



12 divisions - Big division

60 divisions - Smaller

CLOCK

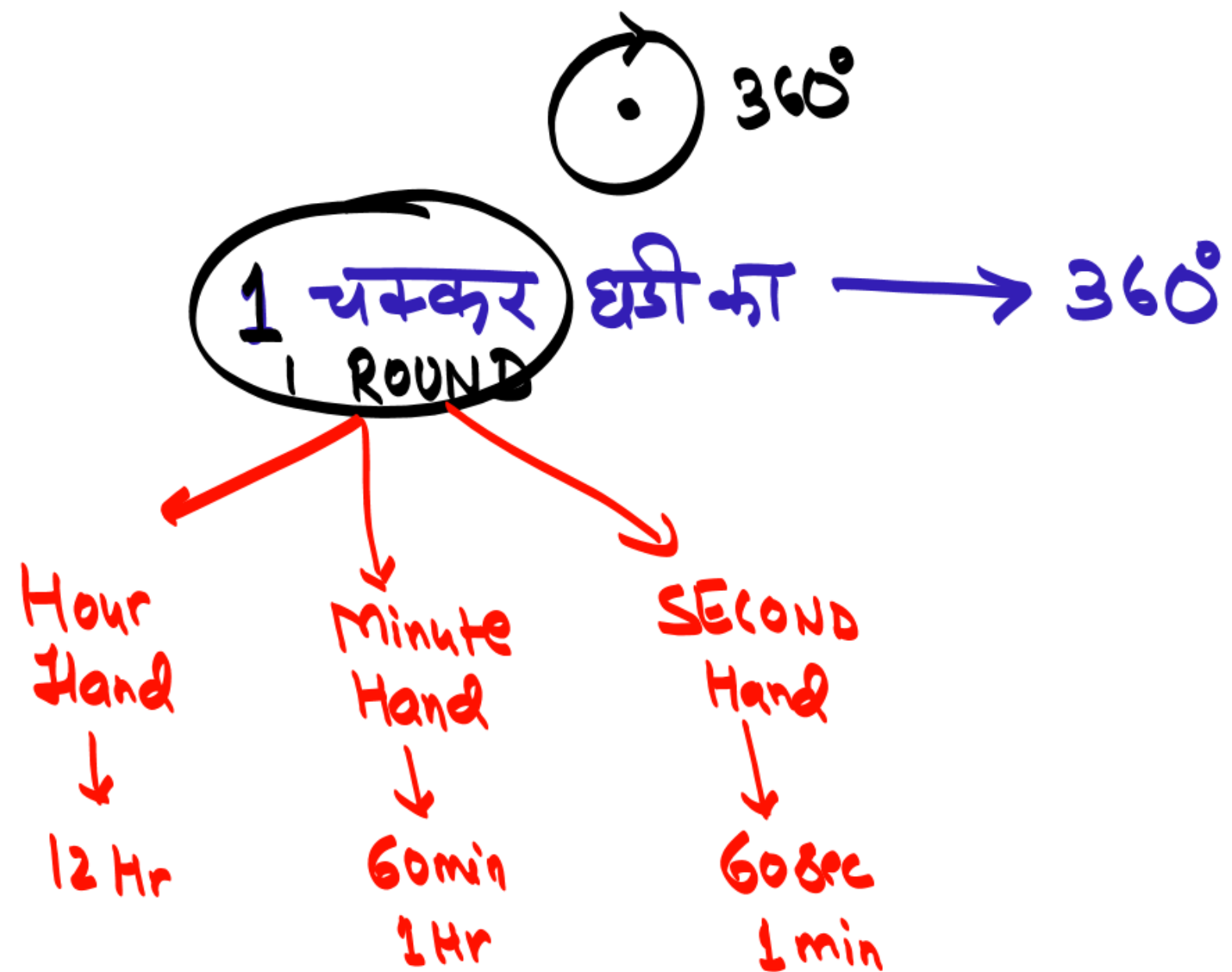
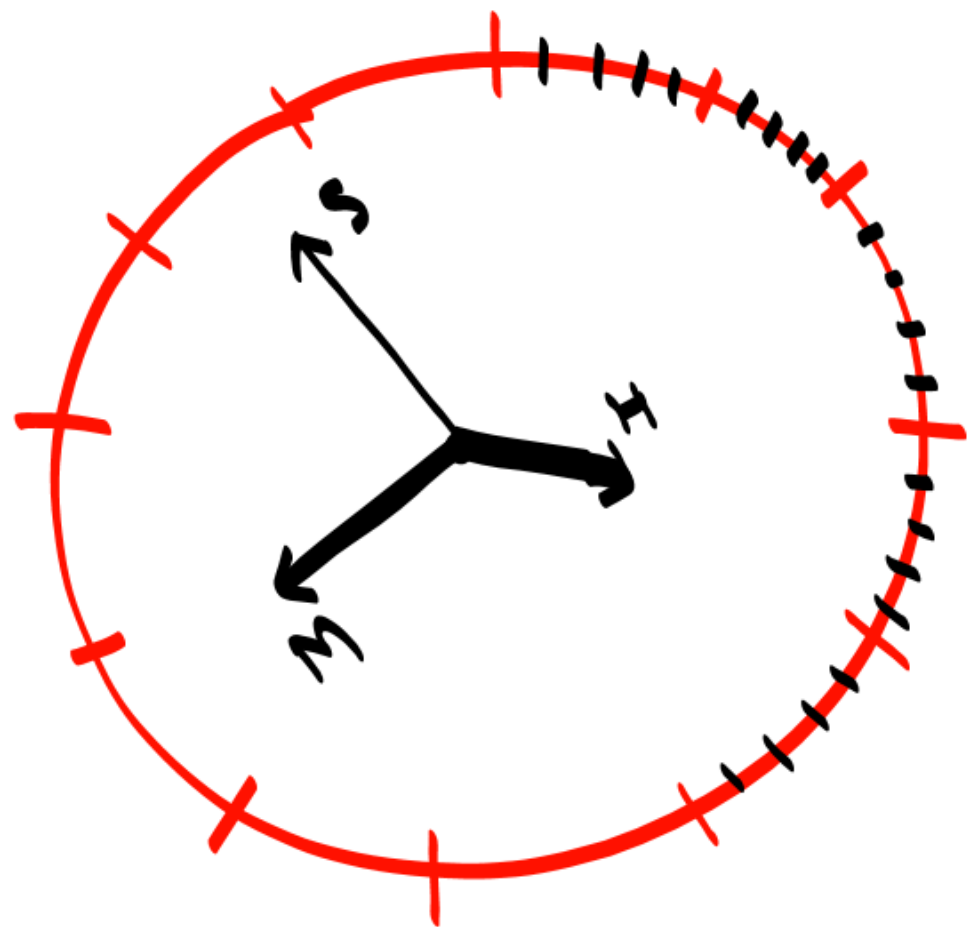
दीवार घड़ी

