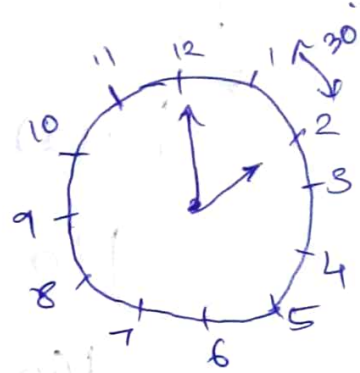


clock

Ln: 1 Angle
 hour hand | minute hand
~~360~~ $\frac{360}{12} = 30^\circ$

60 min = 30°

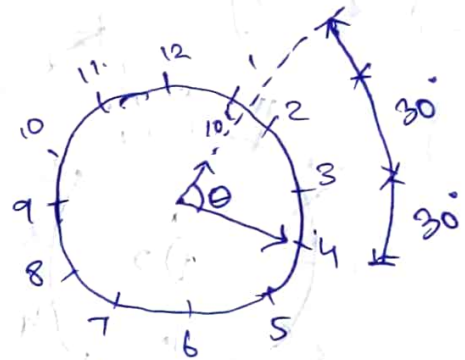
1 min = $\frac{1}{2}$



Ex:
 10 min = 5°
 45 min = 22.5°
2

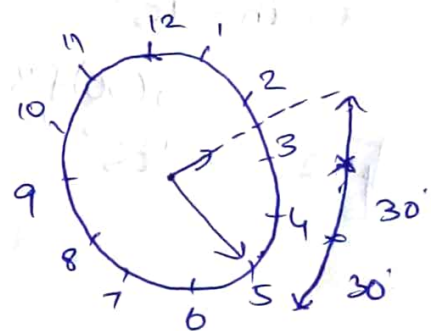
① What is the angle between hour hand and minute hand at 1:20

20 min = 10°
 $= 30 - 10$
 $= 20^\circ$
 $= 30^\circ + 30^\circ + 20^\circ$
 $= 80^\circ$



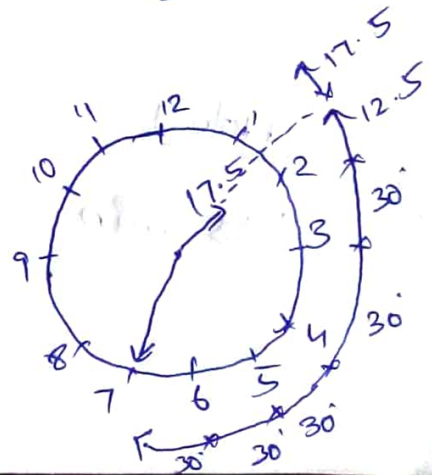
② What is the angle between hour hand and minute hand at 2:25

25 min = 12.5°
 $= 30^\circ - 12.5^\circ$
 $= 17.5^\circ$
 $= 30^\circ + 30^\circ + 17.5^\circ$
 $= 77.5^\circ$



③ 1:35

35 min = 17.5°
 $= 30 - 17.5^\circ$
 $= 12.5^\circ$
 $= 30 + 30 + 30 + 30 + 30 + 12.5^\circ$
 $= 162.5^\circ$



Formula Method:-

$$\left| 30(H) - \frac{11}{2}(M) \right|$$

Ex: 2.25

$$= \left| 30(2) - \frac{11}{2}(25) \right|$$

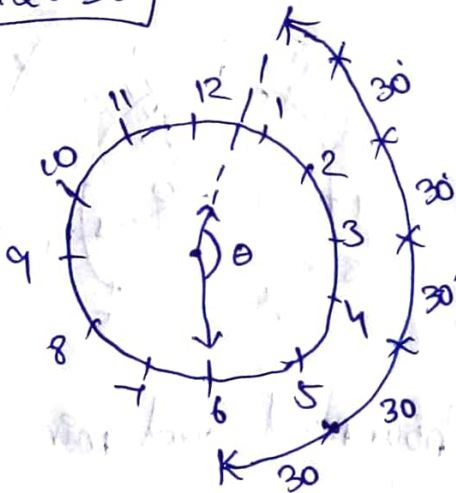
$$= \left| 60 - \frac{275}{2} \right|$$

$$= |60 - 137.5|$$

$$= | -77.5 |$$

$$2.25 \Rightarrow 77.5^\circ$$

③ 12.30



$$30 \text{ min} = 15^\circ$$

$$= 5(30) + 15$$

$$12.30 = 165^\circ$$

1. 20

$$\left| 30(1) - \frac{11}{2}(20) \right|$$

$$|30 - 110|$$

$$|-80|$$

$$80^\circ$$

$$1.20 \Rightarrow 80^\circ$$

Formula:

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

$$= 30(12) - \frac{11}{2}(30)$$

$$= 360 - 165$$

$$= 195^\circ$$

$$= 360 - 195$$

$$= 165^\circ$$



Lesson: 2.

clock Together.

