Nishant Jindal

(5) Prod → Sum/Diff

(6) $3\sin\alpha = 5\sin\beta$.

$\frac{\sin\alpha}{\sin\beta} = \frac{5}{3}$ C & D.

$\frac{\sin\alpha+\sin\beta}{\sin\alpha-\sin\beta} = \frac{5+3}{5-3} = \frac{8}{2} = 4$

$\frac{\cancel{2}\boxed{\sin\left(\frac{\alpha+\beta}{2}\right)}\cos\left(\frac{\alpha-\beta}{2}\right)}{\cancel{2}\boxed{\cos\left(\frac{\alpha+\beta}{2}\right)}\sin\left(\frac{\alpha-\beta}{2}\right)} = 4$

$\frac{\tan\left(\frac{\alpha+\beta}{2}\right)}{\tan\left(\frac{\alpha-\beta}{2}\right)} = 4$

(7) $\frac{2\sin A\cos C + 2\sin A}{2\sin B\cos C + 2\sin\beta}$

$\frac{\cancel{2}\sin A\,\cancel{(\cos C+1)}}{\cancel{2}\sin B\,\cancel{(\cos C+1)}} =$

DPP

Compound Angle

Q.1 If $\sin x + \sin^2 x = 1$, then the value of $\cos^2 x + \cos^4 x$ is -

(A) 0 (B) 2 (C) 1 (D) 3

Q.2 $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1$ is equal to -

(A) 2 (B) 0 (C) 4 (D) 6

Q.3 $\tan A = -\frac{1}{2}$ and $\tan B = -\frac{1}{3}$, then $A + B =$

(A) $\frac{\pi}{4}$ (B) $\frac{3\pi}{4}$ (C) $\frac{5\pi}{4}$ (D) $\frac{7\pi}{4}$

Q.4 $\cos^2 48° - \sin^2 12°$ is equal to -

(A) $\frac{\sqrt{5}-1}{4}$ (B) $\frac{\sqrt{5}+1}{8}$ (C) $\frac{\sqrt{3}-1}{4}$ (D) $\frac{\sqrt{3}+1}{2\sqrt{2}}$

Q.5 The expression $\frac{\sin 8\theta\cos\theta - \sin 6\theta\cos 3\theta}{\cos 2\theta\cos\theta - \sin 3\theta\sin 4\theta}$ is equals.

(A) $\tan\theta$ (B) $\tan 2\theta$ (C) $\sin 2\theta$ (D) $\cos 2\theta$

Q.6 If $3\sin\alpha = 5\sin\beta$, then $\frac{\tan\frac{\alpha+\beta}{2}}{\tan\frac{\alpha-\beta}{2}} =$

(A) 1 (B) 2 (C) 3 (D) 4

Q.7 $\frac{\sin(A-C) + 2\sin A + \sin(A+C)}{\sin(B-C) + 2\sin B + \sin(B+C)}$ is equal to -

(A) $\tan A$ (B) $\frac{\sin A}{\sin B}$ (C) $\frac{\cos A}{\cos B}$ (D) $\frac{\sin C}{\cos B}$

Q.8 $\frac{1+\sin 2\theta+\cos 2\theta}{1+\sin 2\theta-\cos 2\theta} =$

(A) $\frac{1}{2}\tan\theta$ (B) $\frac{1}{2}\cot\theta$ (C) $\tan\theta$ (D) $\cot\theta$

Q.9 If $A = \tan 6°\tan 42°$ and $B = \cot 66°\cot 78°$, then -

(A) $A = 2B$ (B) $A = 1/3B$ (C) $A = B$ (D) $3A = 2B$

Q.10 If $x = y\cos\frac{2\pi}{3} = z\cos\frac{4\pi}{3}$ then $xy + yz + zx =$

(A) -1 (B) 0 (C) 1 (D) 2

Q.11 If $\tan\alpha = (1 + 2^{-1}), \beta - (1, 2^{5+1})^{-1}$, then $\alpha + \beta =$

(A) $\pi/6$ (B) $\pi/4$ (C) $\pi/3$ (D) $\pi/2$

Q.12 If $\tan A - \tan B + \tan C - \tan A, \tan B, \tan C$, then-

(A) A,B,C must be angles of a triangle

(B) the sum of any two of A,B.C is equal to the third

(C) $A + B + C$ must be n intcyral multiple of π

(D) None of these

(1) Done in Copy ↓ Direct form.

(2) $2\{\cancel{1} - 3\sin^2\theta\cdot\cos^2\theta\}$

$-3\{\cancel{1} - 2\sin^2\theta\cos^2\theta\} + \cancel{1}$

$= 0$

(3) $\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A\tan B}$

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

$\tan(A+B) = \frac{-5/6}{5/6} = -1 \mid \frac{3\pi}{4}$

(4) $\cos^2 B - \sin^2 A = \cos(A+B)\cdot\cos(A-B)$

$\cos(60°)\cdot\cos(36°) = \frac{1}{2}\times\frac{\sqrt{5}+1}{4}$

Nishant Jindal

Q10 $\cos(180^\circ+60^\circ) = -\cos 60^\circ$

$x = y\boxed{\cos\frac{2\pi}{3}} = z\cos\frac{4\pi}{3}$

$x = y\cdot\cos 120^\circ = z\cos 240^\circ$

$\boxed{x = -\frac{y}{2}} = -\frac{z}{2}$

$y = -2x\ ,\ z = -2x$

$xy + yz + zx$

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

$-4x^2 + 4x^2 = 0$

Q11 $\tan\alpha = (1+2^{-x})^{-1}$

$\tan\beta = (1+2^{x+1})^{-1}$

DPP

Compound Angle

Q.1 If $\sin x + \sin^2 x = 1$, then the value of $\cos^2 x + \cos^4 x$ is -

(A) 0 (B) 2 (C) 1 (D) 3

Q.2 $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1$ is equal to -

(A) 2 (B) 0 (C) 4 (D) 6

Q.3 $\tan A = -\frac{1}{2}$ and $\tan B = -\frac{1}{3}$, then $A + B =$

(A) $\frac{\pi}{4}$ (B) $\frac{3\pi}{4}$ (C) $\frac{5\pi}{4}$ (D) $\frac{7\pi}{4}$