3 सुईया (3 hands)

Hour
Hand

Minute
Hand

Second
सेकंड सुई



HOUR HAND (घंटे की सुई)

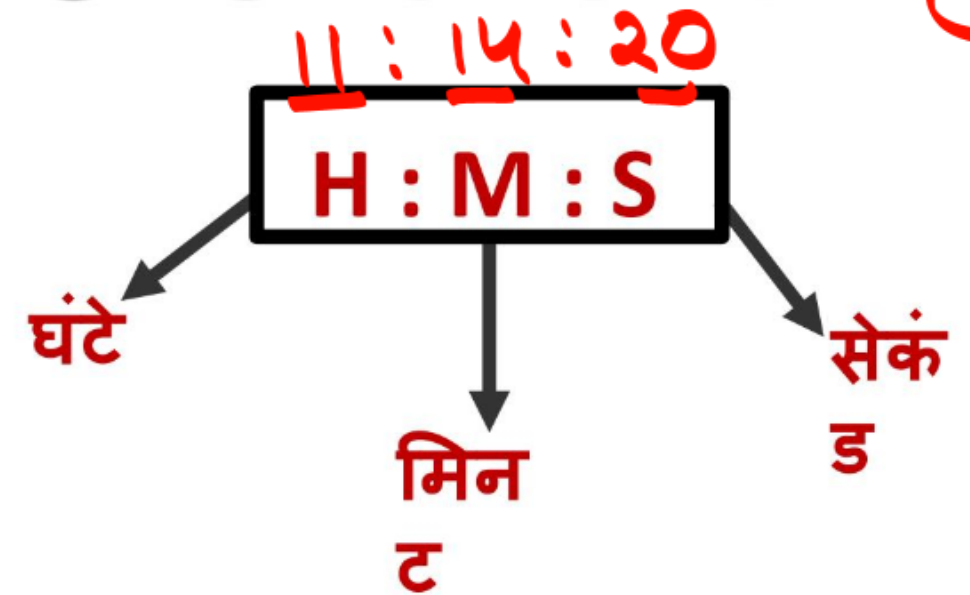
एक, Unitary

$$\underline{12\text{hr}} \longrightarrow 360^\circ$$

$$\underline{1\text{ hr}} [60\text{ min}] \longrightarrow \frac{360}{12} = 30^\circ \checkmark$$

$$\underline{1\text{ min}} [60\text{ sec}] \longrightarrow \frac{30}{60} = \left(\frac{1}{2}\right)^\circ$$

$$\underline{1\text{ sec}} \longrightarrow \frac{\frac{1}{2}}{60} = \left(\frac{1}{120}\right)^\circ$$



✓ FORMULA

घंटे की सुई द्वारा बनने वाला कोण = $30H + \frac{1}{2}M + \frac{1}{120}S$



Example

Q1 What is the angle formed by the hour hand at 8:40:30?

Q2 5 : 50 : 20 पर Hour Hand द्वारा बनने वाला Angle बताए ?

H M S

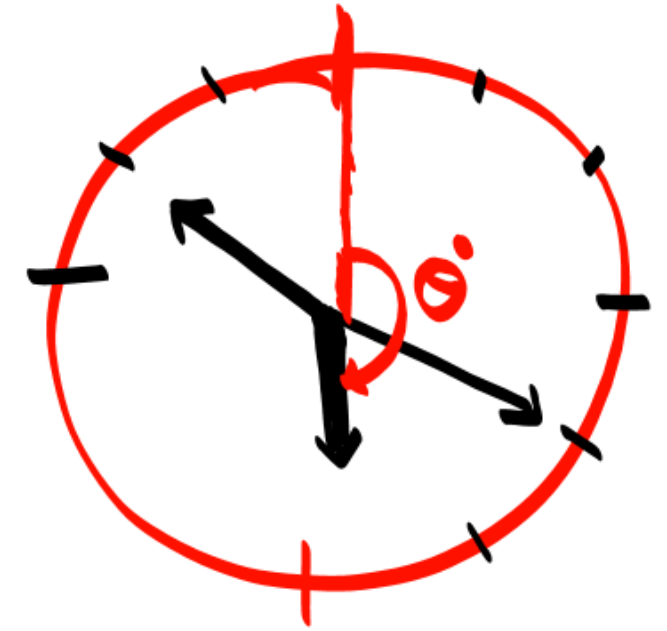
Q2

$$\theta^\circ = 30H + \frac{1}{2}M + \frac{1}{120}S$$

$$\Rightarrow 30 \times 5 + \frac{1}{2}(50) + \frac{1}{120}(20)$$

$$= 150 + 25 + \frac{1}{6}$$

$$= \left(175\frac{1}{6}\right)^\circ$$



Q1
8:40:30



$$30 \times 8 + 40 \times \frac{1}{2} + 30 \times \frac{1}{120}$$

$$240 + 20 + \frac{1}{4}$$

$$\left(260\frac{1}{4}\right)^\circ$$



Ex.)

9 वजकर 16 min पर घंटे की सुई द्वारा बनाया गया कोण?