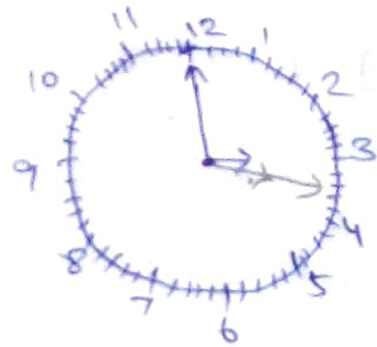
Note: 1

"55 min space gained by minute hand
in 60 minute"

Ex: 30. 3:00 - 4:00

60 space (minute hand) 5 space (hour hand)

55 min



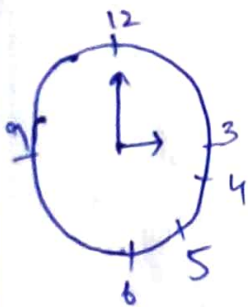
Notes:

$$\frac{300}{11}$$

$$\begin{array}{r} 27.27 \\ 11 \overline{) 300} \\ \underline{22} \\ 80 \\ \underline{77} \\ 3 \end{array}$$

$$= 27.27 \quad 27 \frac{3}{11}$$

① At what time between 3 o'clock and 4 o'clock the hand of the clock be together.



$$55 = 60$$

$$15 = x$$

$$55x = 60 \times 15$$

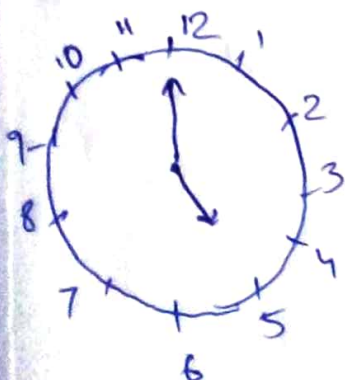
$$x = \frac{60 \times 15}{55}$$

$$x = \frac{180}{11}$$

$$\begin{array}{r} 16 \\ 11 \overline{) 180} \\ \underline{70} \\ 66 \\ \underline{4} \end{array}$$

$$16 \frac{4}{11} \text{ past } 3$$

② At what time between 5 o'clock and 6 o'clock the hand of the clock together



$$55 = 60$$

$$25 = x$$

$$55x = 60 \times 25$$

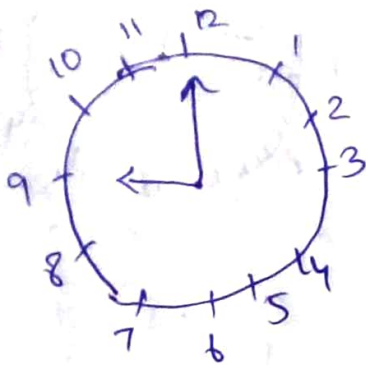
$$x = \frac{60 \times 25}{55}$$

$$= \frac{300}{11}$$

$$= 27 \frac{3}{11} \text{ past } 5$$

$$\begin{array}{r} 27.27 \\ 11 \overline{) 300} \\ \underline{22} \\ 80 \\ \underline{77} \\ 3 \end{array}$$

③ 9.00 to 10.00



$$55 = 60$$

$$45 = x$$

$$x = \frac{60 \times 45}{55}$$

$$= \frac{60 \times 9}{11}$$

$$= \frac{540}{11}$$

$$= 49 \frac{1}{11} \text{ past 9}$$

$$\begin{array}{r} 49 \\ 11 \overline{) 540} \\ \underline{44} \\ 100 \\ \underline{99} \\ 1 \end{array}$$

Lesson #3.

clock opposite

① What time between 7'o clock and 8'o clock the hands of clock be in opposite direction.

$$\begin{array}{r} 5 \\ 11 \overline{) 60} \\ \underline{55} \\ 5 \end{array}$$

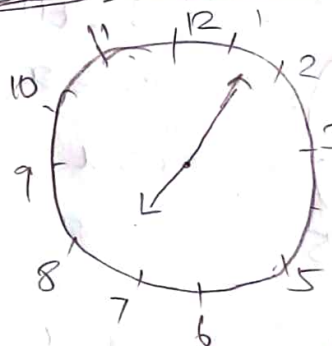
$$5 \frac{5}{11} \text{ past 7}$$

$$55 = 60$$

$$5 = x$$

$$x = \frac{60 \times 5}{55}$$

$$= \frac{60}{11}$$



② At what time between 3'o clock and 4'o clock the hands of the clock be in opposite direction.

