

Angle between HH & MH →

2:42 Angle b/w HH-MH

$$\left[\theta = 30H - 11\frac{M}{2} \right]$$

Method-I

Start

2:00 $\xrightarrow{42 \text{ min. moment}}$ to 2:42

MH

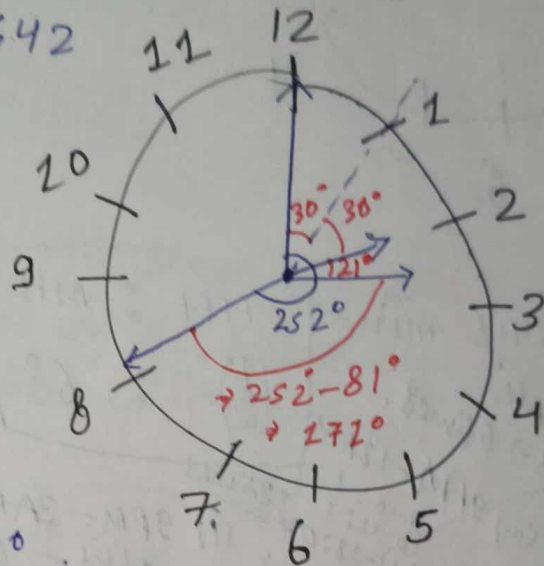
$$1' \rightarrow 6^\circ$$

$$42' \rightarrow 252^\circ$$

HH

$$1' \rightarrow \frac{1}{2}^\circ$$

$$42' \rightarrow 42 \times \frac{1}{2} = 21^\circ$$



$$\theta = 30 \times 2 - 11 \times \frac{42}{2}$$

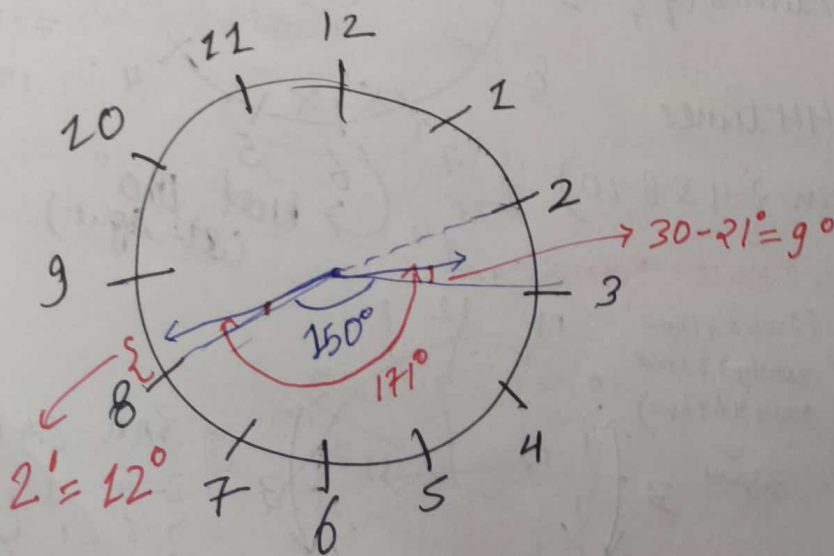
$$\begin{array}{r} 11 \\ 31 \\ 22 \times \\ \hline 231 \\ 60 \end{array}$$

171°
One angle

360° - 0
Second angle

Ans → $252^\circ - 81^\circ = 171^\circ$
 \downarrow (MH from 12) \downarrow (HH from 12)