Q.4 $\cos^2 48^\circ - \sin^2 12^\circ$ is equal to -

(A) $\frac{\sqrt{5}-1}{4}$ (B) $\frac{\sqrt{5}+1}{8}$ (C) $\frac{\sqrt{3}-1}{4}$ (D) $\frac{\sqrt{3}+1}{2\sqrt{2}}$

Q.5 The expression $\frac{\sin 8\theta\cos\theta - \sin 6\theta\cos 3\theta}{\cos 2\theta\cos\theta - \sin 3\theta\sin 4\theta}$ is equals.

(A) $\tan\theta$ (B) $\tan 2\theta$ (C) $\sin 2\theta$ (D) $\cos 2\theta$

Q.6 If $3\sin\alpha = 5\sin\beta$, then $\frac{\tan\frac{\alpha+\beta}{2}}{\tan\frac{\alpha-\beta}{2}} =$

(A) 1 (B) 2 (C) 3 (D) 4

Q.7 $\frac{\sin(A-C)+2\sin A+\sin(A+C)}{\sin(B-C)+2\sin B+\sin(B+C)}$ is equal to -

(A) $\tan A$ (B) $\frac{\sin A}{\sin B}$ (C) $\frac{\cos A}{\cos B}$ (D) $\frac{\sin C}{\cos B}$

Q.8 $\frac{1+\sin 2\theta+\cos 2\theta}{1+\sin 2\theta-\cos 2\theta} =$

(A) $\frac{1}{2}\tan\theta$ (B) $\frac{1}{2}\cot\theta$ (C) $\tan\theta$ (D) $\cot\theta$

Q.9 If $A = \tan 6^\circ\tan 42^\circ$ and $B = \cot 66^\circ\cot 78^\circ$, then -

(A) $A = 2B$ (B) $A = 1/3B$ (C) $A = B$ (D) $3A = 2B$

Q.10 If $x = y\cos\frac{2\pi}{3} = z\cos\frac{4\pi}{3}$ then $xy + yz + zx =$

(A) -1 (B) 0 (C) 1 (D) 2

Q.11 If $\tan\alpha = (1+2^{-1}), \beta - (1, 2^{5+1})^{-1}$, then $\alpha + \beta =$

(A) $\pi/6$ (B) $\pi/4$ (C) $\pi/3$ (D) $\pi/2$

Q.12 If $\tan A - \tan B + \tan C - \tan A, \tan B, \tan C$, then-

(A) A,B,C must be angles of a triangle

(B) the sum of any two of A,B.C is equal to the third

(C) $A + B + C$ must be n intcyral multiple of π

(D) None of these

(8) $\frac{(1+\cos 2\theta)+\sin 2\theta}{(1-\cos 2\theta)+\sin 2\theta}$

$\frac{2\cos^2\theta + 2\sin\theta\cos\theta}{2\sin^2\theta + 2\sin\theta\cos\theta}$

$\frac{2\cos\theta(\cancel{\cos\theta+\sin\theta})}{2\sin\theta(\cancel{\sin\theta+\cos\theta})} = \cot\theta$

(9) $\frac{A}{B} = \frac{\tan 6^\circ\tan 42^\circ}{\cot 66^\circ\cot 78^\circ}$

$\frac{A}{B} = \tan 6^\circ\tan 66^\circ\tan 42^\circ\cdot\tan 78^\circ$

$\frac{\tan(60-6^\circ)\tan 6^\circ\tan(60+6^\circ)}{\tan 54^\circ} \cdot \frac{\tan(60-18^\circ)\tan(60+18^\circ)\tan 18^\circ}{\tan 18^\circ}$

$\frac{\cancel{\tan 3\times 6^\circ}}{\cancel{\tan 54^\circ}} \times \frac{\cancel{\tan 3\times 18^\circ}}{\cancel{\tan 18^\circ}} = 1$

$A = B$

Nishant Jindal

$\tan\alpha = (1+2^{-x})^{-1} = \dfrac{2^x}{1+2^x}$

$\tan\beta = \dfrac{1}{1+2^{1+x}}$

$\tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1-\tan\alpha\cdot\tan\beta}$

$= \dfrac{\dfrac{2^x}{1+2^x} + \dfrac{1}{1+2^{x+1}}}{1 - \dfrac{2^x}{1+2^x} \times \dfrac{1}{1+2^{x+1}}}$

$= \dfrac{2^x + 2^x\cdot 2^x\cdot 2 + 1 + 2^x}{1+\cancel{2^x}+2^{x+1}+2^x\cdot 2^x\cdot 2 - \cancel{2^x}}$

$\tan(\alpha+\beta) = \dfrac{1 \cancel{+2\cdot 2^x} \cancel{+2(2^x)^2}}{1 \cancel{+2\cdot 2^x} \cancel{+2(2^x)^2}} = 1$

