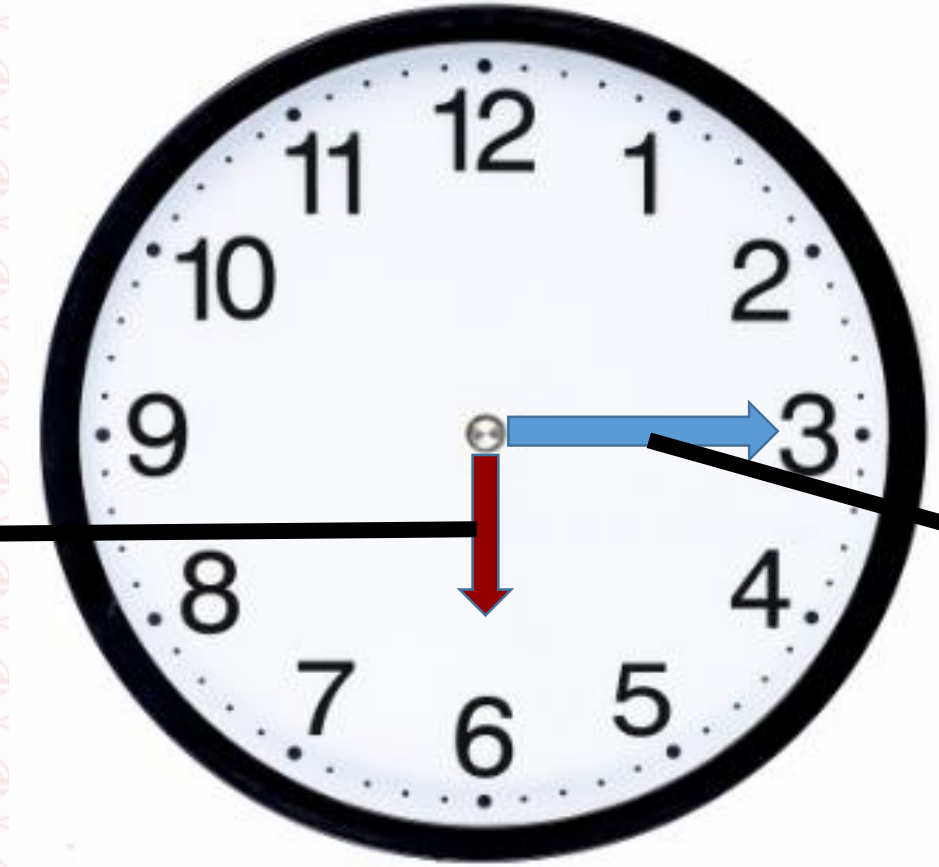
CL  CK

REGULAR CLOCK



Hour Hand

Minute Hand

ABOUT CLOCK

A clock has two hands , the smaller one is called the hour hand while the larger one is called minute hand.

Minute Spaces

The face or dial of watch in a circle whose circumference is divided into 60 equal parts is called minute spaces.