Method-II

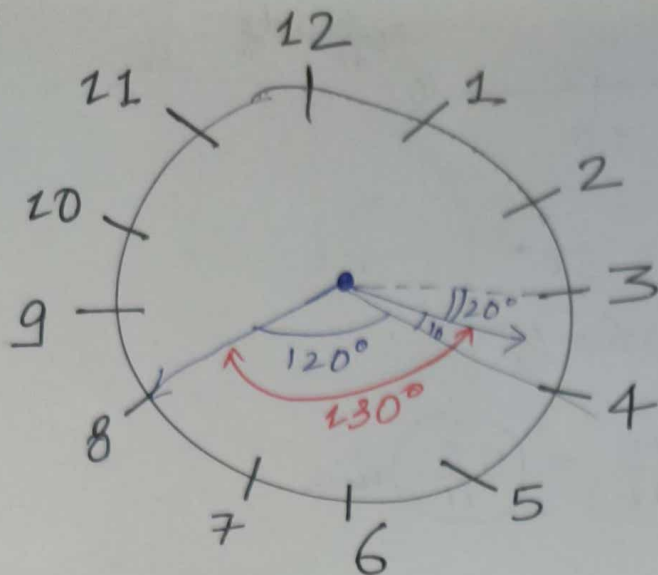


$$\begin{array}{r} 9^\circ \\ + 150^\circ \\ + 12^\circ \\ \hline 171^\circ \end{array}$$

Pages (72)

Q4 →

(3:40)



Meeting Time

- coincide
- straight
- 1 hr

Date
3/03/23

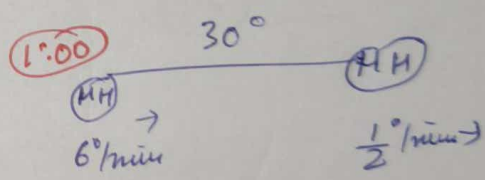
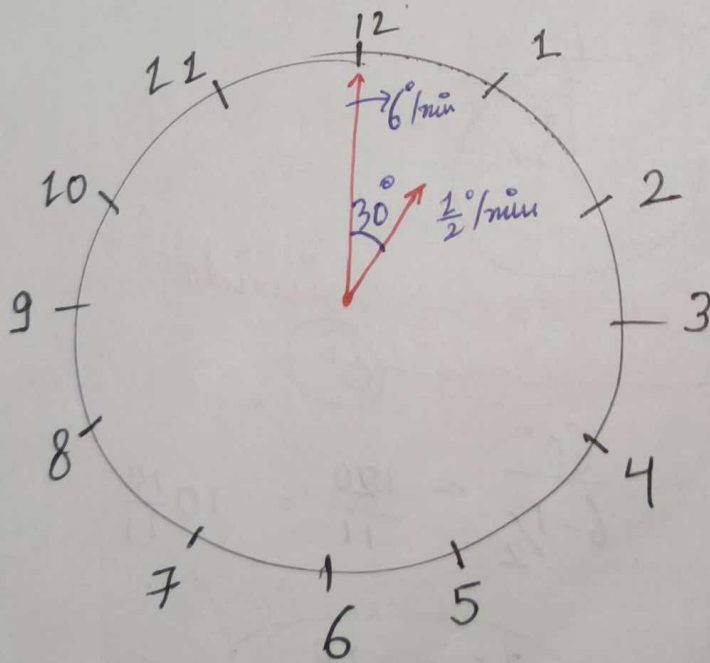
HH
40' → $\frac{1}{2}^\circ$
40' → $40 \times \frac{1}{2} = 20^\circ$

Angle b/w HH & MH
8:47 H=8
M=47

$$\begin{aligned} \theta &= 30 \times 8 - \frac{11 \times 47}{2} \\ &= 240 - \frac{517}{2} \\ &= 240 - 258.5 \\ &= -18.5^\circ \\ &\text{(Ignore)} \\ &= 18.5^\circ \end{aligned}$$

Coincide

* Between 1' O'clock and 2' O'clock at what time HH-MH coincide?