$$H \rightarrow 9$$

$$m \rightarrow 16$$

$$S \rightarrow 0$$

$$Q = 30 \times 9 + 16 \times \frac{1}{2}$$

$$= 270 + 8 = 278^\circ \checkmark$$

घंटे की सुई का कोण

^H
5 : ^M
15 min पर

$$30 \times 5 + 15 \times \frac{1}{2}$$

$$150 + 7.5$$

$$\rightarrow 157.5^\circ$$

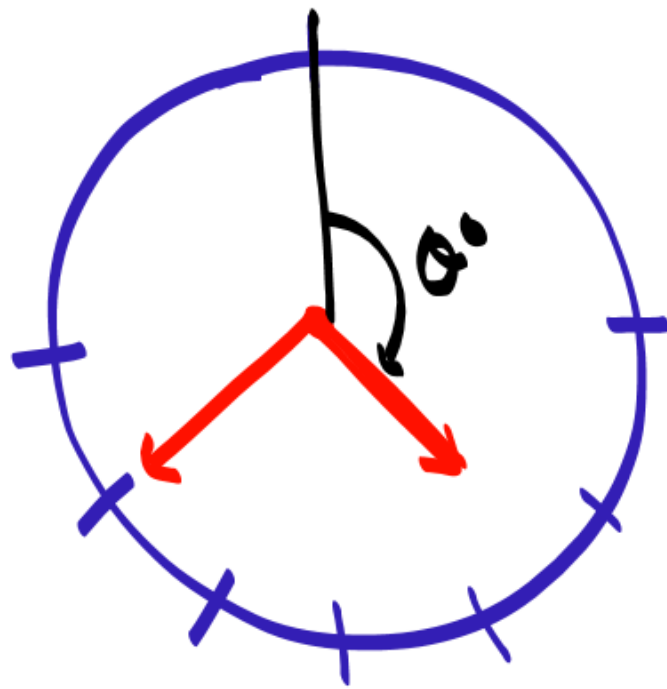
$$\rightarrow \left(57\frac{1}{2}\right)^\circ$$

