Day - 7

① Pythagorean Theorem :-

$$\text{distance} = \sqrt{(5)^2+(3)^2} = \sqrt{25+9}$$

$$= \sqrt{34} \simeq 5.83 \text{ km}$$

② • Facing East
• Turn 90° To the right → South

③ South

④ $D = \sqrt{(10)^2+(4)^2} = \sqrt{100+16} = \sqrt{116} \approx$ 10.77 Km

⑤ $D = \sqrt{(3)^2+(4)^2} = \sqrt{9+16}$

$= \sqrt{25} =$ 5 Km

⑥ Angle $= 3 \times 30° = 90°$

⑦ Angle $= 6 \times 30 = 180°$

⑧ Min hand at 3 (15 min $\times 6° = 90°$)
Hour hand at $12 + (15/60) \times 30° = 7.5°$

Angle $= |90 - 7.5| =$ 82.5°

⑨ west

⑩ They overlap once every 65.45 minute
in 12 hr → 11 times

⑪ 12 km (East)

(12) From west, turning 270° clockwise.
90° → North
180° → East
270° → South

(13) Start: North
45° clockwise → North-East
90° anti clockwise from NE → land at North-west

(14) Net North = 8 − 2 = 6 km
west = 6 km
$$D = \sqrt{6^2 + 6^2} = \sqrt{36 + 36} = \sqrt{72} \simeq 8.49 \text{ km}$$

(15) East 7 km, then west 7 km → cancel out
only Net North = 24 km

(16) Min hand at 20 min = 20 × 60 = 120°
Hr hand at 4:20 = 4 × 30 + (20/60) × 30
= 120 + 10 = 130°
Angle = |130 − 120| = 10°

(17) Min hand : 45 × 6 = 270°
Hr hand : 1 × 30 + (45/60) × 30 =
= 30 + 22.5 = 52.5°
Angle = |270 − 52.5| = 217.5°
Smaller Angle = 360 − 217.5
= 142.5°

(18) $$\theta = \left| 30H - \frac{11M}{2} \right|$$
Let H = 3. Solve for M:
B/w 3:00 & 3:32:44, angle is 90° at
* 3:00 * 3:32:44

(19) Time $= \frac{H \times 60}{11} = \frac{2 \times 60}{11} = \frac{120}{11} \approx 10.91$ min

$= 2:10:55$

(20) They coincide every $360/5.5 \approx 65.45$ sec

in 1 hr $\rightarrow \frac{3600}{65.45} \approx 55$ times

(21) East $\rightarrow$ west cancels $\rightarrow$ Net East $= 0$

North $= 8$ km, South $= 3$ km $\rightarrow$ Net North $= 5$ km

$D = \sqrt{0^2 + 5^2} = 5$ km

(22) $135 + 90 + 225 = 450^\circ \Rightarrow 450^\circ$

mod $360^\circ = 90^\circ$.

Turned 90° from North $\rightarrow$ East

(23) $H = 5$

Cl : Angle $= 90^\circ$

$$90 = \left| 150 - \frac{11M}{2} \right|$$

Case A:

$$150 - \frac{11M}{2} = 90 \Rightarrow \frac{11M}{2} = 60 \Rightarrow M = \frac{120}{11} \approx 10.91 \text{ min}$$

Case B:

$$150 - \frac{11M}{2} = -90 \Rightarrow \frac{11M}{2} = 240 \Rightarrow M = \frac{480}{11} \approx 43.64 \text{ min}$$

Δ^{ngle} at approximately 5:10:55 & 5:43:38

(24) let find time b/w x & x+1 hr

$$M = \frac{(60H \pm 360)}{11}$$

b/t 6 & 7

H = 6

$$M = \frac{(360 - 360)}{11} \Rightarrow M = \frac{720}{11} = 65.45 \text{ min}$$

$$+360 : M = \frac{0}{11} = 0 \text{ min}$$

The hand are oppsite 11 time in 12 hours.

(25) in x minutes, minute hand covers:

∴ Minute angle = 6x.

∴ Hour hand covers:

Hour angle = $\frac{1}{2}x$

we've total:

difference in time b/w hands = 18 minutes.

Mean Angle b/w hands = 18 × 16 = 108°

$$\left|6x - \frac{1}{2}x\right| = 108 \Rightarrow \frac{11x}{2} = 108$$

$$\Rightarrow x = \frac{216}{11} \approx 19.64 \text{ min}$$

The Time is 12 : 19 : 38