$$1:00 + \frac{30}{6 - \frac{1}{2}}$$

$$\frac{60}{11} = 5\frac{5}{11} \text{ min}$$

$$1:00 + 5\frac{5}{11}$$

$$= 1:05\frac{5}{11} \text{ min}$$

$$1:05 \text{ min} : \frac{5}{11} \times 60 \text{ sec}$$

$$1:05 : 27.27 \text{ sec}$$

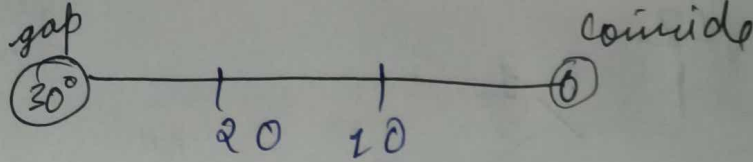
Alternative

$$\theta = 30H - \frac{11}{2}M$$

$$\theta = 0^\circ$$

$$0 = 30 \times 1 - \frac{11}{2}M$$

$$M = \frac{60}{11} = 5\frac{5}{11} \Rightarrow 1:05\frac{5}{11}$$



1:00 + $\frac{30^\circ}{6 - \frac{1}{2}}$

To initial time note hai usko freeze kar do

$= \frac{60}{11} = \left(5 \frac{5}{11}\right) \text{ min}$

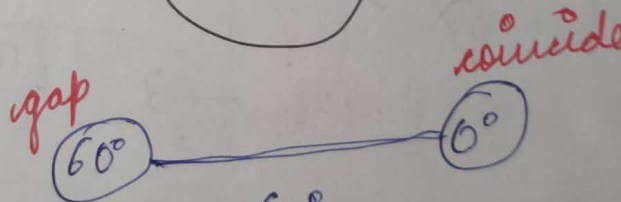
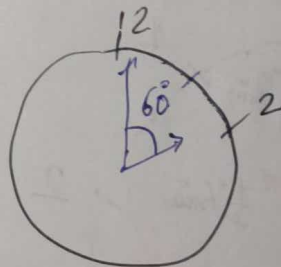
$1:00 + 5 \frac{5}{11} = 1:05 \frac{5}{11} \text{ min}$

$1:05 \text{ min} : \frac{5}{11} \times 60 \text{ sec}$

$\frac{300}{11}$

1:05 : 27.27 sec

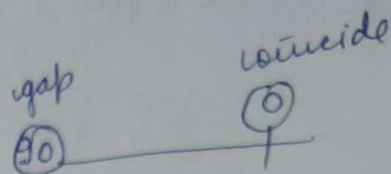
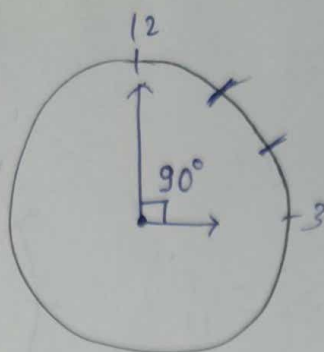
2-3



$\frac{60^\circ}{6 - \frac{1}{2}} = \frac{120}{11} = 10 \frac{10}{11}$

2:40 $\frac{10}{11}$

WB ①



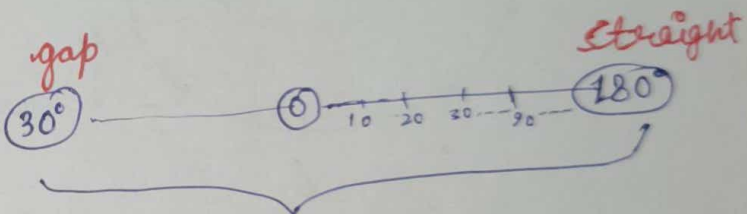
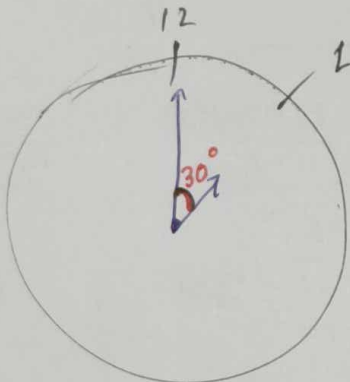
$$3:00 + \frac{90}{6 - \frac{1}{2}}$$

$$3:00 + \frac{180}{11} = 3:16 \frac{4}{11}$$

3:16 $\frac{4}{11}$ Ans

Meeting time : Straight 180°

Ex 2 Between 1 o'clock and 2 o'clock at what time HH and MH will be straight to each other?