$\alpha+\beta = \dfrac{\pi}{4}$

DPP

Compound Angle

Q.1 If $\sin x + \sin^2 x = 1$, then the value of $\cos^2 x + \cos^4 x$ is -

(A) 0 (B) 2 (C) 1 (D) 3

Q.2 $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1$ is equal to -

(A) 2 (B) 0 (C) 4 (D) 6

Q.3 $\tan A = -\frac{1}{2}$ and $\tan B = -\frac{1}{3}$, then $A + B =$

(A) $\frac{\pi}{4}$ (B) $\frac{3\pi}{4}$ (C) $\frac{5\pi}{4}$ (D) $\frac{7\pi}{4}$

Q.4 $\cos^2 48^\circ - \sin^2 12^\circ$ is equal to -

(A) $\frac{\sqrt{5}-1}{4}$ (B) $\frac{\sqrt{5}+1}{8}$ (C) $\frac{\sqrt{3}-1}{4}$ (D) $\frac{\sqrt{3}+1}{2\sqrt{2}}$

Q.5 The expression $\frac{\sin 8\theta\cos\theta - \sin 6\theta\cos 3\theta}{\cos 2\theta\cos\theta - \sin 3\theta\sin 4\theta}$ is equals.

(A) $\tan\theta$ (B) $\tan 2\theta$ (C) $\sin 2\theta$ (D) $\cos 2\theta$

Q.6 If $3\sin\alpha = 5\sin\beta$, then $\frac{\tan\frac{\alpha+\beta}{2}}{\tan\frac{\alpha-\beta}{2}} =$

(A) 1 (B) 2 (C) 3 (D) 4

Q.7 $\frac{\sin(A-C)+2\sin A+\sin(A+C)}{\sin(B-C)+2\sin B+\sin(B+C)}$ is equal to -

(A) $\tan A$ (B) $\frac{\sin A}{\sin B}$ (C) $\frac{\cos A}{\cos B}$ (D) $\frac{\sin C}{\cos B}$

Q.8 $\frac{1+\sin 2\theta+\cos 2\theta}{1+\sin 2\theta-\cos 2\theta} =$

(A) $\frac{1}{2}\tan\theta$ (B) $\frac{1}{2}\cot\theta$ (C) $\tan\theta$ (D) $\cot\theta$

Q.9 If $A = \tan 6^\circ\tan 42^\circ$ and $B = \cot 66^\circ\cot 78^\circ$, then -

(A) $A = 2B$ (B) $A = 1/3B$ (C) $A = B$ (D) $3A = 2B$

Q.10 If $x = y\cos\frac{2\pi}{3} = z\cos\frac{4\pi}{3}$ then $xy + yz + zx =$

(A) -1 (B) 0 (C) 1 (D) 2

Q.11 If $\tan\alpha = (1 + 2^{-1}), \beta - (1, 2^{5+1})^{-1}$, then $\alpha + \beta =$

(A) $\pi/6$ (B) $\pi/4$ (C) $\pi/3$ (D) $\pi/2$

Q.12 If $\tan A + \tan B + \tan C = \tan A, \tan B, \tan C$, then-

(A) A,B,C must be angles of a triangle

(B) the sum of any two of A,B.C is equal to the third

(C) $A + B + C$ must be n intcyral multiple of π

(D) None of these

$A+B+C = n\pi$

then

$\tan A + \tan B + \tan C = \tan A\cdot\tan B\cdot\tan C$

$\tan A + \tan B + \tan C = \tan A\cdot\tan B\cdot\tan C$

then $A+B+C = ?$

$n\pi$

Nishant Jindal

$$\frac{\sin\left(\frac{36\times10^\circ}{2}\right)}{\sin\left(\frac{10^\circ}{2}\right)} \times \sin\left(\frac{10^\circ+360^\circ}{2}\right)$$

$$\sin 180^\circ \times \_\ \_\ \_$$

$$= 0$$

Q14 $y = \sin(e^x) = \boxed{2^x + \frac{1}{2^x}}$

Q17 $\sin\left(\frac{\pi}{14}\right)\cdot\sin\left(\frac{3\pi}{14}\right)\cdot\sin\left(\frac{5\pi}{14}\right)$

$$\cos\left(\frac{\pi}{2}-\frac{\pi}{14}\right)\cdot\cos\left(\frac{\pi}{2}-\frac{3\pi}{14}\right)\cdot\cos\left(\frac{\pi}{2}-\frac{5\pi}{14}\right)$$

$$\cos\left(\frac{6\pi}{14}\right)\cdot\cos\left(\frac{4\pi}{14}\right)\cdot\cos\left(\frac{2\pi}{14}\right)$$

$$-\cos\left(\frac{8\pi}{14}\right)\cdot\cos\left(\frac{4\pi}{14}\right)\cdot\cos\left(\frac{2\pi}{14}\right) =$$

Q.13 The value of $\sin 10^\circ + \sin 20^\circ + \sin 30^\circ + \cdots + \sin 360^\circ$ is equal to -

(A) 0 (B) 1 (C) $\sqrt{3}$ (D) 2

Q.14 The number of real solutions of the equation $\sin(e^x) = 2^x + 2^{-x}$ is -

(A) 1 (B) 0 (C) 2 ≤ 1 ≥ 2 (D) Infinite

Q.15 If $f(x) = \frac{\sin 3x}{\sin x}$, $x \ne 11\pi$, then the range of values of f(x) for real values of x is -

(A) $[-1,3]$ (B) $(-\infty,-1]$ (C) $(3,+\infty)$ (D) $[-1,3)$

Q.16 If $\cos x + \cos y + \cos\alpha = 0$ and $\sin x + \sin y + \sin\alpha = 0$, then $\cot\left(\frac{x+y}{2}\right) =$