ANGLE PATTERN

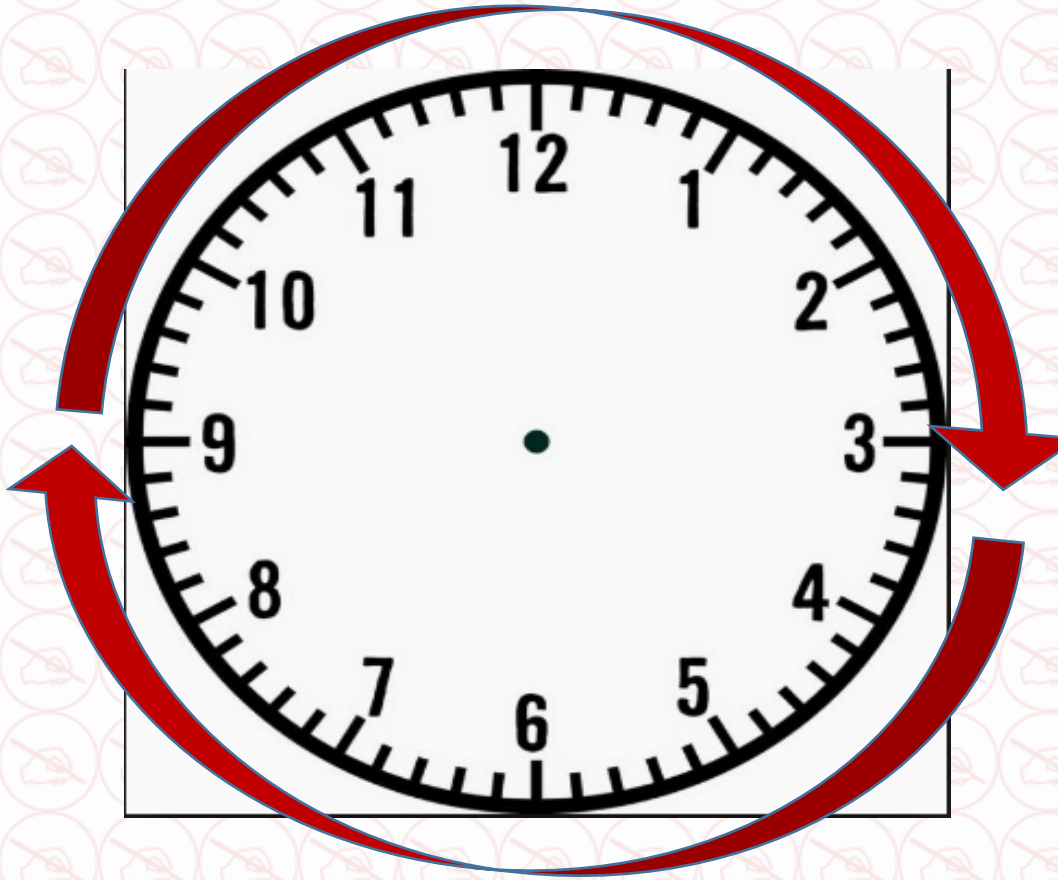
Angle traced by min. hand in 60 min = 360^0

1 min = 6^0

Now, 5 min = 30^0

15 min = 90^0

25 min =150^0



Type of Question

- ANGLE TO TIME
- TIME TO ANGLE
- SLOW AND FAST

ANGLE TO TIME

In this type : Angles are given and we have to find out the exact Time at which the given angle is formed.

Generally there are four conditions/angles in duration of one hour that can be asked.

1. **1st Right Angle/ 90°**
2. **Coincide/0°**
3. **2nd Right Angle/ 90°**
4. **Opposite/ 180°**

Remember The Fact

In one day/24 hour both hand(Min. & Hr.) of the clock…..

Coincides → 22 Times

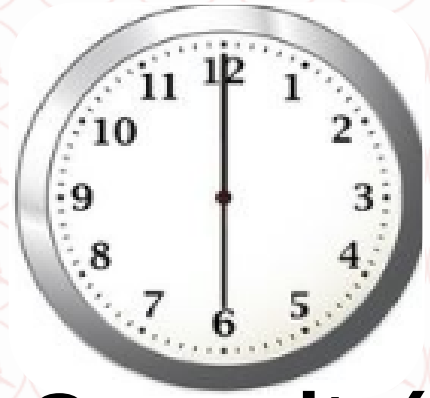
Opposites → 22 Times

Right Angles → 44 Times

Remember The Fact

Straight Line ➡ 44 Times

Coincide(22)



Opposite(22)

Note: Both hand(min. & hr.) of the clock crosses each other at every $65\frac{5}{11}$ min **or** 1 hr $5\frac{5}{11}$ minute

GAIN OF MINUTE HAND OVER HOUR HAND

During one hour both the hands run, minute hands run 60 minute spaces but hour hand run only 5 minute spaces. So in an hour minute hand gains 55 minutes on the hour hand.

55 minute gains = 60 minute

1 minute gains = $\frac{60}{55}$ minute = $\frac{12}{11}$ minute

5 minute gains = $5 \times \frac{12}{11} = \frac{60}{11} = 5\frac{5}{11}$ minute

15 minute gains = $15 \times \frac{12}{11} = \frac{180}{11} = 16\frac{4}{11}$ minute

EXAMPLE

Q.(1) At what time between 5:30 to 6:00 o´clock, will the hands of a clock be at right angles ?

(A) $5:43$

(B) $5:45\frac{7}{11}$

(C) $5:43\frac{7}{11}$

(D) $5:45$

SOLUTION

Ans.(C) $5:43\frac{7}{11}$

$5:40 \times \frac{12}{11} = 5:43\frac{7}{11}$

EXAMPLE

Q.(2) At what time between 4 to 5 o´clock, will the hands of a clock point in opposite direction?

