IFAS CSIR NET

CLOCK HAND PROBLEMS

Q1. A can do a work in 15 days, and B in 20 days. If they work on it together for 4 days, then what fraction of the work is Left?

A → 4 units/day

B → 3 units/day

60 units

(a) $\frac{1}{4}$ (b) $\frac{1}{10}$ (c) $\frac{7}{15}$ (d) $\frac{8}{15}$

LCM method!

A+B → 7 units/day

4 days → 28 units

$\frac{32}{60} \quad 8$

15

5 | 15, 20

3, 4

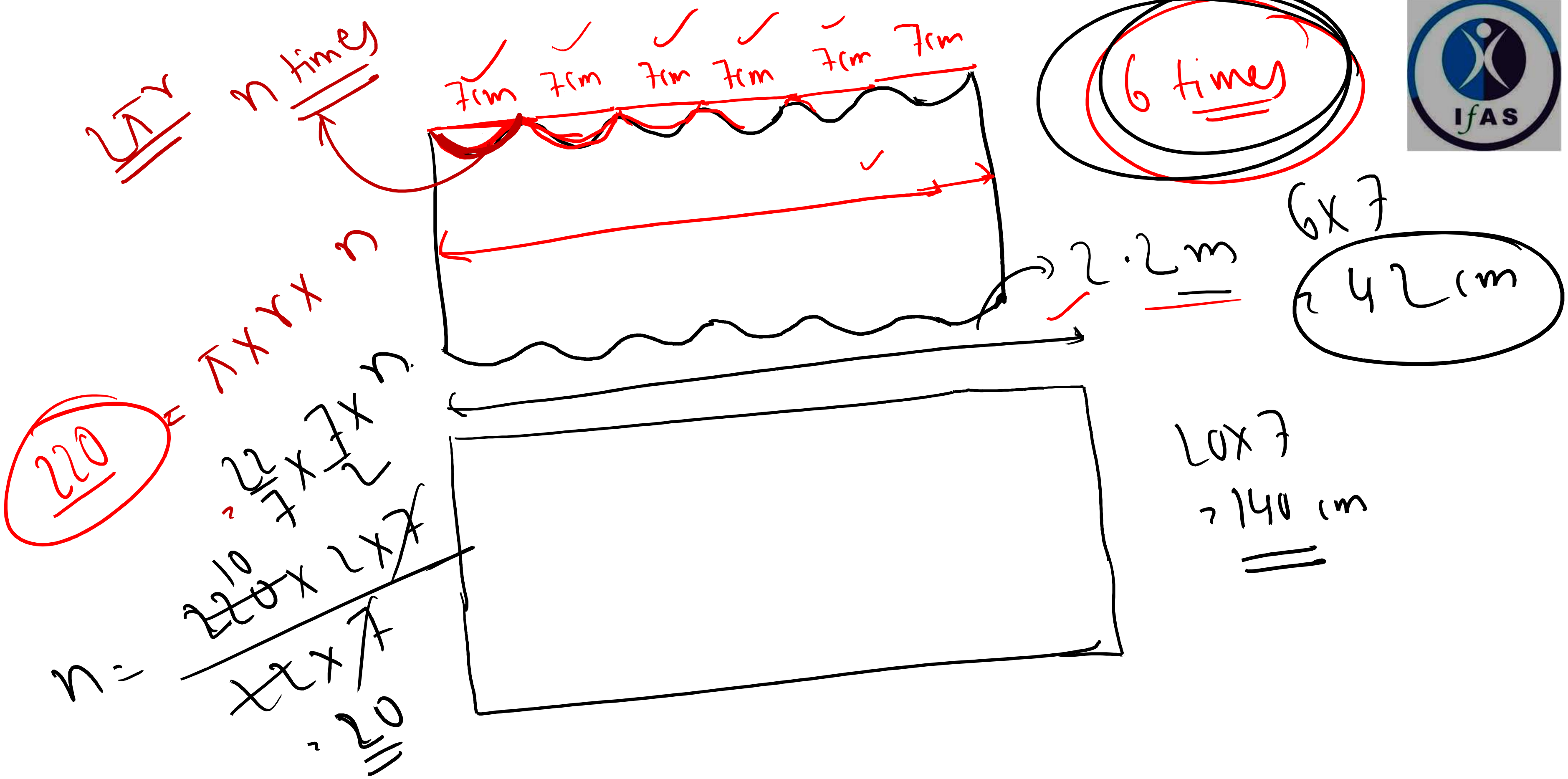
L.C.M. 60

60 − 28 = 32

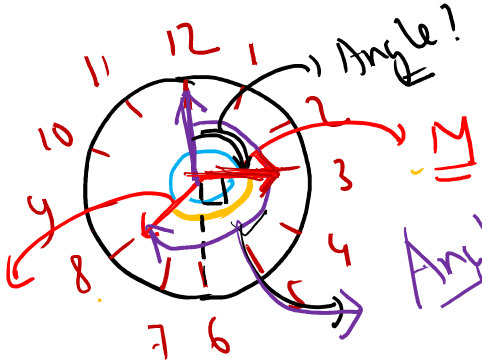
Q.2 A 2.2 meter wide rectangular steel plate corrugated as shown in the diagram, each corrugation is the semi circle in cross section having a diameter of 7 cm. What will be width of steel sheet after it is corrugated?

(1) 1.4 m (2) 1.6 m

(3) 0.7 m (4) 1.1 m


2πr
n times
7cm 7cm 7cm 7cm 7cm 7cm
6 times
2.2m
6x7
= 42 cm
220 = π x r x n
= 22/7 x 7/2 x n
n = 220 x 2 x 7 / 22 x 7
= 20
20x7
= 140 cm

Clock Hand Problems



$0° \leq$ Angle between clock hands $< 180°$

Minute Hand

1 complete rotation $\longrightarrow$ 1 hr (Time)

(360°) (60 mins)

$\Rightarrow$ 1 min $\longrightarrow$ 6^0

Hour Hand

Time

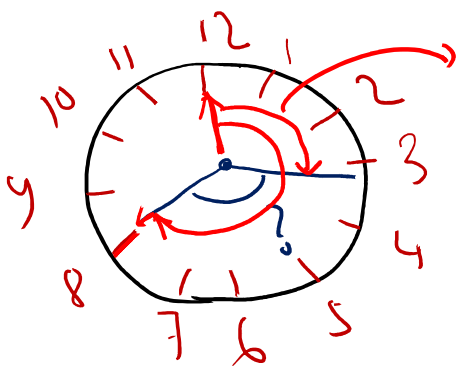
1 complete rotation $\longrightarrow$ 12 hrs

