

Trigo के 60% Qs नहीं आएंगे

 $\sin \alpha + \cos \alpha = ?$

40% self + 20% आप Rest प्रैट हो

620 - 260 = 1

620 क्वेड

$$\begin{aligned}
 & 1) \underbrace{\sin^2 \alpha + \cos^2 (\alpha + \beta)}_{\sin^2 \alpha + \cos(\alpha + \beta)} - 2 \sin \alpha \cdot \cos \beta \cdot \cos(\alpha + \beta) = \\
 & \quad \left(\begin{array}{l} (2) 2 \sin^2 \beta + \boxed{4 \cos(\alpha + \beta) \sin \alpha \sin \beta} + \boxed{2 \cos^2(\alpha + \beta)} \\ 2 \sin^2 \beta + 4 \cos(\alpha + \beta) \sin \alpha \sin \beta + 2 \cos^2(\alpha + \beta) - 1 \end{array} \right) \\
 & \quad \left(\begin{array}{l} 2 \sin^2 \beta + 2 \cos(\alpha + \beta) \left(2 \sin \alpha \sin \beta + \cos(\alpha + \beta) \right) \\ - 1 \end{array} \right) \\
 & \quad \left(\begin{array}{l} 2 \sin^2 \beta + 2 \cos(\alpha + \beta) \left(2 \sin \alpha \sin \beta + \cos(\alpha + \beta) - \cos(\alpha + \beta) \right) \\ - 1 \end{array} \right) \\
 & \quad \left(\begin{array}{l} 2 \sin^2 \beta + 2 \cos(\alpha + \beta) \left(\sin \alpha \sin \beta + \cos \alpha \cos \beta \right) \\ - 1 \end{array} \right) \\
 & \quad \left(\begin{array}{l} 2 \sin^2 \beta + 2 \cos(\alpha + \beta) \left(\cos \alpha \cos \beta + \sin \alpha \sin \beta \right) \\ - 1 \end{array} \right) \\
 & \quad 2 \sin^2 \beta + 2 \cos(\alpha + \beta) \left(\cos \alpha \cos \beta + \sin \alpha \sin \beta \right) - 1 \\
 & \quad 2 \sin^2 \beta + 2 \left(\cos^2 \alpha - \sin^2 \beta \right) - 1 \\
 & \quad 2 \cos^2 \alpha - 1 = \text{LHS}
 \end{aligned}$$

$$\text{Q } \tan \alpha + 2 \tan 2\alpha + 4 \tan 4\alpha + 8 \cot 8\alpha =$$

In this Q we will learn a New concept.

$$\boxed{\tan \theta = \cot \theta - 2 \cot 2\theta}$$

RHS $\cot \theta - 2 \cot 2\theta$

$$= \frac{1}{\tan \theta} - \frac{2}{\tan 2\theta}$$

$$= \frac{1}{\tan \theta} - \frac{2 \times (1 - \tan^2 \theta)}{2 \tan \theta}$$

$$= \frac{1}{\tan \theta} - \frac{1 - \tan^2 \theta}{\tan \theta}$$

$$= \frac{1 - (1 - \tan^2 \theta)}{\tan \theta} = \frac{\tan^2 \theta}{\tan \theta} = \underline{\tan \theta}$$

$$\tan 2\theta = \cot 2\theta - 2 \cot 4\theta$$

$$\tan 4\theta = \cot 4\theta - 2 \cot 8\theta$$

$$\begin{aligned} & \tan \alpha + 2(\tan 2\alpha) + 4(\tan 4\alpha) + 8(\cot 8\alpha) \\ & (\cot \alpha - 2 \cot 2\alpha + 2((\cot 2\alpha - 2 \cot 4\alpha) + 4((\cot 4\alpha - 2 \cot 8\alpha) \\ & + 8 \cot 8\alpha) \\ & = \cot \alpha \end{aligned}$$

$$\boxed{\tan \theta = \cot \theta - 2 \cot 2\theta}$$

Q4 (A) copy

(B) $\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ$

$\tan 9^\circ + (\cot 9^\circ) - (\tan 27^\circ + (\cot 27^\circ))$

Copy me h!!

