← ULTIMATE MATHEMATICS →

(BY: AJAY MITTAL: 9891067390)

TRIGONOMETRY:

X : (1) $\sin(90-\theta) = \cos\theta$; $\cos(90-\theta) = \sin\theta$

$\tan(90-\theta) = \cot\theta$; $\cot(90-\theta) = \tan\theta$

$\sec(90-\theta) = \text{cosec}\,\theta$. $\text{cosec}(90-\theta) = \sec\theta$

(2) $\text{cosec}\,\theta = \frac{1}{\sin\theta}$; $\sin\theta = \frac{1}{\text{cosec}\,\theta}$ $\boxed{\text{Change}}$

$\cot\theta = \frac{1}{\tan\theta}$; $\tan\theta = \frac{1}{\cot\theta}$

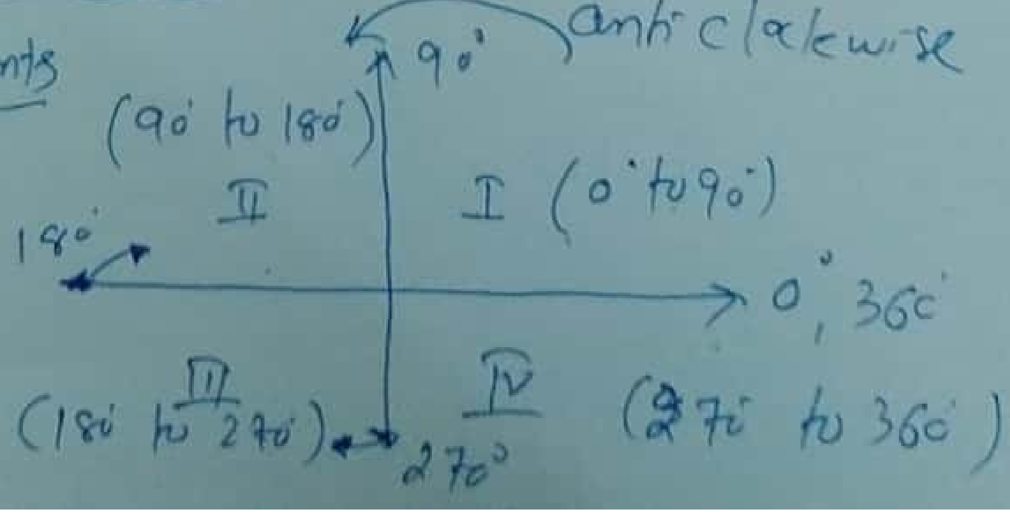
$\sec\theta = \frac{1}{\cos\theta}$, $\cos\theta = \frac{1}{\sec\theta}$ $\boxed{\text{Reciprocal}}$

(3) trigo table

·	0	30°	45	60°	90°
$\sin\theta$	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1
$\cos\theta$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0
$\tan\theta$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	N.D (∞)

X) Trigonometry

(1) Quadrants
four



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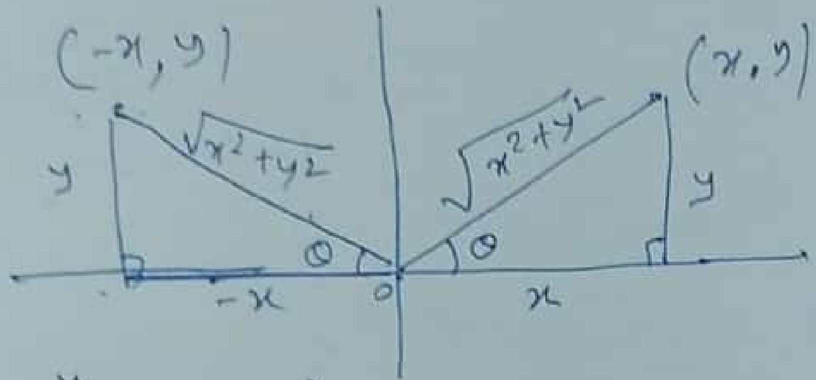
②

