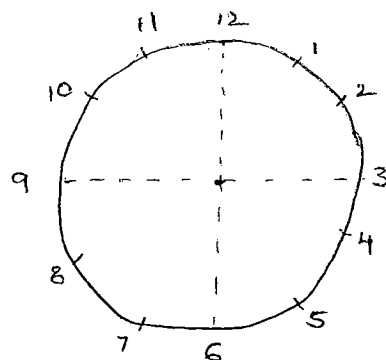


CLOCKS

62



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

$$\boxed{1 \text{ min} = 6^\circ}$$

$$12 \text{ hours} = 360^\circ$$

$$\boxed{1 \text{ hour} = 30^\circ}$$



$$60 \text{ min} = 30^\circ$$

$$1 \text{ min} = \frac{1}{2}^\circ$$

The difference between minutes and hours are

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

1. In a clock of 12 hours the minutes hand and hours hand are coincide into each other. the angle between them is 0° is in 11 times.
2. In a clock of 12 hours the minutes hand and hours hand are in opposite direction i.e., the angle between them is 180° is in 11 times \longleftrightarrow
3. In a clock of 12 hours the minutes hand and hours hand are pendicular to each other that is the angle between them is 90° is in 22 times. \updownarrow

4.

$$\boxed{\theta = \frac{11}{2}m - 30h} \quad , \quad \text{if } \frac{11}{2}m > 30h$$

θ = The angle between the minute hand and hour hand

m = minutes

h = hours

$$\boxed{\theta = 30h - \frac{11}{2}m} \quad , \quad \text{if } \frac{11}{2}m < 30h$$

Ex:- What is the angle between minutes and hours hand of a clock at 4 hr 30m.

$$\begin{aligned} A. \quad \theta &= \frac{11}{2}m - 30h \\ &= \frac{11}{2}(30) - 30(4) \\ &= 165 - 120 \\ &= 45^\circ \end{aligned}$$

Ex:- What is the angle between the two hands of a clock when the clock shows 3 hours 25 minutes

$$\begin{aligned} A. \quad \theta &= \frac{11}{2}m - 30h \\ &= \frac{11}{2}(25) - 30(3) \\ \theta &= 47\frac{1}{2}^\circ \end{aligned}$$

Ex:-) At what time between 6 and 7^o are the hands of a clock together.

$$\begin{aligned} A. \quad \theta &= \frac{11}{2}m - 30h \\ @ \text{ Both hands together (coincides) means } \theta &= 0^\circ \end{aligned}$$

$$0 = \frac{11}{2}m - 30(6)$$

$$m = 32\frac{8}{11}$$

\therefore @ 6 hours $32\frac{8}{11}$ min both hands are coincide.

Ex:- A what time between 3 and 4^o are the hands of a clock in the opposite direction

A. Opposite direction, $\theta = 180^\circ$

$$\theta = \frac{11}{2}m - 30h$$

$$180^\circ = \frac{11}{2}m - 30(3)$$

$$m = 49\frac{1}{11}$$

@ 3 hours $49\frac{1}{11}$ min.