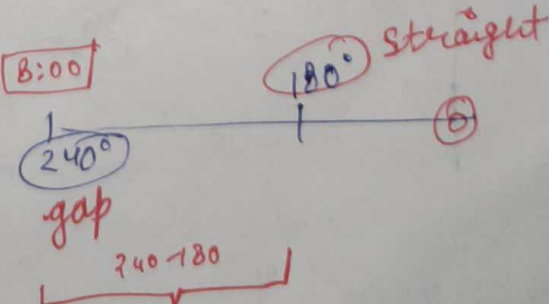
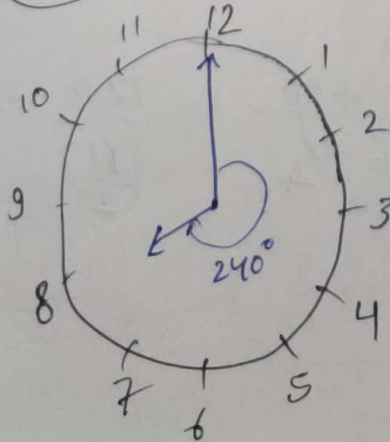


$$1:00 + \frac{30 + 180}{6 - \frac{1}{2}} = \frac{210}{6 - \frac{1}{2}} = \frac{210}{\frac{11}{2}}$$

$$\Rightarrow \frac{420}{11} = 38 \frac{2}{11}$$

1:38 $\frac{2}{11}$ Ans

Ex 3 ⑧-⑨



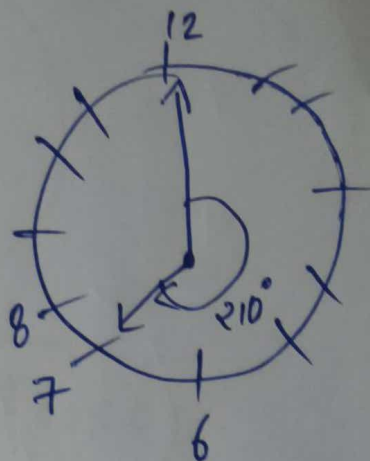
$$\frac{60}{6 - \frac{1}{2}} = \frac{120}{11} = 10 \frac{10}{11}$$

8:10 $\frac{10}{11}$ Ans

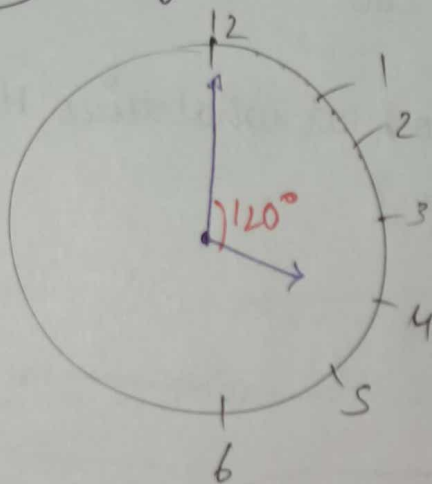
7-8 Straight

$$210^\circ + \frac{30^\circ}{6 - \frac{1}{2}} = \frac{60}{11} = 5 \frac{5}{11}$$