(C) Copy me hai

Q5 Copy me hai

Q6 $m \tan(\theta - 30^\circ) = n \tan(\theta + 120^\circ)$

$$\frac{m}{n} = \frac{\tan(\theta + 120^\circ)}{\tan(\theta - 30^\circ)} = \frac{\sin(\theta + 120^\circ)}{\sin(\theta - 30^\circ)} \cdot \frac{\cos(\theta - 30^\circ)}{\cos(\theta + 120^\circ)} \quad \text{by } 2\theta - \frac{m+n}{2(m-n)}$$

$$\frac{m+n}{m-n} = \frac{\sin A \cdot (\cos B + \cos A \cdot \sin B)}{\sin A \cdot \cos B - \cos A \cdot \sin B} = \frac{\sin(A+B)}{\sin(A-B)} = \frac{\sin(\theta + 120^\circ + \theta - 30^\circ)}{\sin(\theta + 120^\circ - \theta + 30^\circ)} = \frac{\sin(50 + 2\theta)}{\sin(150)} = 2 \cos 2\theta$$

Q7 $\sin(\alpha + \beta) = \frac{4}{5}$ & $\cos(\alpha - \beta) = \frac{5}{13}$

$\sin(\alpha + \beta) = \frac{3}{5} \quad \sin(\alpha - \beta) = \frac{12}{13}$

$\tan(\alpha + \beta) = \frac{3}{4} \quad \tan(\alpha - \beta) = \frac{5}{12} \quad \text{Copy}$

$\tan(2\alpha) = \tan((\alpha + \beta) + (\alpha - \beta)) = \frac{\tan(\alpha) + \tan(\beta)}{1 - \tan(\alpha)\tan(\beta)}$

$$\text{Q8 } \sin 25^\circ \cdot \sin(60-25^\circ) \cdot \sin(60+25^\circ)$$

$$= \frac{\sin 3 \times 25^\circ}{4} = \frac{\sin 75^\circ}{4} = \frac{\sin(15^\circ)}{4}$$

$$= \frac{\sqrt{3+1}}{8\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{(\sqrt{3+1})\sqrt{2}}{16}$$

$$= \frac{\sqrt{6+\sqrt{2}}}{16} = \frac{\sqrt{a+b}}{c}$$

$$a=6, b=2, c=16$$

$$a^2 + b^2 + c^2 = (a+b+c)^2 - 2(ab+bc+ca) \quad a+b+c=24$$

$$\frac{(tmA+tmB+tmC)^2}{(tmA \cdot tmB \cdot tmC)} - 2 \left(\frac{tmA \cdot tmB + tmB \cdot tmC + tmC \cdot tmA}{tmA \cdot tmB \cdot tmC} \right)$$

$$(tmA+tmB+tmC) - 2((otC + otA + otB))$$

$$\text{Q9 } LHS = \frac{6,27^\circ}{6,9^\circ} \times \frac{6,81^\circ}{6,27} = \frac{\sin 90^\circ}{6,9^\circ} = \tan 90^\circ$$

$$\text{Q10 } A+B+C=\pi \quad \tan A + \tan B + \tan C = \tan A \cdot \tan B \cdot \tan C$$

$$LHS = \sum \frac{\tan A}{\tan B \tan C}$$

$$= \frac{\tan A}{\tan B \tan C} + \frac{\tan B}{\tan A \tan C} + \frac{\tan C}{\tan A \tan B}$$