(A) $\sin\alpha$ (B) $\cos\alpha$ (C) $\cot\alpha$ (D) $2\sin\alpha$

Q.17 The value of $\sin\frac{\pi}{14}\sin\frac{3\pi}{14}\sin\frac{5\pi}{14}$ is :-

(A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{2}$ (D) 1

Q.18 Maximum and minimum value of $2\sin^2\theta - 3\sin\theta + 2$ is -

(A) $\frac{1}{4}, -\frac{7}{4}$ (B) $\frac{1}{4}, \frac{21}{4}$ (C) $\frac{21}{4}, -\frac{3}{4}$ (D) $7, \frac{7}{8}$

Q.19 For $\theta \in (0, \pi/2)$, the maximum value of $\sin\left(\theta+\frac{\pi}{6}\right) + \cos\left(\theta+\frac{\pi}{6}\right)$ is attained at $\theta =$

(A) $\frac{\pi}{12}$ (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{4}$

Q.20 Minimum value of the expression $\cos^2\theta - (6\sin\theta\cos\theta) + 3\sin^2\theta + 2$, is -

(A) $4+\sqrt{10}$ (B) $4-\sqrt{10}$ (C) 0 (D) 4

$$\cos\theta\cdot\cos 2\theta\cdot\cos 4\theta = \frac{\sin(2\cdot LA)}{2^n(\sin(SA))}$$

$$\cos\left(\frac{14\pi-6\pi}{14}\right) = \cos\left(\pi-\frac{6\pi}{14}\right) = \cos\frac{6\pi}{14}$$

$$-\frac{\sin\left(2\times\frac{8\pi}{14}\right)}{2^3\sin\left(\frac{2\pi}{14}\right)} = -\frac{\sin\left(\frac{14\pi+2\pi}{14}\right)}{8\cdot\sin\left(\frac{2\pi}{14}\right)} = \frac{-\sin\left(\pi+\frac{2\pi}{14}\right)}{8\sin\left(\frac{2\pi}{14}\right)} = \frac{+\sin\frac{2\pi}{14}}{8\sin\left(\frac{2\pi}{14}\right)} = \frac{1}{8}$$

Q16.

$$\cos x+\cos y = -\cos\alpha \Rightarrow \frac{\cancel{2}\cos\left(\frac{x+y}{2}\right)\cdot\cancel{\cos\left(\frac{x-y}{2}\right)}}{\cancel{2}\sin\left(\frac{x+y}{2}\right)\cdot\cancel{\cos\left(\frac{x-y}{2}\right)}} = \frac{-\cos\alpha}{-\sin\alpha}$$

$$\sin x+\sin y = -\sin\alpha$$

$$\cot\left(\frac{x+y}{2}\right) = \cot\alpha$$

Sum of Any +ve No / fxn with its Reciprocal is always gr. than or equal to

$$2^x + \frac{1}{2^x} \ge 2$$

Q15 $y = \frac{\sin 3x}{\sin x} = \frac{3\sin x - 4\sin^3 x}{\sin x}$

$$y = \frac{\cancel{\sin x}(3-4\sin^2 x)}{\cancel{\sin x}} \Rightarrow y = 3-4\sin^2 x$$

$$0 \le \sin^2 x \le 1$$

$$0 \ge -4\sin^2 x \ge -4$$

$$3 \ge \boxed{3-4\sin^2 x} \ge -1$$

$$y \in [-1,3]$$

Nishant Jindal

$\frac{\sin\left(\frac{36\times 10^\circ}{2}\right)}{\sin\left(\frac{10^\circ}{2}\right)} \times \sin\left(\frac{10^\circ+360^\circ}{2}\right)$

$\sin 180^\circ \times$ - - -

$= 0$

Q14 $y = \sin(e^x) = \boxed{2^x + \frac{1}{2^x}}$

Q17 $\sin\left(\frac{\pi}{14}\right)\cdot\sin\left(\frac{3\pi}{14}\right)\cdot\sin\left(\frac{5\pi}{14}\right)$

$\cos\left(\frac{\pi}{2}-\frac{\pi}{14}\right)\cdot\cos\left(\frac{\pi}{2}-\frac{3\pi}{14}\right)\cdot\cos\left(\frac{\pi}{2}-\frac{5\pi}{14}\right)$

$\cos\left(\frac{6\pi}{14}\right)\cdot\cos\left(\frac{4\pi}{14}\right)\cdot\cos\left(\frac{2\pi}{14}\right)$

$-\cos\left(\frac{8\pi}{14}\right)\cdot\cos\left(\frac{4\pi}{14}\right)\cdot\cos\left(\frac{2\pi}{14}\right) =$

Q.13 The value of $\sin 10^\circ + \sin 20^\circ + \sin 30^\circ + \cdots + \sin 360^\circ$ is equal to -

(A) 0 (B) 1 (C) $\sqrt{3}$ (D) 2

Q.14 The number of real solutions of the equation $\sin(e^x) = 2^x + 2^{-x}$ is -

(A) 1 (B) 0 (C) 2 ≤ 1 ≥ 2 (D) Infinite

Q.15 If $f(x) = \frac{\sin 3x}{\sin x}, x = 11\pi$, then the range of values of f(x) for real values of x is -

(A) $[-1,3]$ (B) $(-\infty,-1]$ (C) $(3,+\infty)$ (D) $[-1,3)$

Q.16 If $\cos x + \cos y + \cos\alpha = 0$ and $\sin x + \sin y + \sin\alpha = 0$, then $\cot\left(\frac{x+y}{2}\right) =$