^H
4 : 40 ^M

$$0^\circ \Rightarrow 30 \times 4 + 40 \times \frac{1}{2}$$

$$120 + 20$$

$$= 140^\circ \checkmark$$

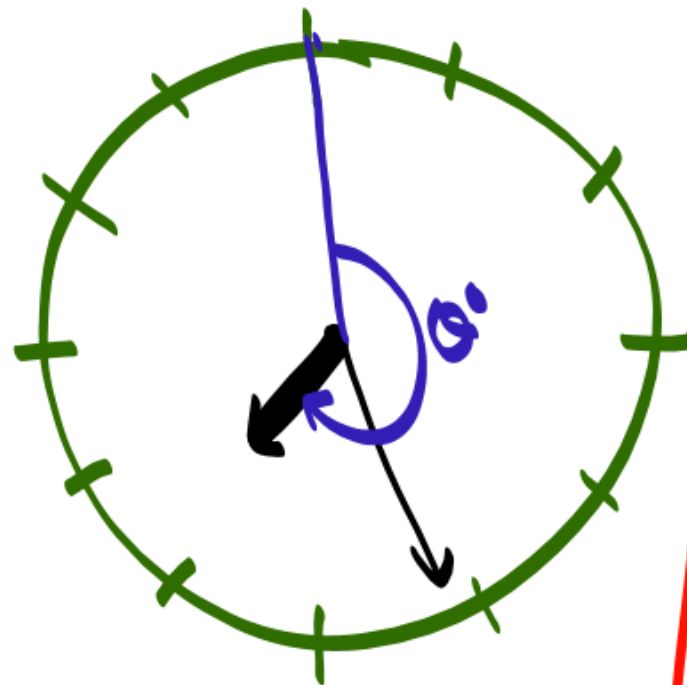


^H
7 : ^M
26

$$30 \times 7 + 26 \times \frac{1}{2}$$

$$210 + 13$$

$$= 223^\circ \checkmark$$

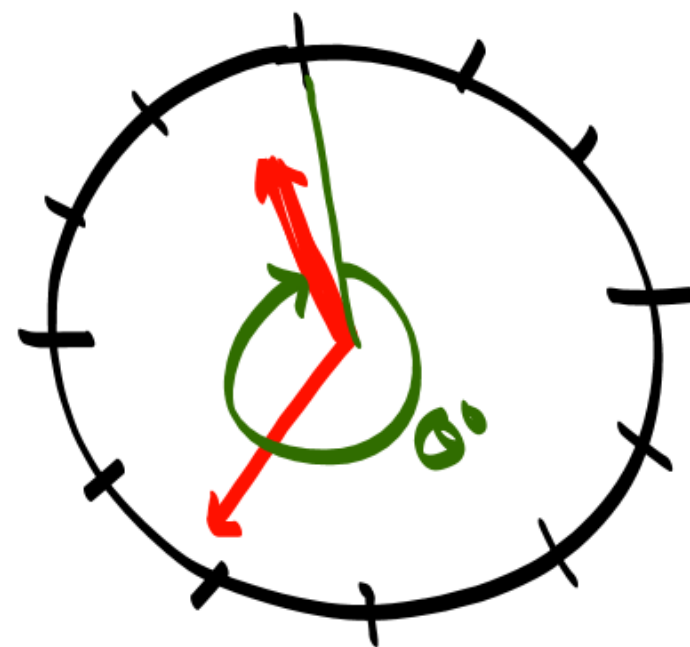


11 : 36

$$30 \times 11 + 36 \times \frac{1}{2}$$

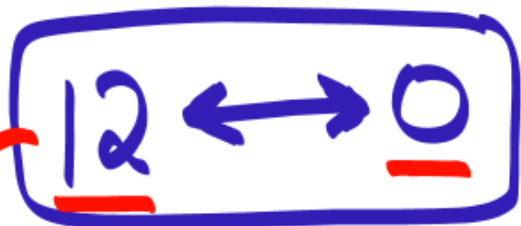
$$330 + 18$$

$$= 348^\circ$$



$$00:48 \leftrightarrow 12:48$$

H M
12:48



00:48
H M

$$30 \times 0 + 48 \times \frac{1}{2}$$

$$\Rightarrow 24^\circ \checkmark$$

12:48

$$30 \times 12 + 48 \times \frac{1}{2}$$

$$360 + 24 \Rightarrow \boxed{384^\circ} - 360^\circ = 24^\circ \checkmark$$

12:06
↓

00:06

$$6 \times \frac{1}{2} = 3^\circ \checkmark$$

5:58

$$30 \times 5 + 58 \times \frac{1}{2}$$

$$150 + 29$$

$$= 179^\circ$$

9:42

$$30 \times 9 + 42 \times \frac{1}{2}$$

$$270 + 21$$

$$= 291^\circ$$

1:17

$$30 \times 1 + 17 \times \frac{1}{2}$$

$$30 + 8.5^\circ$$

$$38.5^\circ \checkmark$$