$$= \frac{\tan^2 A + \tan^2 B + \tan^2 C}{\tan A \cdot \tan B \cdot \tan C}$$

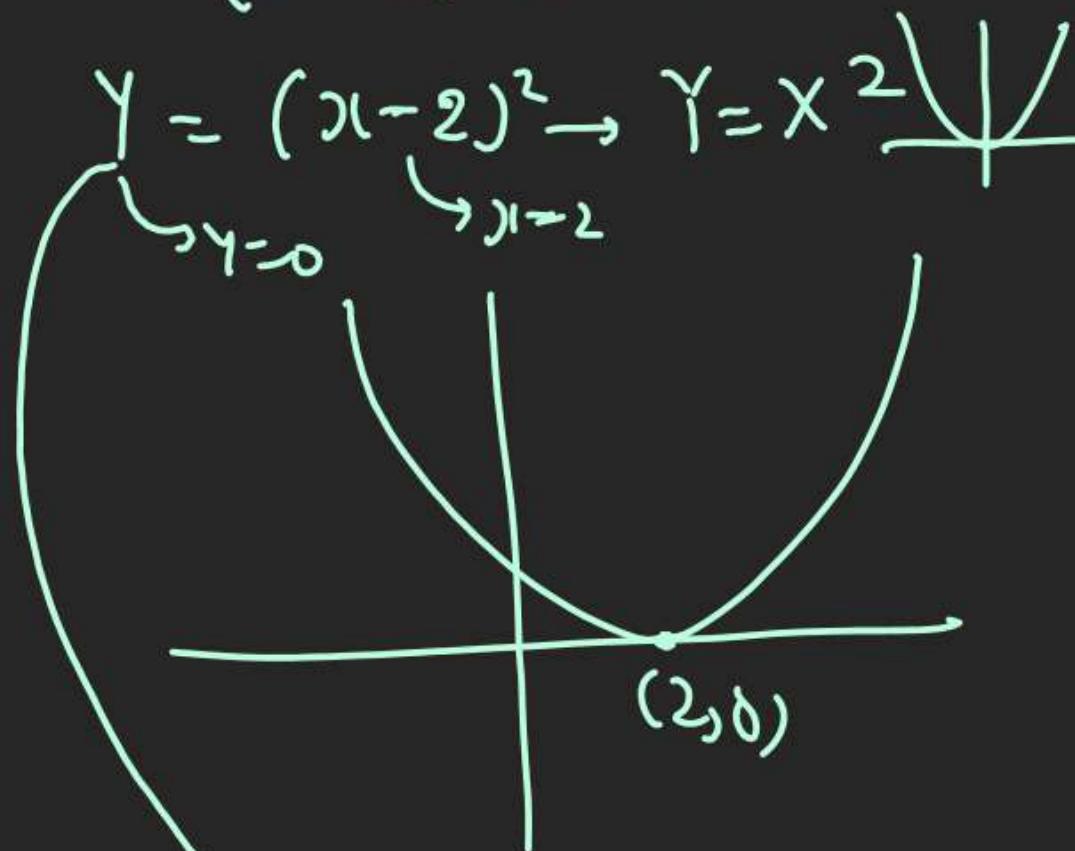
$$= \frac{(tan A + tan B + tan C)^2 - 2(tan A \tan B + tan B \tan C + tan C \tan A)}{(tan A + tan B + tan C)}$$