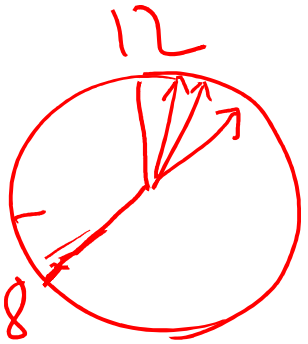
$\Rightarrow 360° \longrightarrow$ 12 hrs

$\therefore$ 1 hr $\longrightarrow 30°$

$\therefore$ 1 min $\longrightarrow \frac{1}{2}°$

What is the angle between the clock hands when the time is 8:16 ?





Sol

Minute hand

16 mins — $16 \times 6^\circ$

$= 96^\circ$

~~Hour hand~~

8 hrs — $(8 \times 30^\circ) = 240^\circ$

16 mins

Hour hand

$8\text{ hrs} + \frac{16}{60}\text{ hrs}$ $= \frac{16}{60}\text{ hrs}$

Angle travelled $= (8 \times 30^\circ) + \left(\frac{16}{60} \times 30^\circ\right)$

$= 248^\circ$

Angle between the clock hands $= 248^\circ - 96^\circ$

$248^\circ - 100^\circ + 4^\circ$

$= 152^\circ$

***

When the time is H (8) hours and M (16) min in clock,

Then the angle between them is

$$= \frac{1}{2} |60H - 11M|$$

Q. Time 8:16, Angle = ?

8H, 16M

$$\text{Angle} = \frac{1}{2}|60H - 11m|$$

$$= \frac{1}{2}|(8\times60) - (11\times16)|$$

$$= \frac{1}{2}|480 - 176|$$

$$= \frac{1}{2}\times304^0 = 152^0$$

$|-5| = 5$

$|5| = 5$

$|0| = 0$

Q.2 What is angle between the clock hands when the time is 7:35 AM ?

H M

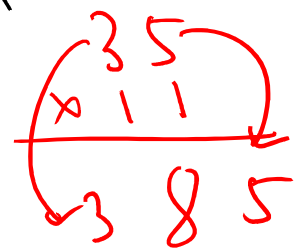
Sol^n

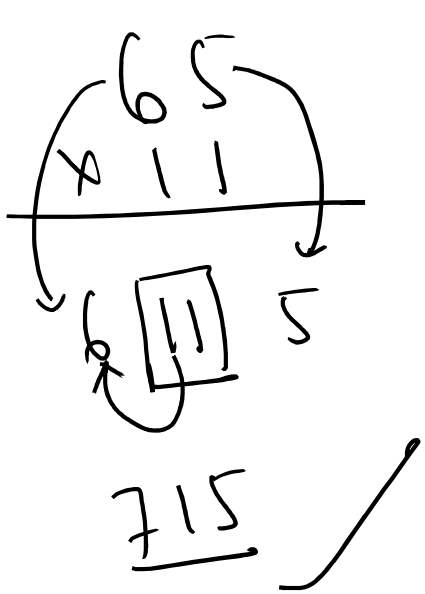
$$\text{Angle} = \frac{1}{2}|60H - 11M|$$