(A) $4:54\frac{8}{11}$

(B) $4:45\frac{7}{11}$

(C) $4:50\frac{7}{11}$

(D) $4:54\frac{6}{11}$

SOLUTION

Ans.(D) $4:54\frac{6}{11}$

$4:50 \times \frac{12}{11}$

EXAMPLE

Q.(3) At what time between 9 to 10 o´clock, will the hands of a watch be together?

(A) $9:48\frac{9}{11}$

(B) $9:49\frac{1}{11}$

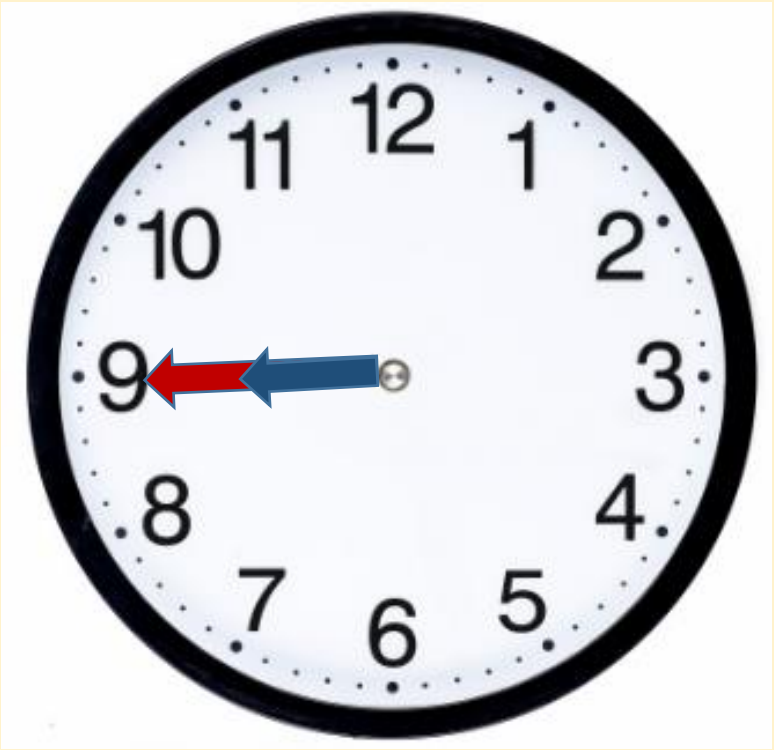
(C) $9:47\frac{6}{11}$

(D) $9:50\frac{6}{11}$

SOLUTION

Ans.(B) $9:49\frac{1}{11}$

$9:45 \times \frac{12}{11} = 9:49\frac{1}{11}$



EXAMPLE

Q(4) It is 15 past 7 by a clock, Find out at what time both the hands would form 90^0 angle for the first time?

(A) $7:20\frac{4}{11}$

(B) $7:21\frac{9}{11}$

(C) $7:51\frac{5}{11}$

(D) $7:6\frac{9}{11}$

SOLUTION

Ans.(B) $7:21\frac{9}{11}$

$7:20 \times \frac{12}{11} = 7:21\frac{9}{11}$

EXAMPLE

Q(5) It is 15 past 7 by a clock, Find out at what time both the hands would form 90^0 angle for the second time?

(A) $7:20\frac{4}{11}$

(B) $7:21\frac{9}{11}$

(C) $7:54\frac{6}{11}$

(D) $7:6\frac{9}{11}$

SOLUTION

Ans.(C) $7{:}54\frac{6}{11}$

$7{:}50 \times \frac{12}{11} = 7{:}54\frac{6}{11}$

EXAMPLE

Q(6) It is 15 past 7 by a clock, Find out at what time both the hands would coincide with each other ?

(A) $7:26\frac{6}{11}$

(B) $7:38\frac{6}{11}$

(C) $7:38\frac{9}{11}$

(D) $7:38\frac{2}{11}$

SOLUTION

Ans.(D) $7:38\frac{2}{11}$

$7:35 \times \frac{12}{11} = 7:38\frac{2}{11}$

EXAMPLE

Q(7) It is 15 past 7 by a clock, Find out after how much time both the hand would be exactly opposite to each other ?