$$\sum \tan A - 2 \sum (\cot A) \quad R.H.S$$

Quadratic Eqn

$$y = x^2 - 4x + 4 \text{ is graph}$$

$$= (x-2)^2 - 2^2 + 4.$$



$$y = (x-2)(x-2)$$

$$D = (-4)^2 - 4 \times 1 \times 4 \\ = 16 - 16 = 0$$

1) $D=0$
graph \times Axis
ki chikhi k
Bnta hai

2) It touches
X Axis bina leat

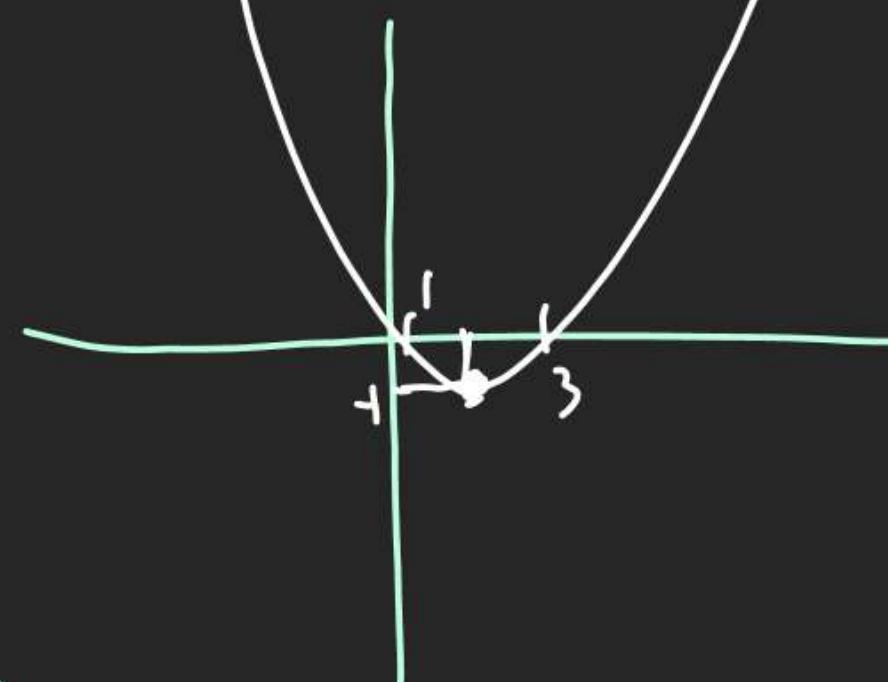
$$x=2$$

(3) $x=2, x=2$ are Roots

$$Q \quad y = x^2 - 4x + 3 = (x-1)(x-3) \\ = (x-2)^2 - 2^2 + 3$$

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

$$y+1 = (x-2)^2 \Rightarrow y = x^2 \\ y=1 \quad x=2$$



$$Y = x - x^2 \text{ graph.}$$

$$= -(x^2 - \boxed{x}) \rightarrow \frac{1}{2}$$

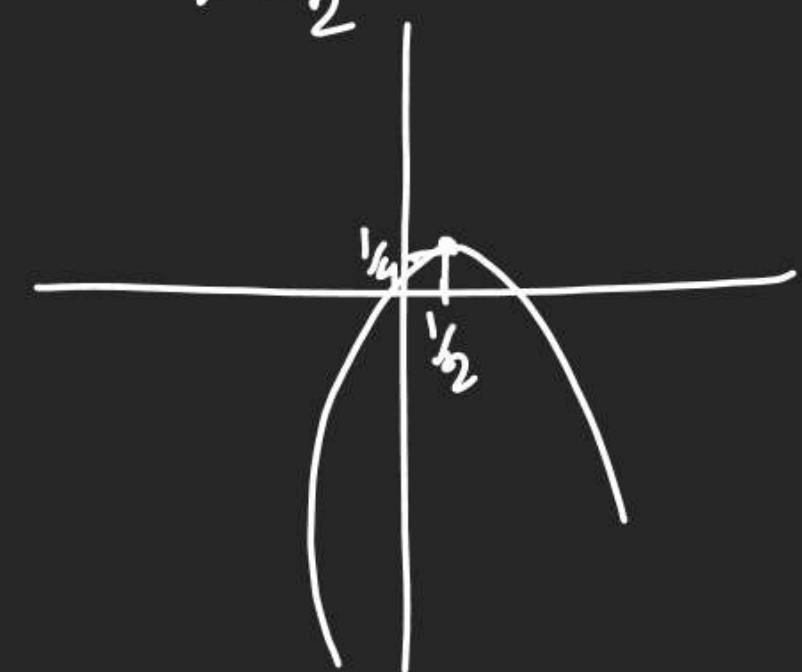
$$= -\left\{ (x - \frac{1}{2})^2 - \left(\frac{1}{2}\right)^2 \right\}$$

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

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

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

$\downarrow Y = \frac{1}{4}$



$$Y = x^2 - 4x + 4$$



$$Y = x^2 - 4x + 3$$

L.C. = 1 +ve



$$Y = x - x^2$$

Leading off =

x^2 का प्रथमाला off



When L.C. = -ve
then graph is
downward
Parabola.

Conclusion.

1) $\boxed{a}x^2 + bx + c = 0$ is Quad Eqn.

But $y = \boxed{a}x^2 + bx + c$ is Quad. fxn.
L.C.

2) $\boxed{a}x^3 + bx^2 + cx + d = 0$ is Cubic Eqn.

But $y = \boxed{a}x^3 + bx^2 + cx + d$ is Cubic fxn.

3) Leading coeff = coeff of highest deg
L.C.

4) $y = ax^2 + bx + c$ graph is Parabola

If $a = +ve$ then Upward Parabola

If $a = -ve$ —————— Downward

(5) Graph cutting X Axis

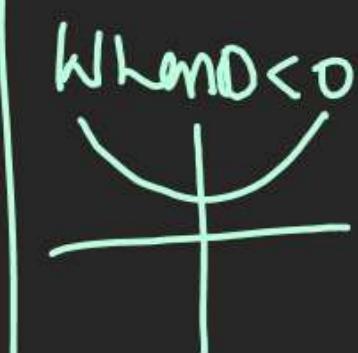
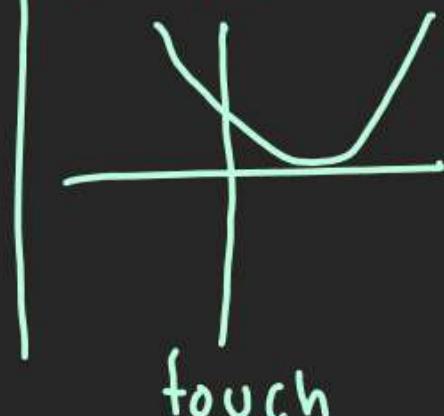
for Quad Eqn.