Minute Hand (मिनट वाली सुई)

1 Hr
60 min

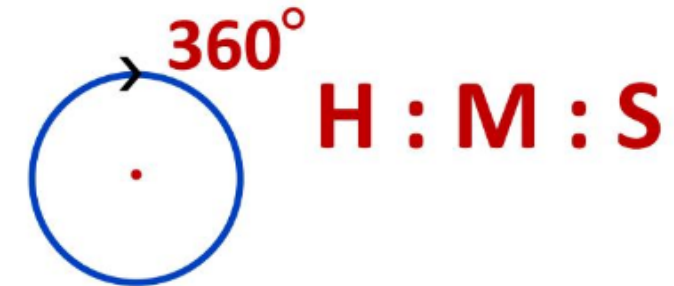
1 चक्कर
 360° 1 Hr

1 min [60 sec]

$\frac{360}{60} = 6^\circ$ 1 min

1 sec

$\frac{6}{60} = \left(\frac{1}{10}\right)^\circ$ 1 sec



मिनट सुई द्वारा बनने वाला कोण
Angle formed by minute Hand

FORMULA

$$\theta^\circ = 6^\circ M + \left(\frac{1}{10}\right)^\circ S$$

$$\theta^\circ = 360^\circ H + 6^\circ M + \frac{1}{10}^\circ S$$



Total Angle covered in
5:16:30 duration?

Two types of Questions
दो प्रकार के प्रश्न

Time Duration

मिनट की सुई द्वारा
5:16:30 में बताने
वाला कुल कोण

Total Angle

$$5 \times 360 + 16 \times 6 + 30 \times \frac{1}{10}$$

$$\Rightarrow 1800 + 96 + 3$$

$$= \underline{1899^\circ}$$

Exact Time

5 बजे 16 min and 30 sec पर मिनट की
सुई द्वारा बताने वाला कोण

$$6m + \frac{1}{10}s$$

$$16 \times 6 + 30 \times \frac{1}{10}$$

$$96 + 3 = 99^\circ$$

Example

Q1 ✓ in 12 minute and 50 seconds, what is the Angle formed by minute Hand?
Q2 ✓ 28 minute 50 Sec में मिनिट सुई द्वारा बनने वाला कोण?