(A) $\sin\alpha$ (B) $\cos\alpha$ (C) $\cot\alpha$ (D) $2\sin\alpha$

Q.17 The value of $\sin\frac{\pi}{14}\sin\frac{3\pi}{14}\sin\frac{5\pi}{14}$ is :-

(A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{2}$ (D) 1

Q.18 Maximum and minimum value of $2\sin^2\theta - 3\sin\theta + 2$ is -

(A) $\frac{1}{4}, -\frac{7}{4}$ (B) $\frac{1}{4}, \frac{21}{4}$ (C) $\frac{21}{4}, -\frac{3}{4}$ (D) $7, \frac{7}{8}$

Q.19 For $\theta \in (0, \pi/2)$, the maximum value of $\sin\left(\theta+\frac{\pi}{6}\right) + \cos\left(\theta+\frac{\pi}{6}\right)$ is attained at $\theta =$

(A) $\frac{\pi}{12}$ (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{4}$

Q.20 Minimum value of the expression $\cos^2\theta - (6\sin\theta\cos\theta) + 3\sin^2\theta + 2$, is -

(A) $4+\sqrt{10}$ (B) $4-\sqrt{10}$ (C) 0 (D) 4

$1-\frac{9}{16}.$

$y = 2\sin^2\theta - 3\sin\theta + 2$

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

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

$= 2\left(\left(\sin\theta-\frac{3}{4}\right)^2 + \frac{7}{16}\right)$

1

$2\left(0+\frac{7}{16}\right)$ $2\left(\left(1-\frac{3}{4}\right)^2+\frac{7}{16}\right)$

$\frac{7}{8}$, 1

Nishant Jindal

2 parts

$\boxed{Ex2} \rightarrow 15\,x$

Ratte

Ex1

Yad Rakhna hai

Nishant Jindal

Quadratic Eqn.

[12-15 Lec] $\to$ {4 Lec Adv. Level.}

Chhutti le lena.
Naaraz nahi hona!!