$$7:00 + 5 \frac{5}{11} = 7:05 \frac{5}{11}$$

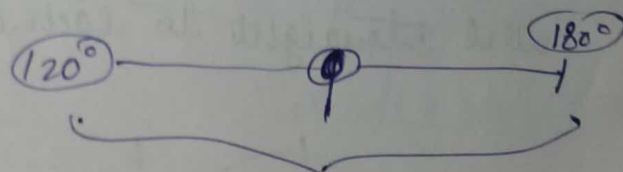


4-5 Straight



4-5

4:00



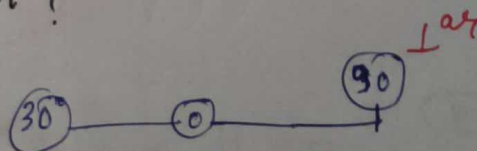
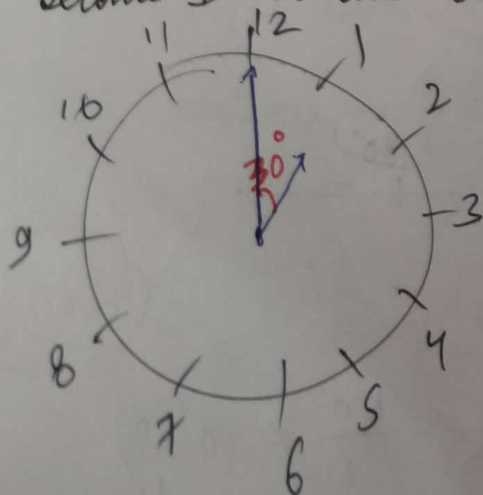
$$\frac{120 + 180}{6 - \frac{1}{2}} = \frac{300}{1 \frac{1}{2}} = \frac{600}{11}$$

4:54 $\frac{6}{11}$ Ans

$$= 54 \frac{6}{11}$$

Meeting Time (1st 90°/270°)

Q. B/w 1'o clock - 2'o clock, at what time MH/HH become 1st to each other?



$$\frac{30 + 90}{6 - \frac{1}{2}} = \frac{120}{\frac{11}{2}} = \frac{240}{11}$$

1:21 $\frac{9}{11}$

and

$$= 21 \frac{9}{11}$$

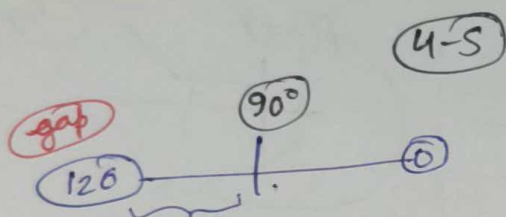


$$\frac{30^\circ + 270^\circ}{6 - \frac{1}{2}} = \frac{300}{(\frac{11}{2})}$$

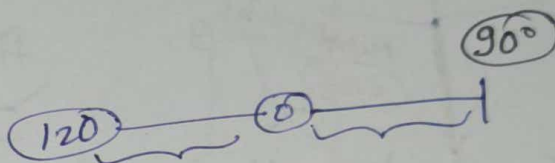
$$= \frac{600}{11} = 54 \frac{6}{11}$$

and

$$1:54 \frac{6}{11}$$



$$\frac{30^\circ}{6 - \frac{1}{2}} = \frac{60}{11} = 5 \frac{5}{11}$$



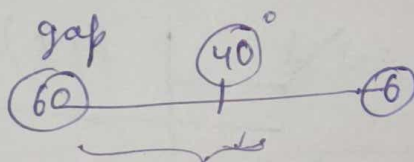
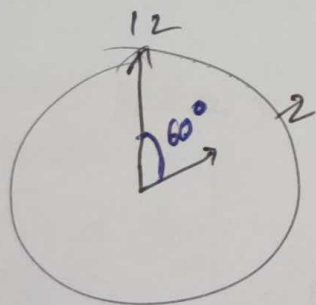
$$\frac{120^\circ + 90^\circ}{6 - \frac{1}{2}} = \frac{420}{11} = 38 \frac{2}{11}$$