$$\begin{array}{r} 49 \\ 11 \overline{) 540} \\ \underline{44} \\ 100 \\ \underline{99} \\ 1 \end{array}$$

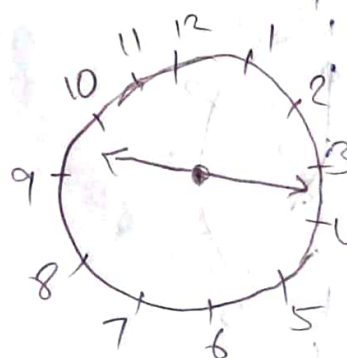
$$49 \frac{1}{11} \text{ past 3}$$

$$55 = 60$$

$$45 = x$$

$$x = \frac{60 \times 45}{55}$$

$$= \frac{540}{11}$$



③ 4'o clock to 5'o clock opposite direction

$$\begin{array}{r} 54 \\ 11 \overline{) 600} \\ \underline{55} \\ 50 \\ \underline{44} \\ 6 \end{array}$$

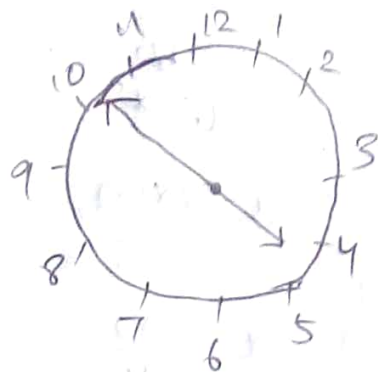
$$54 \frac{6}{11} \text{ past } 4$$

$$55 = 60$$

$$50 = x$$

$$x = \frac{60 \times 50}{55}$$

$$x = \frac{600}{11}$$



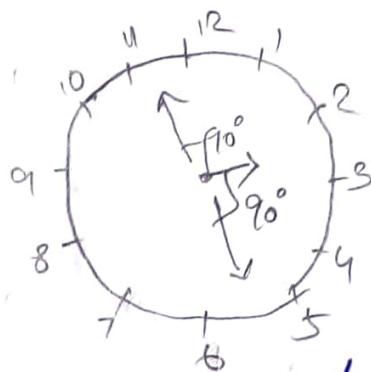
LESSON 4

Right Angle.

$$0^\circ = 180^\circ = 90^\circ$$



2 Answer



① At what time between 4'o clock and 5'o clock will both the hands of clock be at right angle.

$$\begin{array}{r} 38 \\ 11 \overline{) 420} \\ \underline{33} \\ 90 \\ \underline{88} \\ 2 \end{array}$$

$$\begin{array}{l} 55 = 60 \\ 35 = x \end{array}$$

$$x = \frac{60 \times 35}{55}$$

$$x = \frac{420}{11}$$

$$38 \frac{2}{11} \text{ past } 4$$

$$\begin{array}{l} 55 = 60 \\ 5 = x \end{array}$$

$$x = \frac{60 \times 5}{55}$$

$$x = \frac{60}{11}$$

$$5 \frac{5}{11} \text{ past } 4$$



$$\begin{array}{r} 5 \\ 11 \overline{) 60} \\ \underline{55} \\ 5 \end{array}$$

② 7-8

$$\begin{array}{r} 54 \\ 11 \overline{) 600} \\ \underline{55} \\ 50 \\ \underline{44} \\ 6 \end{array}$$

$$55=60$$

$$50=x$$

$$x = 60 \times 50$$

$$55$$

$$x = \frac{600}{11}$$

$$54 \frac{6}{11} \text{ past } 7$$

$$55=60$$

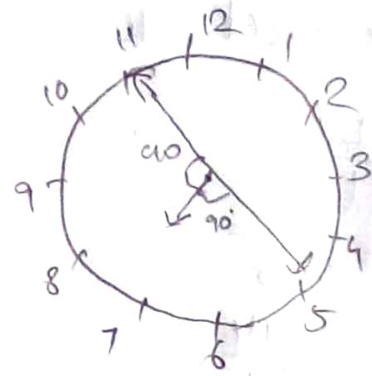
$$80=x$$

$$x = 60 \times 20$$

$$55$$

$$= \frac{240}{11}$$

$$21 \frac{9}{11} \text{ past } 7$$

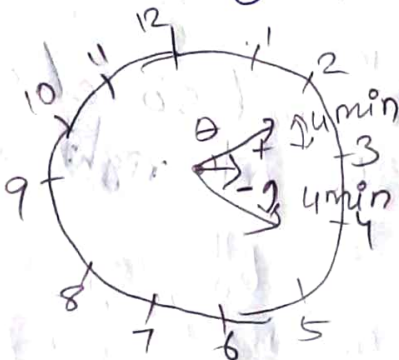


$$\begin{array}{r} 21 \\ 11 \overline{) 240} \\ \underline{22} \\ 20 \\ \underline{11} \\ 9 \end{array}$$

LESSON #5

Apart?