(A) $65\frac{6}{11}$

(B) $65\frac{5}{11}$

(C) $55\frac{10}{11}$

(D) $21\frac{6}{11}$

SOLUTION

Ans.(C) $55\frac{10}{11}$

$8{:}10 \times \frac{12}{11} = 8{:}10\frac{10}{11}$

$8{:}10\frac{10}{11} - 7{:}15 = 55\frac{10}{11}$

EXAMPLE

Q(8) It is 15 past 7 by a clock, Find out After how many minutes past 7, the hands of clock will form 90^o angle for the first time ?

(A) $10\frac{10}{11}$

(B) $11\frac{7}{11}$

(C) $6\frac{9}{11}$

(D) $7\frac{7}{11}$

SOLUTION

Ans.(C) $6\frac{9}{11}$

$7:20 \times \frac{12}{11} = 7:21\frac{9}{11}$

$7:21\frac{9}{11} - 7:15 = 6\frac{9}{11}$

EXAMPLE

Q(9) A clock showing 8:20 . After how much time , the minute hand and hour hand will make an angle of 90^0?

(A) $30\frac{10}{11}$

(B) $32\frac{9}{11}$

(C) $7\frac{3}{11}$

(D) $12\frac{9}{11}$

SOLUTION

Ans.(C) $7\frac{3}{11}$

8:25 $\frac{12}{11}$ = 8:27 $\frac{3}{11}$

8:27 $\frac{3}{11}$ - 8:20 = $7\frac{3}{11}$

EXAMPLE

Q(10) A clock showing 8:20. After how much time , the minute hand and hour hand will be making an angle of 72^0 ?

(A) $12\frac{5}{11}$min

(B) $30\frac{5}{11}$min

(C) $10\frac{6}{11}$min

(D) $12\frac{5}{11}$min

SOLUTION

Ans.(C) $10\frac{6}{11}$

$8:28 \quad \frac{12}{11} = 8:30\frac{6}{11}$

✘

$8:30\frac{6}{11} - 8:20 = 10\frac{6}{11}$

TIME TO ANGLE

In this type : Time is given and we have to find out the exact Angle traced by the min. hand and hour hand at the given time.

ANGLE PATTERN

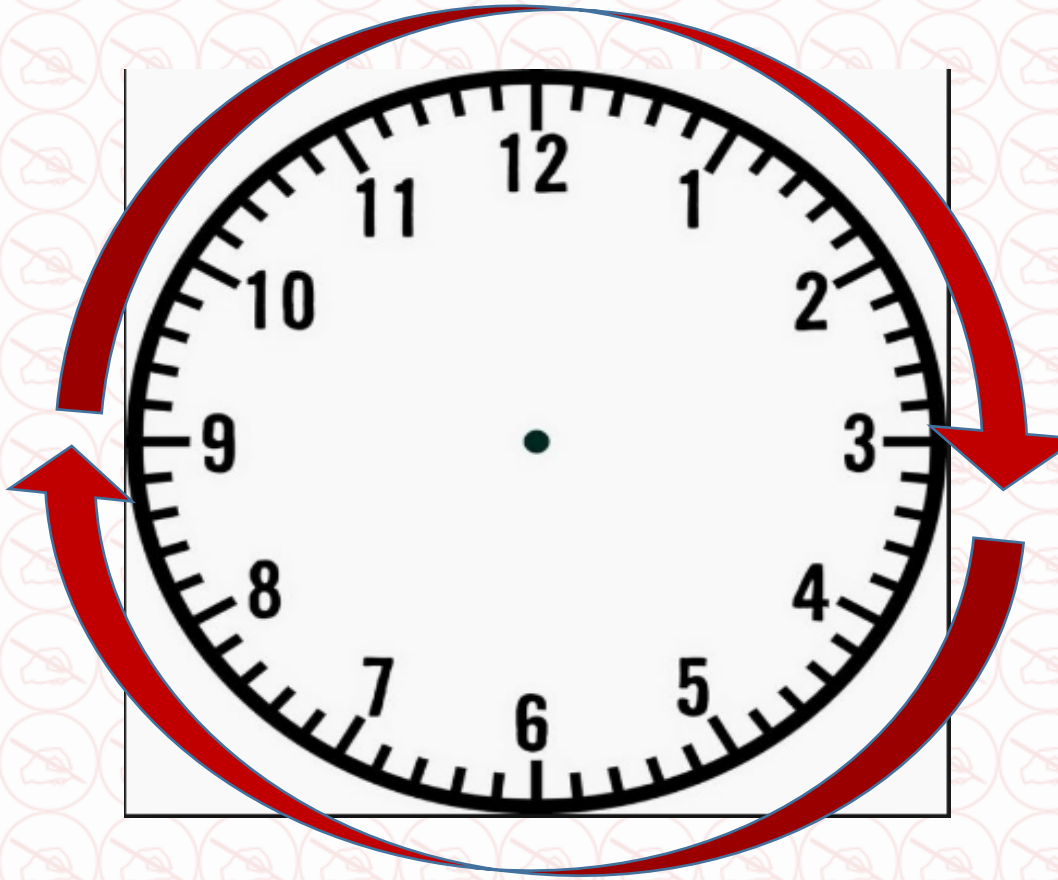
Angle traced by hour hand in 12 hr = 360^0