① $Y = x^2 + \boxed{x} + 1$ $\quad \tfrac{1}{2}$

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

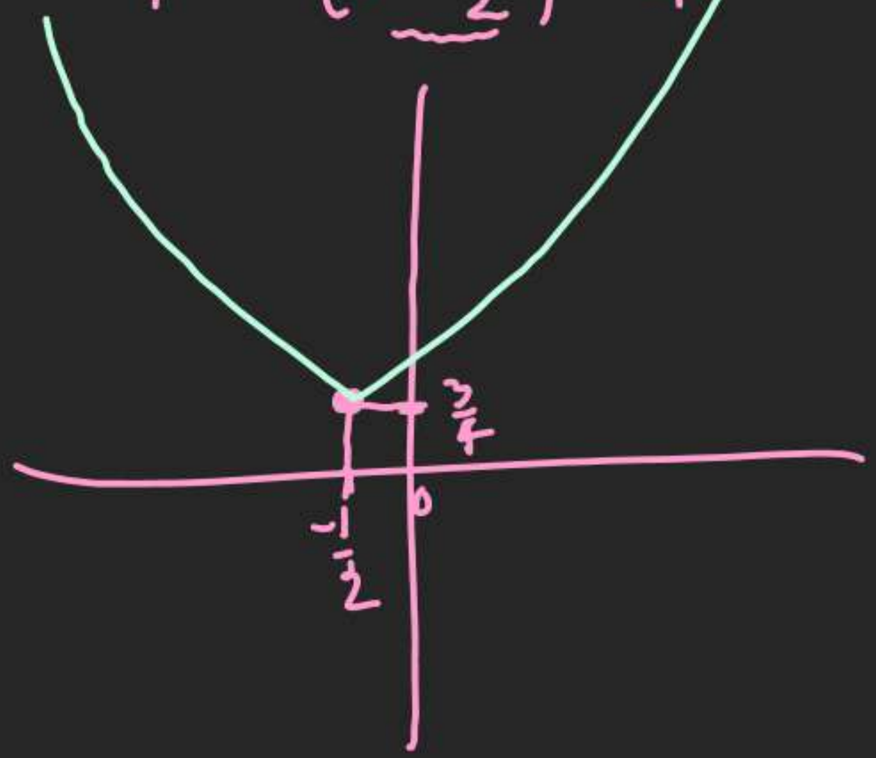
$y = x^2$

$y = -x^2$

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

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

$\to y = \frac{3}{4}$



Nishant Jindal

(2) $y = x^2 - \boxed{x} + 1 \to \frac{1}{2}$

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

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

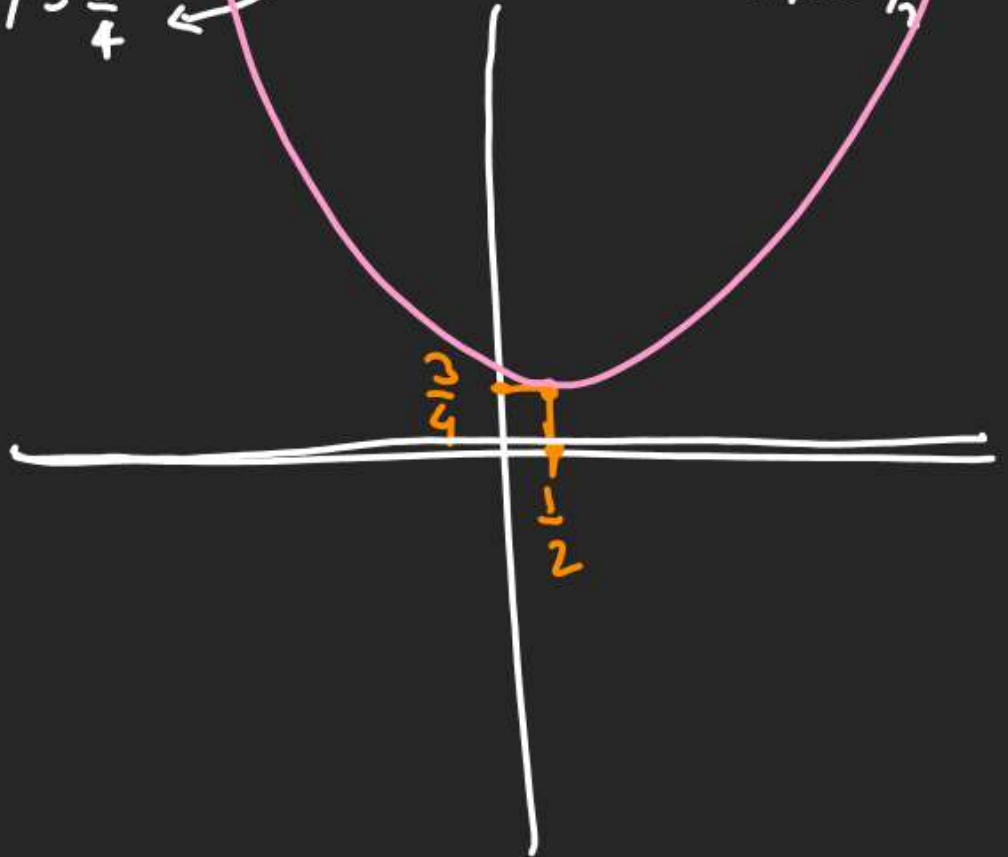
$\boxed{D = -3} = -ve$

Total Graph above x Axis

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

$$\left(y - \frac{3}{4}\right) = \left(x - \frac{1}{2}\right)^2 \to Y = X^2$$

$y = \frac{3}{4}$ $\quad$ $x = 1/2$



(3) $y = 2x^2 - 4x + 7$'s graph.

$D = (-4)^2 - 4 \times 2 \times 7$

$= 16 - 56 = -40 = -ve$

$\therefore$ Graph Above X Axis

$$= 2\left[x^2 - \boxed{2}x + \frac{7}{2}\right]$$

$$= 2\left[(x-1)^2 - (1)^2 + \frac{7}{2}\right]$$

$$= 2\left[(x-1)^2 + \frac{5}{2}\right]$$

$$y = 2(x-1)^2 + 5 \Rightarrow (y-5) = 2(x-1)^2 \Rightarrow Y = 2X^2$$

$y = 5$ $\quad$ $x = 1$

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

$= 2\left[x^2 + \boxed{2}x + \frac{1}{2}\right]$

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

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

$Y = 2(x+1)^2 - 1$

$(Y+1) = 2(x+1)^2 \to Y = 2X^2$

$Y = -1$ $\quad$ $x = -1$

1) $D = 4^2 - 4 \times 2 \times 1$

$D = 8$ +ve

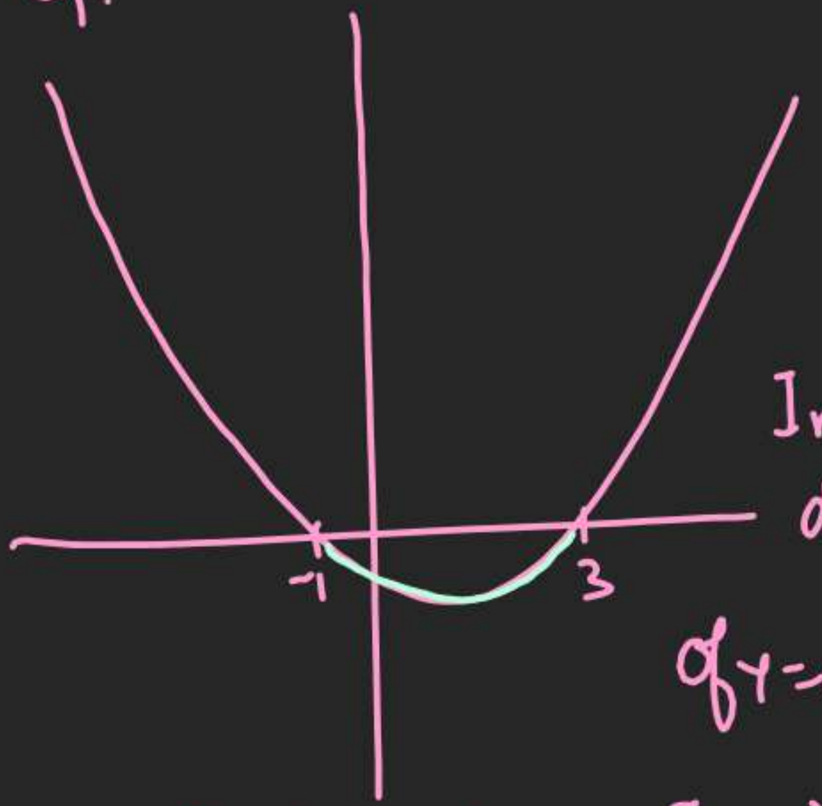
X Axis Ko Cut

2) Places where Graph Cut X Axis is known as Roots

$$X = \frac{-4 \pm \sqrt{4^2 - 4 \times 2 \times 1}}{2 \times 2}$$

$$X = \frac{-4 \pm 2\sqrt{2}}{2 \times 2} = \frac{-2+\sqrt{2}}{2}, \quad \frac{-2-\sqrt{2}}{2}$$

Q.