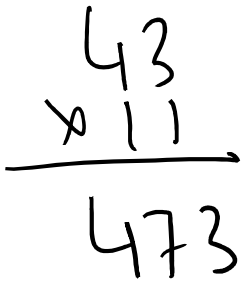
$$= \frac{1}{2}|(60\times 7) - (11\times 35)|$$

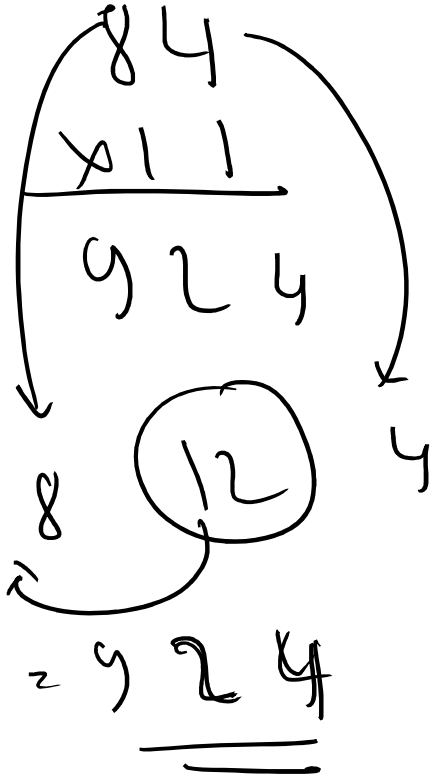
$$= \frac{1}{2}|420 - 385|$$

$$= \frac{35}{2} = 17.5^\circ$$




65
x 11
6 11 5
715


43
x 11
473


84
x 11
924
8 12 4
= 924

Q.2 (CSIR)

At what time after 4 o'clock, the hour and the minute hands will lie opposite to each other?

(1) 4- 50'-31"

(2) 4- 52'- 51'

(3) 4- 53'- 23'

(4) 4 - 54' - 33'

$$\frac{1}{2}\left|60H - 11M\right| = 180^0$$

$|11M - 60H|$

$$\Rightarrow \frac{1}{2}\left|(60\times 4) - 11M\right| = 180^0$$

$$\Rightarrow -240^0 + 11M = 360^0$$

$$\Rightarrow 11M = 600^0$$

$$\Rightarrow M = \frac{600}{11} = 54\frac{6}{11}\ \text{mins} = 32 \sim 33$$

$$\frac{6}{11}\times 60 = \frac{360^0}{11}$$

Q.4 In a day how many times the minute-hand and hour-hand make right angle between them.

(1) 12

(2) 20

(3) 22

(4) 44

1 hr — 2 times → 2×24 = 48

2 – 4 → 1 time ✓

total 2 times (A.M & P.M)

8 – 10 → 2 times (A.M & P.M)

Total. 48 – 2 – 2

= 44

In a period of 12 hours, the hands make an angle of:

(i) 0° with each other (i.e. they coincide with each other) 11 times.

(ii) 180° with each other (i.e. they lie on the same straight line) 11 times.

(iii) 90° or "any other angle" with each other 22 times.

Q. 4 (CSI 13)

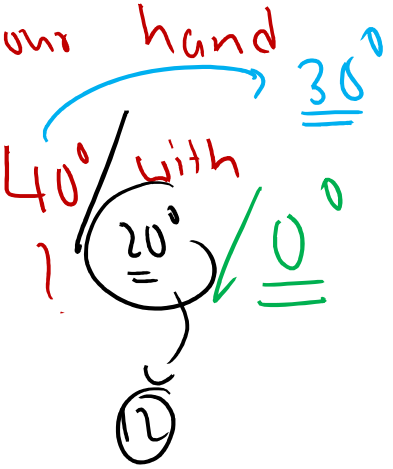
How many times starting at 1:00 PM would the minute hand and hour hand of a clock make an angle of 40° with each other in the next 6 hrs ?

(1) 6

(2) 7

(3) 11

(4) 12



Q.5 How many times the clock hands will coincide between 9:00 PM and 3:00 AM ?

Ans. 5

HAPPY LEARNING

THANKS