1 hr = 30^0

i.e., 60min = 30^0

1 min = $\frac{30}{60} = \frac{1^o}{2}$

It means hour hand moves $\frac{1^o}{2}$ in one minute



EXAMPLE

Q.(11) An accurate clock shows 8 o´clock in morning. Through how many degrees will be the hour hand rotate when the clock shows 2 o´clock in the afternoon?

(A) 120^0
(B) 150^0
(C) 180^0
(D) 90^0

SOLUTION

Ans. (C) 180^0

EXAMPLE

Q.(12) A clock is started at noon. By 10 minutes past 5, the hour hand has turned through by what angle?

(A) 155^0 (B) 67^0

(C) 130^0 (D) 230^0

SOLUTION

Ans. (A)155^0

EXAMPLE

Q.(13) At what angle the hands of a clock are inclined at 15 minutes past 5?

(A)157.5^0 (B) 164.5^0

(C) 67.5^0 (D) 52.5^0

SOLUTION

Ans. (C) 67.5^0

EXAMPLE

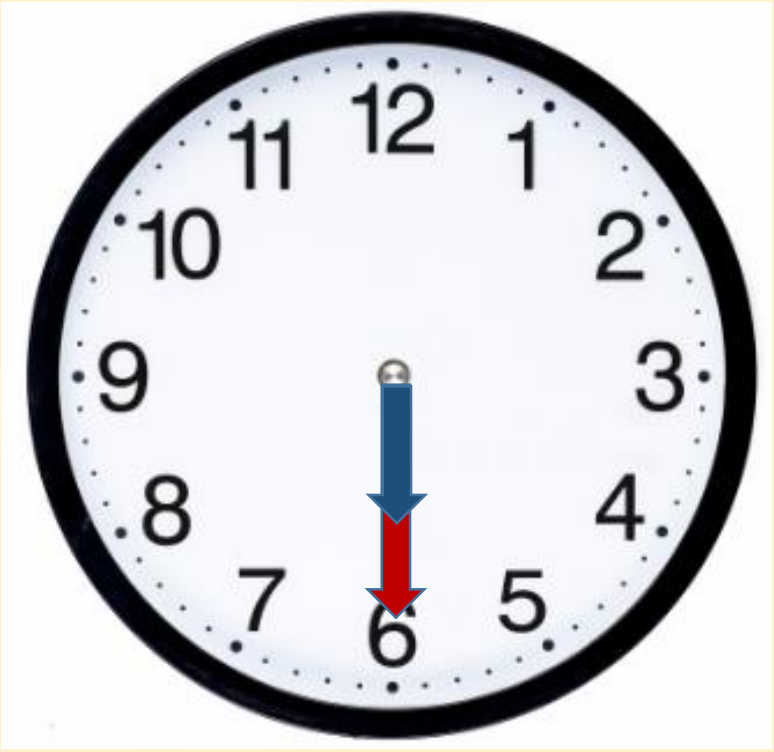
Q.(14) At what angle the hands of a clock are inclined at 30 minutes past 6?

(A) 0^0 (B) 15^0

(C) 12.5^0 (D) 10^0

SOLUTION

Ans. (B) 15^0



EXAMPLE

Q.(15) At what angle the hands of a clock are inclined at 30 minutes past 3?

(A)105^0 (B) 90^0

(C) 75^0 (D) 102.5^0

SOLUTION

Ans. (C) 75^0

EXAMPLE

Q.(16) The reflex angle between the hands of a clock at 10:25 is?