(2)

I	II	III	IV
Add	Sugar	To	Coffee
All (+ve)	$\sin\theta$, $\csc\theta$ (+ve)	$\tan\theta$, $\cot\theta$ (+ve)	$\cos\theta$, $\sec\theta$ (+ve)

$2, \frac{1}{2}$

Reason



$\sqrt{4} = 2$

$\sin\theta = \frac{y}{\sqrt{x^2+y^2}}$

$\tan\theta = \frac{y}{x}$

$\sin\theta = \frac{y}{\sqrt{x^2+y^2}}$ (+ve)

$\tan\theta = \frac{y}{-x}$ (-ve)

$\cos\theta = \frac{-x}{\sqrt{x^2+y^2}}$ (-ve)

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(3) $(1\times 90^\circ)$ $(3\times 90^\circ)$

$90^\circ, 270^\circ$ → change (odd multiple of 90°)

$180^\circ, 360^\circ$ → No change

$(2\times 90^\circ)$ $(4\times 90^\circ)$ (even multiple of 90°)

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(1) $\sin(\overset{\text{II}}{180^\circ} - \theta) = \sin\theta$

$\underset{\text{left}}{\downarrow}$ $\qquad$ $\underset{\text{acute}}{\downarrow}$

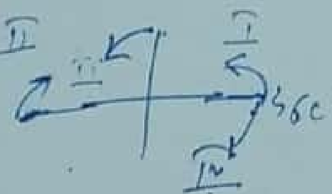
Check

(2) $\tan(\overset{\text{IV}}{270^\circ} + \theta) = -\cot\theta$

left

(3) $\sec(\overset{\text{III}}{270^\circ} - \theta) = -\operatorname{cosec}\theta$

left.



(4) $\sin(120^\circ) = \sin(\overset{\text{II}}{90^\circ + 30^\circ}) = \cos(30^\circ) = \frac{\sqrt{3}}{2}$

$= \sin(\underset{\text{II}}{180^\circ} - 60^\circ) = \sin(60^\circ) = \sqrt{3}/2$

(5) $\cot(315^\circ) = \cot(\underset{\text{IV}}{360^\circ} - 45) = -\cot(45) = -1$

(6) $\operatorname{cosec}(420^\circ) = \operatorname{cosec}(360^\circ + 60) = \operatorname{cosec}(60^\circ) = 2/\sqrt{3}$

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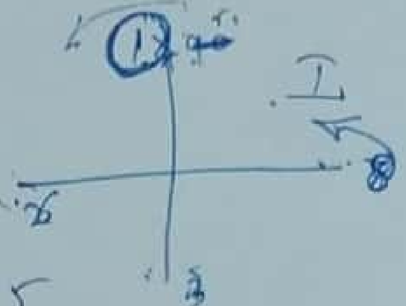
(i) $\sin(765°)$

$$\sin(\underbrace{8 \times 90°} + \underline{45})$$

$$= \sin(45) = 1/\sqrt{2}$$

$$\begin{array}{r} 8 \\ 90° \overline{)765°} \\ 720 \\ \hline 45 \\ \hline \end{array}$$



(ii) $\cot(1410°)$

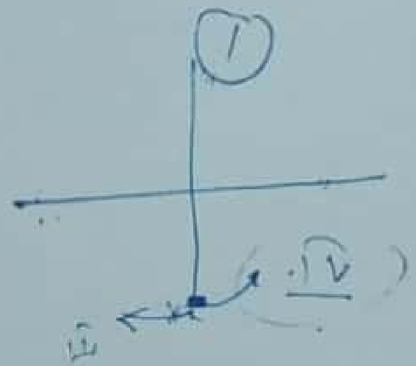
left

$$= \cot(\underbrace{15}_{\text{odd}} \times 90° + 60)$$

$$= -\tan(60°)$$

$$= -\sqrt{3}$$

$$\begin{array}{r} 15 \\ 90 \overline{)1410} \\ 90 \\ \hline 510 \\ 450 \\ \hline 60 \\ \hline \end{array}$$