In this diagram of $y = ax^2 + bx + c$

A) $y < 0$ in $x \in (a, b)$

find a & b

$Y < 0$ means places where graph below X Axis

$\therefore y < 0$ in $x \in (-1, 3)$

$a = -1, b = 3$

Nishant Jindal

(B) $y > 0$ in $x \in$ - - -

$y>0$ means graph above X Axis

$$\boxed{y > 0 \text{ in } x \in (-\infty, -1) \cup (3, \infty)}$$

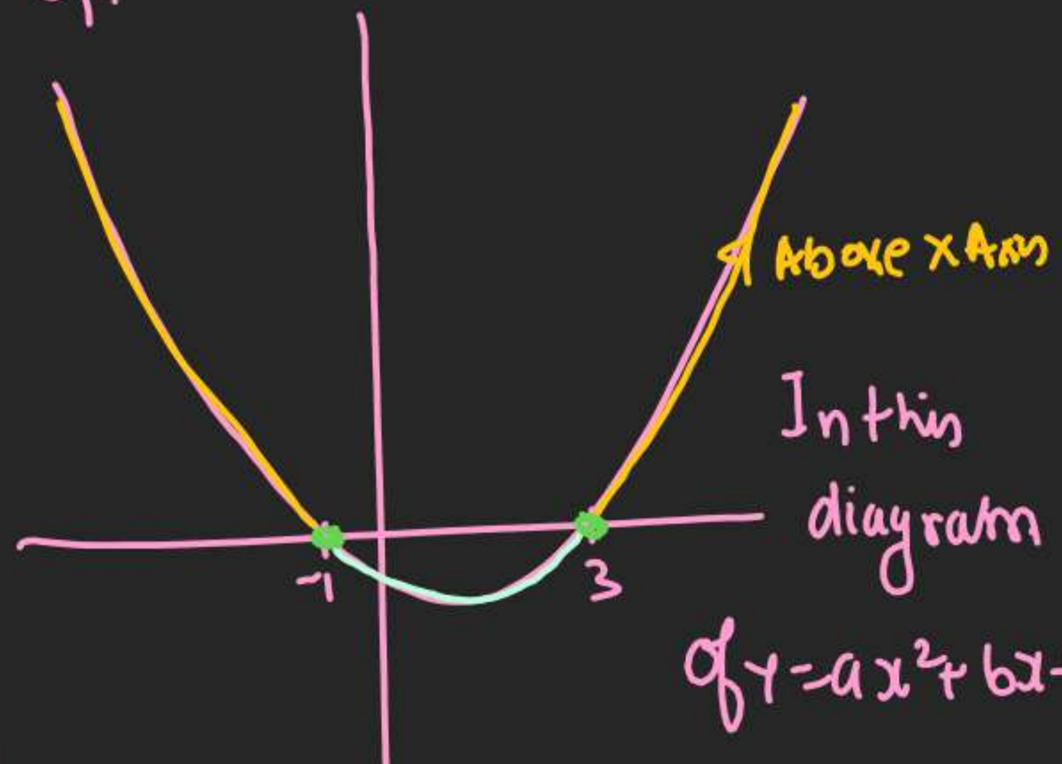
(C) $\underline{y = 0}$ at $x \in$?

graph cuts X Axis at

$x = -1, 3$

$x \in \{-1, 3\}$

Q.



In this diagram of $y = ax^2 + bx + c$

A) $y < 0$ in $x \in (a, b)$
find a & b.

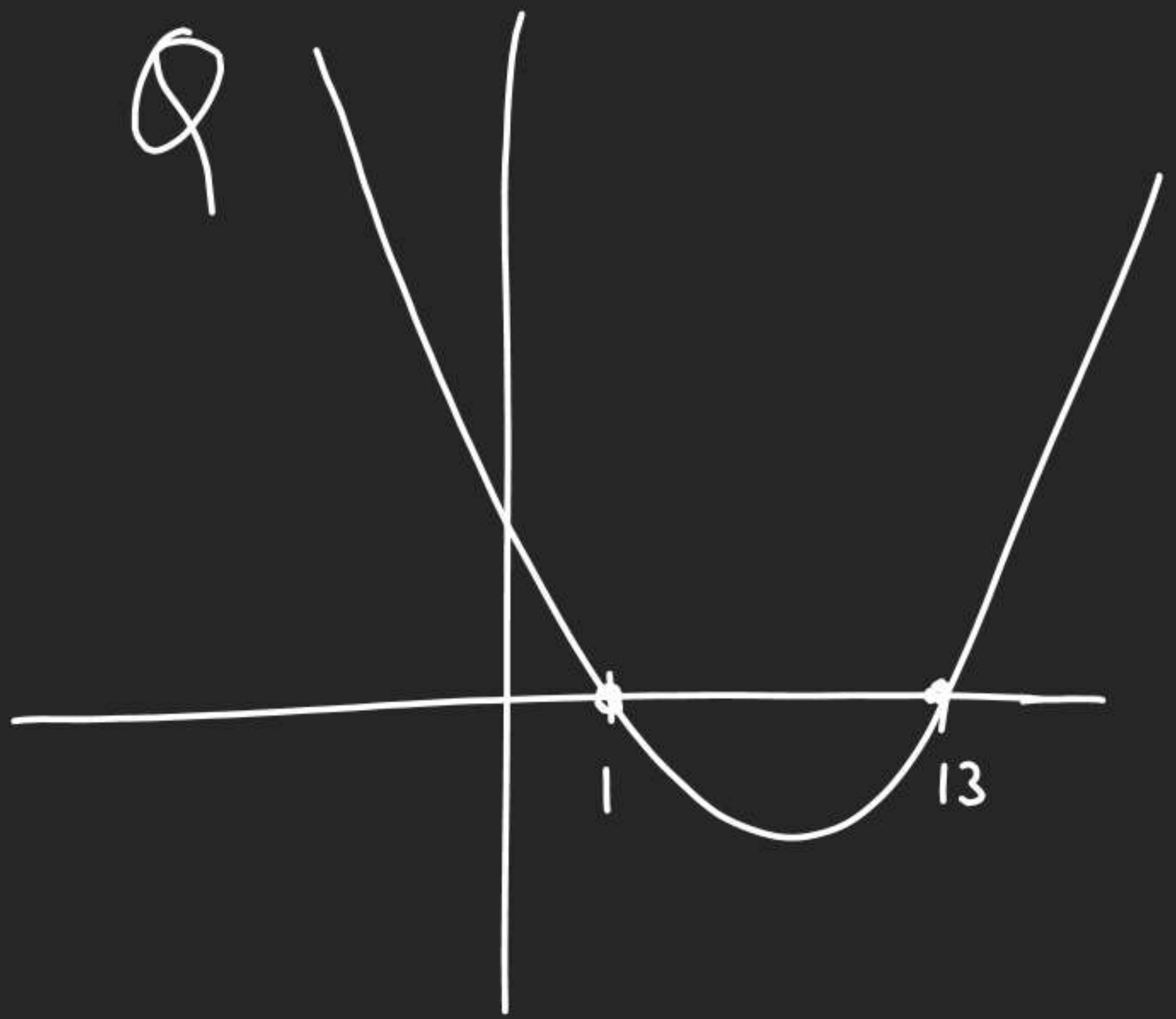
$y < 0$ means places where graph below X Axis