Q2

$$\theta_m = 6M + \frac{1}{10}S$$

$$= 28 \times 6 + \frac{50}{10}$$

$$\Rightarrow 168 + 5 = 173^\circ$$

Q1

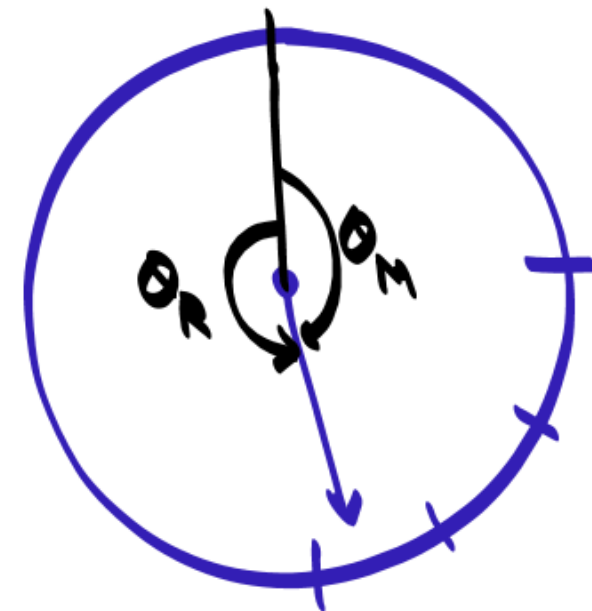
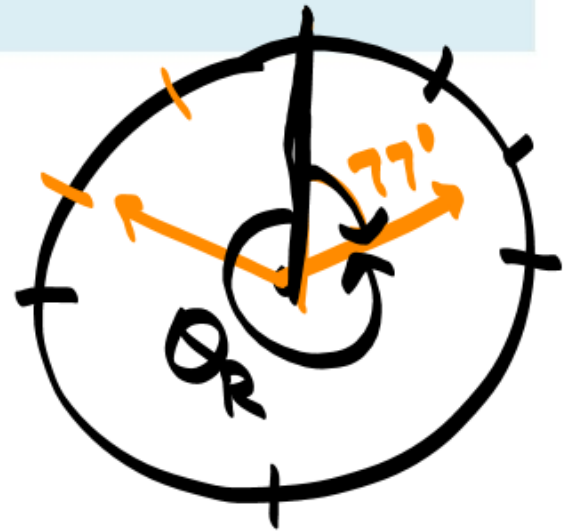
12 : 50



$$12 \times 6 + \frac{50}{10}$$

$$72 + 5 = 77^\circ \checkmark$$

$$\theta_R = 360 - 77 = 283^\circ$$



$$\theta_m = 173^\circ$$

$$\theta_R = 360 - 173 = 187^\circ$$



Second Hand (FASTEST HAND of clock) /
सेकंड वाली सुई

1 min
60 sec

1 चक्कर

360°

1 sec

$$\frac{360}{60} = 6^\circ$$

$$\theta_s^\circ = 6s$$

$$\theta_s = 360^\circ m + 6^\circ s$$



Example

Angle formed by Second Hand in 25 sec?

25 sec में सेकण्ड वाली सुई द्वारा बनाया गया कोण?

$$\theta_s = 25 \times 6 = 150^\circ$$

$$\theta_R = 360 - 150 = 210^\circ$$

Reflex Angle
वृत्त कोण



Example: Calculate Second Hand Angle
सेकंड की सुई द्वारा बनने वाला कोण?

in 12 sec

$$12 \times 6 \\ = 72^\circ$$

10 sec

$$10 \times 6 \\ 60^\circ$$

17 sec

$$17 \times 6 \\ = 102^\circ$$

15 min; 16 sec

$$16 \times 6 = 96^\circ$$

$$15 \times 360^\circ + 96^\circ$$

$$5400 + 96$$

$$= 5496^\circ$$

total Angle
duration

5:40:20

$$20 \times 6 = 120^\circ \checkmark$$

Total Rotation degree Based (कोणीय दूरी) कुल घूर्णन कोण ?

Example

what is total angle Covered/made by Minute Hand in 1hr, 37 min, 30sec ?
1 : 37 : 30 मे मिनट सुई कितना घूम चुकी होगी?

$$Q_m = 6M + \frac{1}{10}S$$

$$Q_m = \underline{360^\circ H} + 6M + \frac{1}{10}S \quad \text{--- Total duration Angle}$$

$$Q_m = 360 \times 1 + 6 \times 37 + \frac{30}{10} = 360 + 222 + 3 \\ \Rightarrow 585^\circ$$

