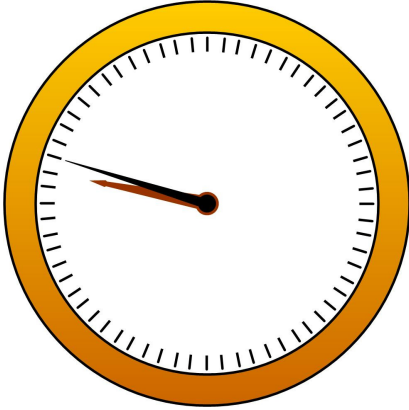# Fallen Clock Puzzle

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This is a nice variation on the typical clock problem posed by Cary Mallon and retweeted by Henk Reuling ([1]):

> This clock has fallen on the floor, and unfortunately, there is no indication which way 'up' the clock should hang. However, both hands are pointing *precisely* at the [adjacent] minute marks. You can now work out what the time is.

Solution

Suppose the time is given in h hours and m minutes. First, we wish to find out where the hour hand would be in minutes. Each hour represents 5 minutes on the clock and each minute is 1/60 of an hour and therefore 1/60 of a 5 minute interval. So in terms of minutes, the total time for the hour hand is given by

$$h5 + (m/60)5 = 5h + m/12 \text{ (minutes)}$$

The minute hand is given simply as m minutes. The statement of the problem says this number is one more minute than the minutes represented by the hour hand, so

$$5h + m/12 = m - 1$$

Hence,

$$\frac{12}{11}(5h + 1) = m$$

The only way for the left hand side to have an integral value for h = 1, 2, …, 11, 12 is if h = 2. Then m = 12. So the time is 2:12.

References

[1] Cary Mallon (https://twitter.com/cmal1102) "Fallen Clock" (https://twitter.com/cmal1102/status/1222962762889846784) retweeted by Henk Reuling (https://twitter.com/HenkReuling) January 20, 2020