(A) 166^0 (B) 162.5^0

(C) 197.5^0 (D) 120^0

SOLUTION

Ans. (C) 197.5^0

Slow and Fast

Concept of slow & fast or Losing & Gaining of Time

Let us try understanding this concept with the help of an example. If a watch indicates 9.20, when the correct time is 9.10, it is said to be 10 minutes too fast. And if it indicates 9.00, when the correct time is 9.10, it is said to be 10 minutes too slow.

Such kind of problems appear in exams very often, when a clock runs faster or slower than the expected pace.

Slow and Fast

Clock is running fast: It is also referred to as gaining time i.e. when a normal clock covers 60 minutes, a faster clock will cover more than 60 minutes.

Clock is running slow: It is also referred to as losing time i.e. when a normal clock covers 60 minutes, a slower clock will cover less than 60 minutes.

EXAMPLE

Q.(17) A watch gains 5 minutes in one hour and was set right at 8 AM. What time will it show at 8PM on the same day?

(A) 8:20 pm

(B) 8:15 pm

(C) 8:30 pm

(D) 9 pm

SOLUTION

Ans.(D) A correct clock would have completed 12 hours by 8 pm. But the faster clock actually covers 5 min. extra in one hour. So, it will cover 12 x 5 = 60 minutes extra.

Therefore, when the correct clock would show 8 pm, the faster clock will show 60 minutes extra i.e. 9 pm.

EXAMPLE

Q.(18) A watch loses 5 minutes in one hour and was set right at 7am. What time will it show at 2 pm on the same day?

(A) 2:35 pm

(B) 1:25 pm

(C) 2:15 pm

(D) 3 pm

SOLUTION

Ans.(B) A correct clock would have completed 7 hours by 2 pm, whereas the slower clock looses 5 minute per hour i.e. $5 \times 7 = 35$ minute in 7 hours.

Therefore, the slower clock shows 1:25 pm.

EXAMPLE

Q.(19) A watch which gains 5 seconds in 3 minutes was set right at 7 a.m. In afternoon of the same day , then what will the watch indicates at 4 pm

(A) 4:10
(B) 4:20
(C) 3:50
(D) 4:15

SOLUTION

Ans.(D) A correct clock would have completed 9 hours by 4 pm, whereas the faster clock gains 5 sec per 3 min i.e., 100 sec per hour, 900 sec or 15 minute in 9hours.
Therefore, the faster clock shows 4:15 pm.

EXAMPLE

Q.(20) In a clock, minute hand crosses hour hand in 65 minutes. Find out the clock fast or slow by how many minutes?

(A) $\frac{5}{11}$min fast

(B) $\frac{5}{11}$min slow

(C) $65\frac{5}{11}$min fast

(D) $65\frac{5}{11}$min slow

SOLUTION

Ans.(A)

EXAMPLE

Q(21) How much does a watch lose per day , if its hands coincide 64 minute

(A) $32\frac{5}{11}$min

(B) $32\frac{8}{11}$min

(C) $1\frac{1}{11}$min

(D) $1\frac{5}{11}$min

SOLUTION

Ans.(B)

55 min. spaces are covered in 60 min.

60 min. spaces are covered in $\left(\frac{60}{55} \times 60\right)$ min. $= 65\frac{5}{11}$ min.

Loss in 64 min. $= \left(65\frac{5}{11} - 64\right) = \frac{16}{11}$ min.

Loss in 24 hrs $= \left(\frac{16}{11} \times \frac{1}{64} \times 24 \times 60\right)$ min. $= 32\frac{8}{11}$ min.

EXAMPLE

Q.(22) A watch which gains uniformly is 5 minutes slows at 8 o'clock in the morning on Sunday and is 5 minutes 48 seconds fast at 8 pm on the Following Sunday when was it correct

(A) 2 pm on Monday
(B) 2 pm on Wednesday
(C) 7:20 pm on Wednesday
(D) 3:30 pm on Friday

SOLUTION

Ans.(C)

This sunday morning at 8:00 AM, the watch is 5 min. Slow, and the next sunday at 8:00PM it becomes 5 min 48 sec fast. The watch gains $5+5\frac{48}{60}$ min in a time of (7×24)+12 = 180 hours.

To show the correct time, it has to gain 5 min.

$\frac{54}{5}min \rightarrow 180hours$

5min ->

$\left(5 \Big/ \frac{54}{2} \times 180\right)$

$83\frac{1}{3}hrs = 72hrs + 11\frac{1}{3}hrs = 3days + 11hrs + 20min$

So the correct time will be shown on wednesday at 7:20 PM