Assignment

1) Derive the time taken for the coincidence of minute hand and hour hand.

Ans:- Let the time after 12:00 be x minute

$1 \min = 6° (360°$ in 60 min $)$ [min hand]

$1 \min = 0.5° (30°$ in 60 min $)$ [hour hand]

After x minutes

· Angle by minute hand $= 6x$

· Angle by hour hand $= 0.5x$

$6x = 0.5x + 30$

$\Rightarrow 5.5x = 30$

$x = \dfrac{30}{5.5} = \dfrac{300}{55} = \dfrac{60}{11}$

so, the hands coincide after 60/11 minutes.

$\dfrac{60}{11} \min = 5\min + \dfrac{5}{11} \times 60 \sec = 5\min \ 27.27 \sec$

∴ The minute & hour hand coincide at 5 minutes & 27.27 sec

2) Sid walks 5 km towards the south. Then he turns to the west & walks 10 km. After this he turns to the south & walks 5 km. Again he turns towards East & walks 10 km. How far is he from the starting point.
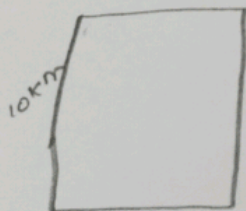
Ans:-

South 5km, west 10km, South 5km, East 10km

South 5km + 5km = 10km

west 10km, East 10km = 10 km

He is 10 km south of the starting point.

3. Rajesh walked 20km towards the north. Then he turned right & walks 30km. Then he turn right & walks 35km. Then he turn left & walks 15 km , finally he turn left & walk 15 m . In which direction and how many meters is he from the starting points.

Ans :- North 20m
    right —> East 30m
    right —> south 35m
    left —> East 15m
    left —> North 15m

Total North & south movement :-
- North : 20m +15m =35m
- South : 35m =Net om

Total East & west movement :-
East :- 30m + 15m =45m

∴ Final position : 45m East from start

$$\boxed{45 \text{ meter East}}$$

4) How many minimum cuts should be made to get 512 small cubes out of Cube 9.

Ans :- Minimum Cuts of 512 Cubs
    $n \times n \times n$ = assuming the cutting cube of size.
∴ To cut a cube of size $8 \times 8 \times 8$

Along Ist dimension =7 cuts
Along 2nd dimension =7 cuts.
Along 3rd dimension =7 cuts.

Total cuts = 7+7+7 = 21

$$\therefore \boxed{21 \text{ cuts}}$$

5) In coloured cube Having a cubes per sides ($n=6$) illestrate how many cubes are

   a) 3 face coloured   b) 2 face coloured

   c) 1 face coloured   d) no face coloured

Ans]

a] 3 face coloured.

   Total small cubes $= 6^3 = 216$.

   corners of a cube $= 8$

   $\boxed{\therefore 8}$

b] 2 face coloured (Edges without corners).

   $(n-2)$

   Number of edges $= 12$

   $6-2 = 4$

   $12 \times 4 = 48$ $\boxed{\therefore 48}$

c] 1 - face coloured (center cube on face)

   $(n-2)^2 = 16$ center cubes.

   Number of faces $= 6$.

   $6 \times 16 = 96$

   $\boxed{\therefore 96}$

d] 0 - face coloured (~~center cubes on fo~~ Interior)

   $(n-2)^3 = 4^3 = 64$

   $\boxed{\therefore 64}$