$$4:05 \frac{5}{11}$$

and

$$4:38 \frac{2}{11}$$

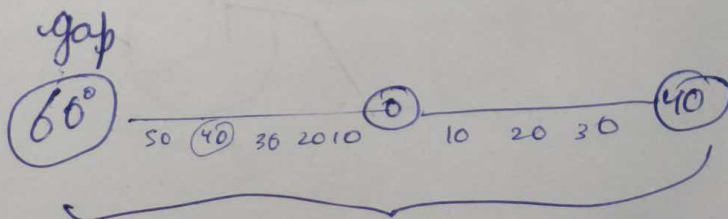
9:6



$$\frac{20}{6 - \frac{1}{2}} = \frac{40}{11} = 3 \frac{7}{11}$$

and

$$2:03 \frac{7}{11}$$

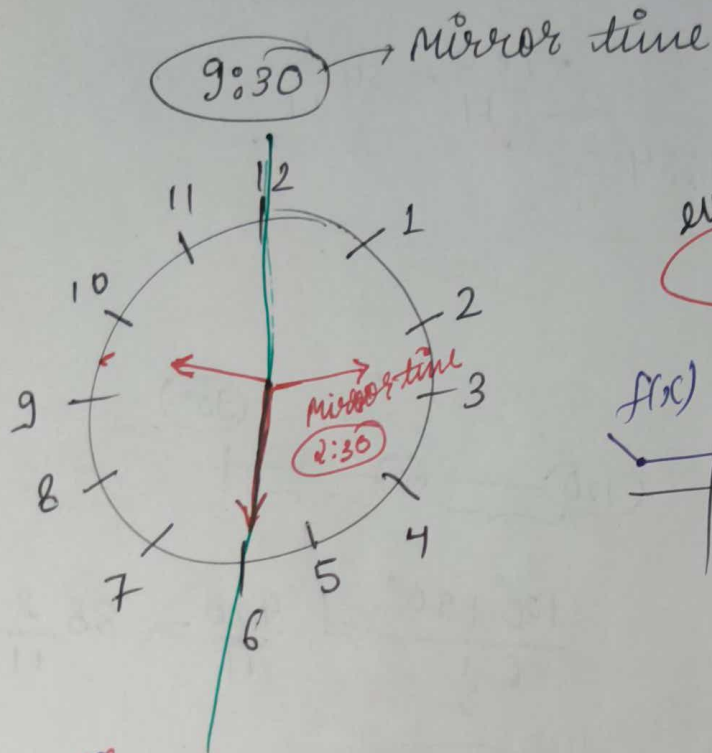


$$2:18 \frac{7}{11}$$

$$\frac{60 + 40}{6 - \frac{1}{2}} = \frac{200}{11} = 18 \frac{2}{11}$$

Miscellaneous

Mirror time



or

12 - 9:30

Mirror time
2:30

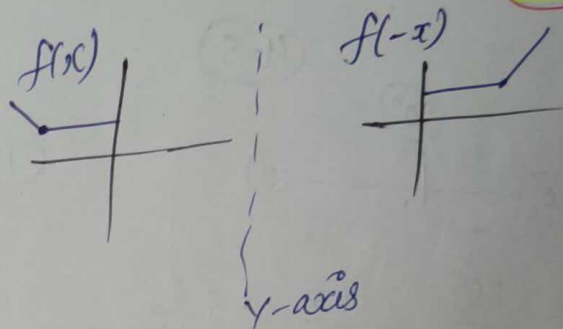
even Mirror image

$$f(-x) = f(x)$$

Rotate the graph around

Y-axis

Page from

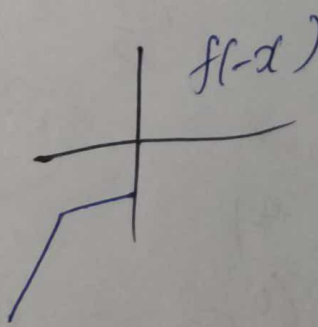
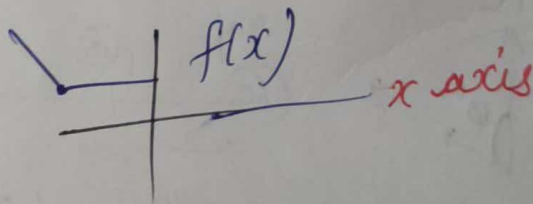


