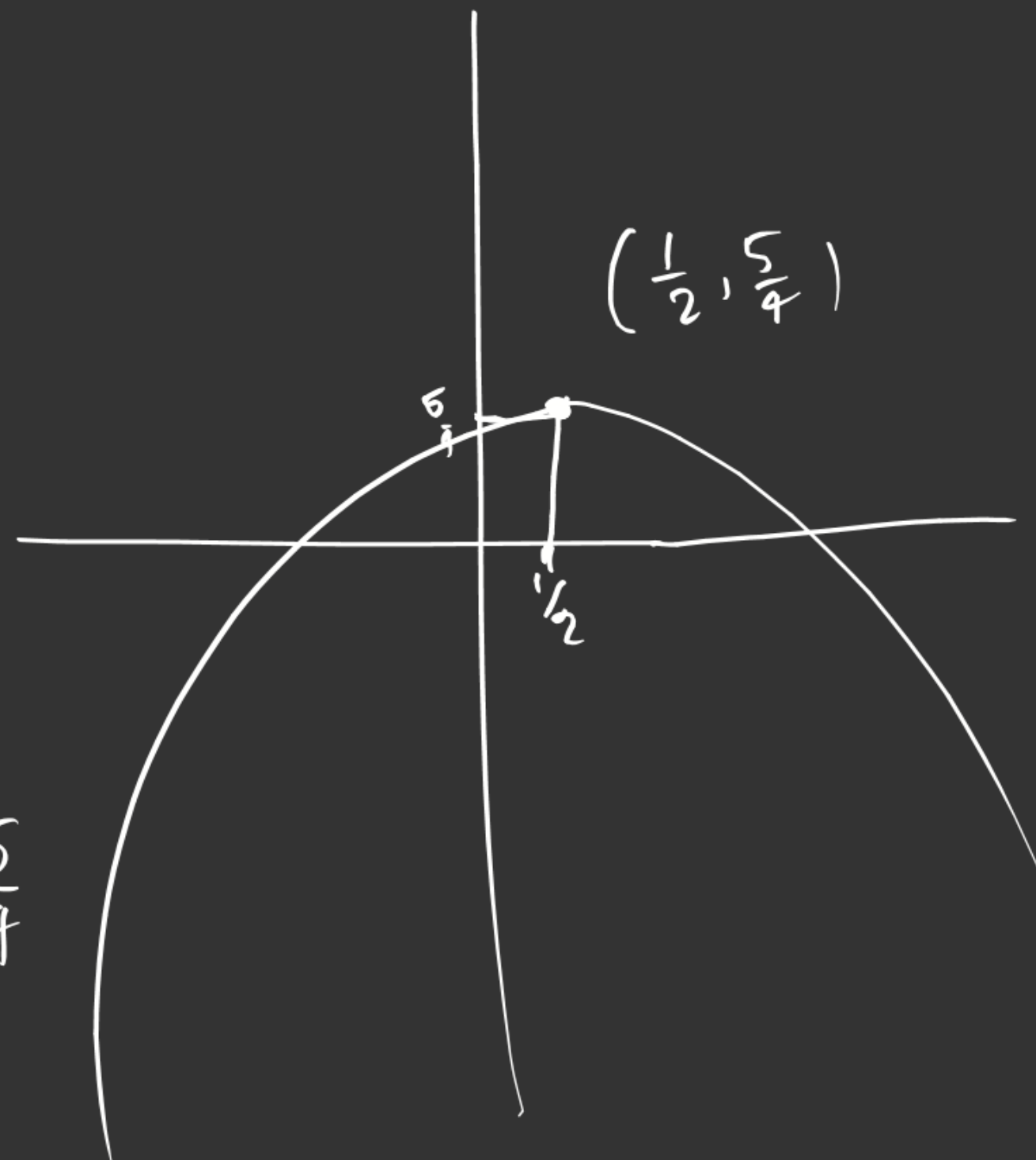   <u>downward Parabola.</u>

② $\dfrac{dy}{dx} = -2x + 1 = 0$

    $x = +\dfrac{1}{2}$

$Y = -\left(\dfrac{1}{2}\right)^2 + \left(\dfrac{1}{2}\right) + 1$

$= -\dfrac{1}{4} + \dfrac{1}{2} + 1 = \dfrac{-1+2+4}{4} = \dfrac{5}{4}$

$\left(\dfrac{1}{2}, \dfrac{5}{4}\right)$ Vertex

$\left(\dfrac{1}{2}, \dfrac{5}{4}\right)$

Number System

3.333333----
←———————→
Repeat
Q

0 is niether +ve nor -ve Integer.

(D) Rational No → Rep. by Q

A) Natural No

$N = \{1, 2, 3, 4, 5 - - \infty\}$

3.1245----
Q

$\boxed{\pi, e}$

$\pi \simeq 3.14$

$\dfrac{\pi}{2} \simeq 1.57$

$\pi^2 \simeq 9.86$

If after decimal Digits are Repeatative or : Terminating then No is Rational No, othermise Irr. No. (Q')

(B) Whole No :-

$W = \{0, 1, 2, 3 - - - \infty\}$

(C) Integer → Rep I / Z

$I = \{-\infty - \sim -3, -2, -1, 0, 1, 2, 3 . - - \infty\}$
    ——————   ———————
    -ve Int   +ve Int

$e \simeq 2.718$

3.0 = Q

3.2 Q

3.2135 Q

3.2135--~ Not her Q'