(iii) $\cancel{\cos(720°)}$ $\cos(270°)$

$$\checkmark \ \cos(270° + 0) = +\sin 0° = 0$$

$$\checkmark \ \cos(270 - 0) = -\sin 0 = 0$$

$\pi = 180°$

$$x = \frac{\pi}{2} \cdot \sin\left(\frac{\pi}{2}\right) = \frac{\frac{22}{7}}{2} \times 1 = \frac{\frac{22}{7}}{2}$$

$\pi \to 180°$, $\frac{22}{7}$

$\frac{\pi}{2} = 90°$

$\frac{\pi}{3} = 60°$

$\frac{\pi}{6} = 30°$

$\pi/4 = 45°$

$\pi = 180°$

Class - XI TRIGONOMETRY 2020-2021

WORKSHEET No: 1

Topic ____ Date ____

Qns 1 → Show that $\cos(510^\circ)\cdot\cos(330^\circ) + \sin(390^\circ)\cos(120^\circ) = -1$

Qns 2 → Show that $\cos(660^\circ)\sin(330^\circ) - \sin(420^\circ)\cos(390^\circ) = -1$

Qns 3 → Show that $\tan(225^\circ)\cot(405^\circ) + \tan(765^\circ)\cot(675^\circ) = 0$

Qns 4 → Show that $\tan(720^\circ) - \cos(270^\circ) - \sin(150^\circ)\cdot\cos(120^\circ) = \frac{1}{4}$

Qns 5 → Show that $2\sin^2\left(\frac{\pi}{6}\right) + \operatorname{cosec}^2\left(\frac{7\pi}{6}\right)\cdot\cos^2\left(\frac{\pi}{3}\right) = \frac{3}{2}$

Qns 6 → Show that $\tan\left(\frac{11\pi}{3}\right) - 2\sin\left(\frac{4\pi}{6}\right) - \frac{3}{4}\operatorname{cosec}^2\left(\frac{\pi}{4}\right) + 4\cos^2\left(\frac{17\pi}{6}\right) = \frac{3-4\sqrt{3}}{2}$

Qns 7 → Show that $\dfrac{\cos(\pi+x)\cos x}{\sin(\pi-x)\cos\left(\frac{\pi}{2}+x\right)} = \cot^2 x$

Qns 8 → Show that $\dfrac{\cos(2\pi+\theta)\cdot\operatorname{cosec}(2\pi+\theta)\tan\left(\frac{\pi}{2}+\theta\right)}{\sec\left(\frac{\pi}{2}+\theta\right)\cos\theta\cot(\pi+\theta)} = 1$

Qns 9 → Show that $\dfrac{\sin(180^\circ+\theta)\cdot\cos(90^\circ+\theta)\tan(270^\circ-\theta)\cot(360^\circ-\theta)}{\sin(360^\circ-\theta)\cdot\cos(360^\circ+\theta)\operatorname{cosec}\theta\cdot\cos(360-\theta)} = 1$

Qns 10 → Show that $\cos\left(\frac{3\pi}{2}+x\right)\cdot\cos(2\pi+x)\left[\cot\left(\frac{3\pi}{2}+x\right) + \cot(2\pi+x)\right] = 1$

Qns 11 → Find x from the equation

$\operatorname{cosec}(90^\circ+\theta) + x\cos\theta\cot(90^\circ+\theta) = \sin(90^\circ+\theta)$

$\boxed{\text{Ans } x = \tan\theta}$

Qns 12 → Find x from the equation

$x\cot(90^\circ+\theta) + \tan(90^\circ+\theta)\cdot\sin\theta + \operatorname{cosec}(90^\circ+\theta) = 0$ $\boxed{\text{Ans } x = \sin\theta}$

Qns 13 → If A, B, C, D be the angles of a cyclic quadrilateral

Show that $\cos(180^\circ-A) + \cos(180^\circ+B) + \cos(180^\circ+C) - \sin(90^\circ+D) = 0$

— x —