odd Water image

$$f(-x) = -f(x)$$

Rotate the graph around

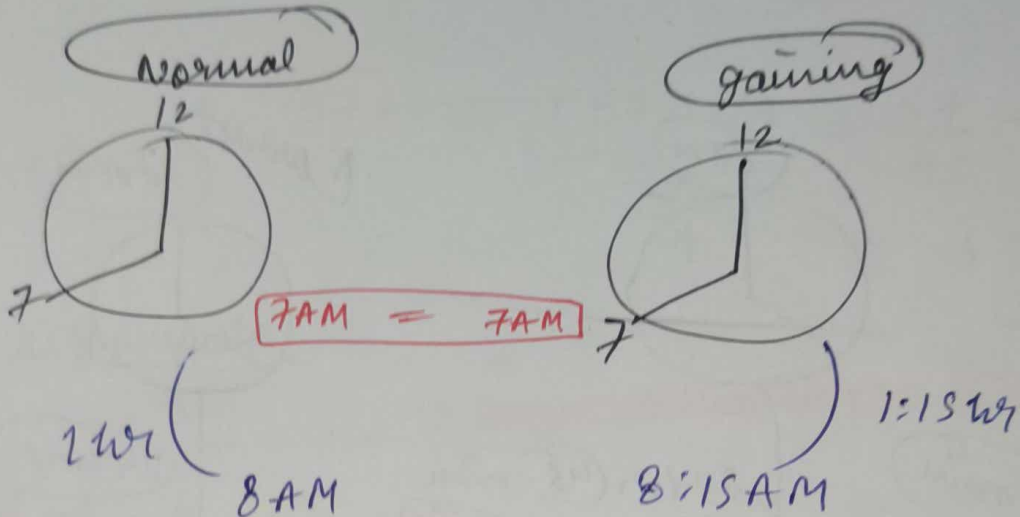
X-axis



Gain/Loss

gaining clock → gains 15 min/day hr

Q In how many ways hr Both will show same time again. AM/PM does not matter

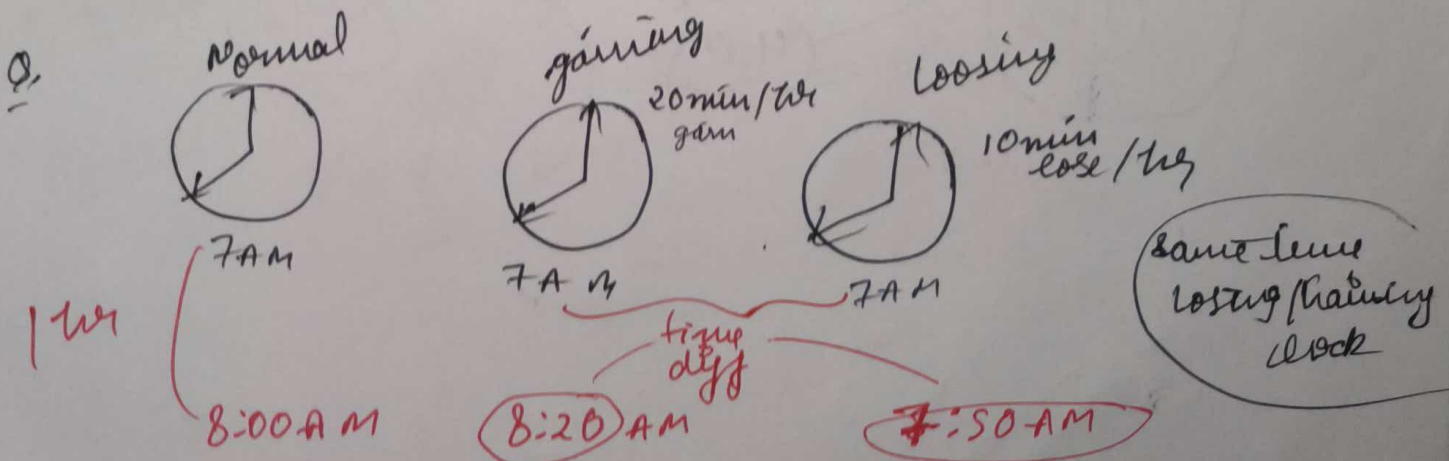


diff 15 min $\frac{1}{4}$ hr

1 hr 1 hr 4 hr

Always go with (12) hr diff

12 hr $12 \times 4 = 48$ hrs Ans.



diff - Normal

$30 \text{ min} = \frac{1}{2} \text{ hr}$

1 hr

1 hr

2 hr

12 hr

24 hr

T-20

loss



15 min

23 hr 45 min

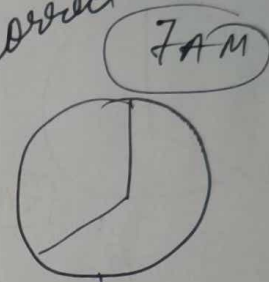
15 min

6:45

add

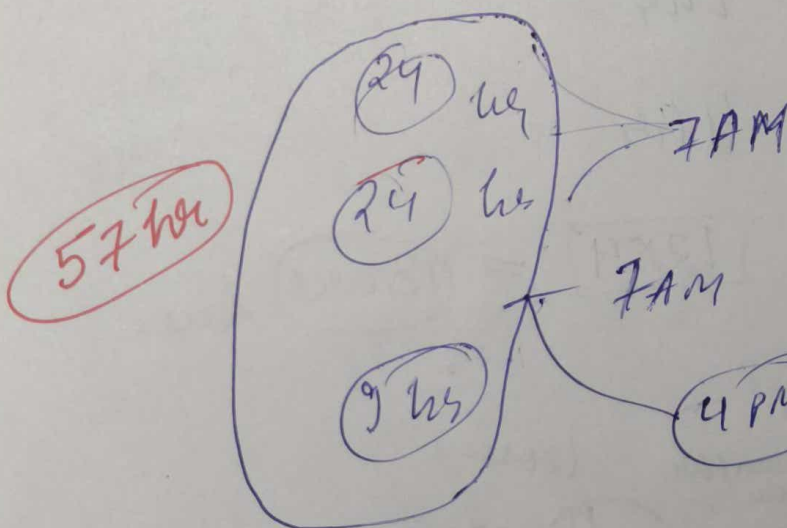
to get correct time

Correct



24 hrs

7 AM



57 hr

7 AM

4 PM

add 36 min

4:36 Ans

$$45_{\text{min}} = \frac{45}{60} \text{ hr}$$

$$23 \text{ hr } 45 \text{ min} = 23 \frac{3}{4} \text{ hr} = \frac{95}{4}$$

losing

$$\boxed{\frac{95}{4}} \text{ hr}$$

add

to get the correct time

$$15 \text{ min} = \frac{1}{4} \text{ hr}$$

$$\textcircled{57} \rightarrow \frac{57 \times \frac{1}{4}}{\frac{95}{4}} = \frac{57}{95} = \frac{3}{5} \text{ hr} = \frac{3 \times 60}{5} = \textcircled{36} \text{ min}$$

For self purpose

↳

Angle b/w minute hand and hour hand

$$\theta^\circ = \frac{11}{2} \times \text{Minute} - 30 \times \text{Hour}$$

Q what will be the value of an angle in the 1 minute b/w the minute and the hourly needle of the clock.

minute

$$1' = 6^\circ$$

Hour

$$1' = \frac{1}{2}^\circ$$

$$6^\circ - \frac{1}{2}^\circ = \textcircled{5.5^\circ}$$