$a = +ve$

When $D > 0$



When $D = 0$



No cut No touch

(6) Quad Eqn, Cubic Eqn, Biquad Eqn

they all part of Polynomial Eqn



एक शब्द के तरीके
Polynomial fn.

$$Y = \boxed{x}, Y = \boxed{3x^2}, Y = \boxed{\frac{2x^3}{9}}$$

1 शब्द का शब्द = monomial.

$$Y = x - 5, Y = 3x^2 + 1, Y = \frac{x^2}{9} + 1$$

2-2 शब्द = Binomial.

$$Y = \underline{a}x^2 + \underline{b}x + \underline{c}, Y = \underline{x}^3 - \underline{3}x + \underline{y}$$

3 शब्द = trinomial.

1) $y = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_2 x^2 + a_1 x + a_0$ is polynomial
fn of n deg.

$\checkmark y = \sqrt{5} x^3 + 2x - 7$ ✓ Polynomial.

$$Y = \frac{2}{7} x^2 - 6\sqrt{3} x^1 + 7 \quad \checkmark \text{ Poly.}$$

$$Y = 3x^2 - 6x^{-1} + 5 \quad \text{⊗}$$

$$Y = 3x^3 + \frac{2}{x^4} + 4x \quad \text{⊗ Poly.}$$

12 lectures.

2) $f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_2 x^2 + a_1 x + a_0$ Poly fxn. (क्षेत्र)

A) $n = \text{finite deg}$ B) $n \in \mathbb{N}$ (i) $a_n = 1$.

$$f(x) = a \rightarrow \text{constant fxn}$$

$$f(x) = ax + b \rightarrow \text{linear fxn.}$$

$$f(x) = ax^2 + bx + c \rightarrow \text{Quadratic fxn}$$

$$f(x) = a x^3 + b x^2 + c x + d \rightarrow \text{(which)}$$

$$f(x) = a x^4 + b x^3 + c x^2 + d x + e \rightarrow \text{Biquad.}$$

Poly fxn

Theory of eqn

(3) Zeroes of Polynomial \rightarrow Jese Eqn me Roots Vese Poly fxn me Zeroes

Zeroes are values of x in hve answer of fxn becomes zero

$$f(x) = x^2 - 3x + 2 \rightarrow \left\{ \begin{array}{l} f(1) = 1^2 - 3 \times 1 + 2 = 0 \\ f(2) = 2^2 - 3 \times 2 + 2 = 0 \end{array} \right\} \therefore x=1, 2 \text{ are zeroes of } f(x) = x^2 - 3x + 2$$

(4) Fundamental Theorem of Algebra.

N deg Poly $f(x)$ has max^m N zeroes

Bhavarth: → Q quad $f(x)$ can have max^m 2 zeroes

(ubic $f(x)$ — max^m 3 zeroes)

(5)* If α, β are zeroes of Q quad $f(x)$

then Q $f(x)$ will be $\rightarrow a(x-\alpha)(x-\beta)$

(6)* If α, β, γ are zeroes of cubic $f(x)$

then (ubic $f(x)$) $\Rightarrow a(x-\alpha)(x-\beta)(x-\gamma)$

Ex: If 2, 3 are zeroes of Q $f(x)$

then Q $f(x) = [a](x-2)(x-3)$

Ex:- If $f(x) = \underline{(x-2)^2} (x-3)$ then zeros?

$$f(x) = (x-2)(x-2)(x-3) \text{ is cubic}$$

3 Zeros $\rightarrow x = 2, 2, 3$

Lekin Distinct Zeros $\rightarrow x = 2, 3$

Where 2 is Repeated Zero

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

3 Zeros $\rightarrow 2, 3, 3$

Distinct Zero $\rightarrow \boxed{2, 3}$

In [hne] 3 is Repeated Zero

If $f(x) = (x-2)^2$ is f(x) then Zeros:

$$= (x-2)(x-2)$$

2 Zeros = 2, 2

Where 2 is Repeated Zero.