$\therefore y < 0$ in $x \in (-1, 3)$

$a = -1, b = 3$

Nishant Jindal

Q



(1) $y > 0$?

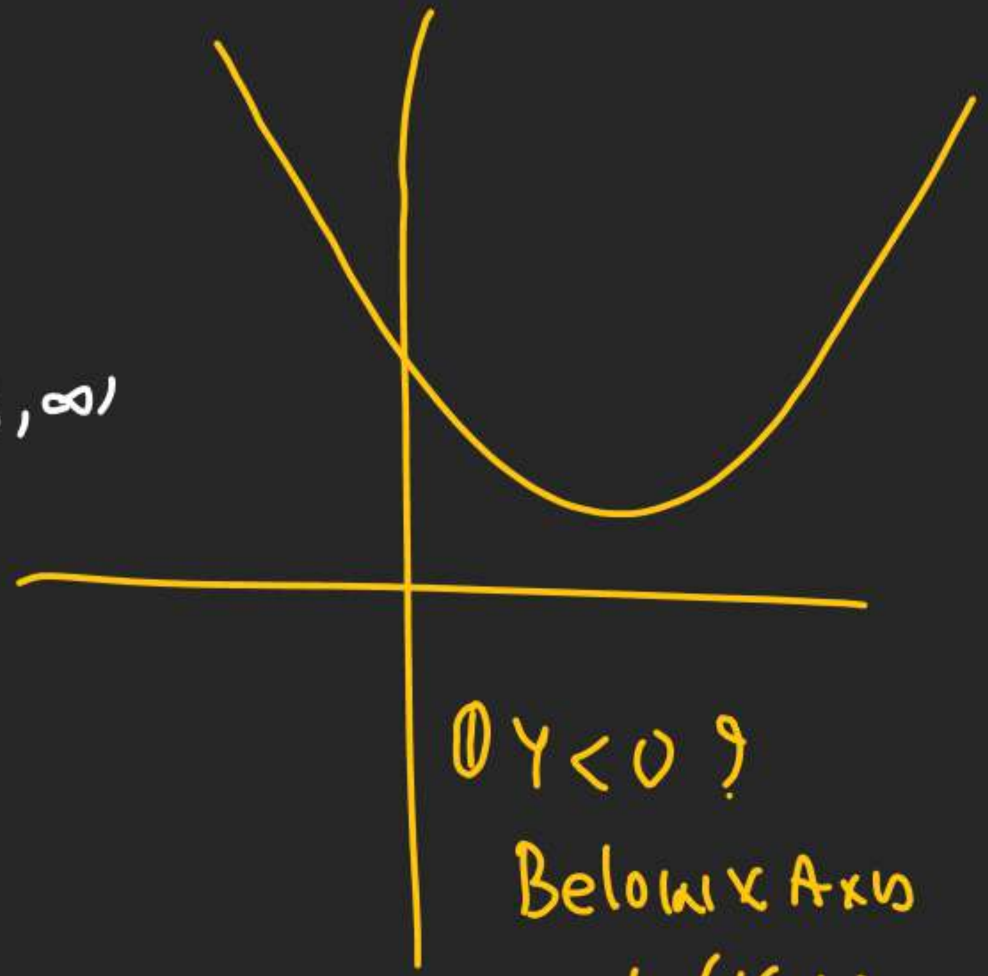
$x \in (-\infty, 1) \cup (13, \infty)$

(2) $y < 0$??

$x \in (1, 13)$

(3) $y = 0$?

$x \in \{1, 13\}$



(1) $y < 0$?

Below X Axis

$x = \phi$ (Kahin Below X Axis Nhin hai)

(2) $y > 0$?

$x \in (-\infty, \infty)$ at all pts

(3) $y = 0$?

X Axis Par no Cut $\Rightarrow x = \phi$

Nishant Jindal

1) $y = 3x^2 - 4x + 5$'s graph

2) $y = 2x^2 - 4x + 1$'s graph