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



$$60 \text{ min} \rightarrow 360^\circ$$

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

① At what time between 3 o'clock and 4 o'clock will both hands of clock be 4 min apart?

$$1 \text{ min} \Rightarrow 6^\circ \times 4 = 24^\circ$$

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

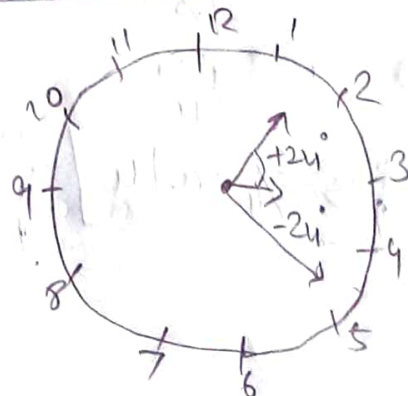
$$24 = 90(3) - \frac{11}{2}(M)$$

$$24 = 90 - \frac{11}{2}M$$

$$\frac{11}{2}M = 66$$

$$M = \frac{132}{11} = 12$$

$$= 12 \text{ past } 3$$



$$-24 = 30(3) - \frac{11}{2} M$$

$$-24 = 90 - \frac{11}{2} M$$

$$\frac{11}{2} M = 114$$

$$M = \frac{228}{11}$$

$$M = 20 \frac{8}{11} \text{ past } 3$$

⑨ At what time between 5 o'clock and 6 o'clock will both the hands of a clock be 3 min apart

$$1 \text{ min} \Rightarrow 6^\circ \times 3 = 18^\circ$$



$$18 = 30(5) - \frac{11}{2} M$$

$$18 = 150 - \frac{11}{2} M$$

$$\frac{11}{2} M = 132$$

$$M = \frac{264}{11}$$

$$M = 24 \text{ min past } 5$$

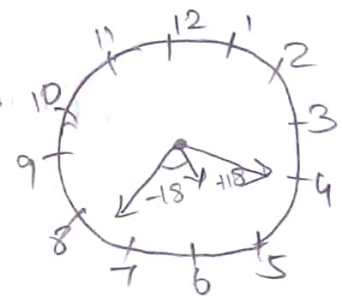
$$-18 = 30(5) - \frac{11}{2} M$$

$$-18 = 150 - \frac{11}{2} M$$

$$\frac{11}{2} M = 168$$

$$M = \frac{336}{11}$$

$$M = 30 \frac{6}{11} \text{ past } 5$$



LESSON #6.

Loss / Gain

	Normal	Gain	Loss	Normal	slow/loss
Gain	5:00	5:05		5:00	5:00
	6:00	6:10		6:00	5:55
	7:00	7:15		7:00	6:50

Increase

Decrease

$45\frac{4}{5}$ hours

hour + min

45 hour $\frac{4}{5} \times 60$ min

45 hour 48 min

- ① Akash saw the clock when it was set right 8 am. The clock gains 5 minutes in an hour. What time will it show at 8 pm at same day?

8.00 am $\xrightarrow{5\text{min}}$ 8.00 pm

1 hr \rightarrow 5 min

12 hr $\rightarrow 12 \times 5$
 $= 60$ min

8.00 pm \rightarrow 9.00 pm.

- ② If a clock gains 5 minutes every hour and it set correctly at 5 am, then at what time will show at 10 am at the same day?

5.00 am $\xrightarrow{5\text{min}}$ 10.00 am.

1 \rightarrow 5 min.

5 hr $\rightarrow 5 \times 5$
 $= 25$ min.

10.00 am \rightarrow 10.25 min. am.

③ Rayu observed that a watch loses 5 seconds in one hour which was set right at 7 am. what time will it show at 2 pm on the same day.

7.00 am $\xrightarrow{5 \text{ sec.}}$ 2.00 pm.

1 hr \rightarrow 5 sec

$7 \times 5 \rightarrow 35 \text{ sec}$

2.00 pm \rightarrow 1.59.25 sec.