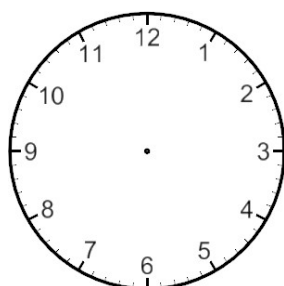# Introduction to Modular Arithmetic

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1   12-Hour Time

Consider a 12-hour clock below.

For the purposes of this worksheet, we will ignore the distinction between am and pm. We only care about the number of the hour.

Example: You have a meeting that starts at 10 and lasts for 5 hours. What time does your meeting end?

Solution: We know that $10 + 5 = 15$, but the clock resets after 12 hours, so the meeting ends at 3, since $15 - 12 = 3$.

Questions:

1. After waiting in a long line for 3 hours, you look at your watch to see that it is 1 o'clock. What time did you get in line?

2. If you have to start work at 4 and you work for 9 hours, what time will you be done?

3. Suppose you order a book online at 2, and you are told that it will arrive in 53 hours. What time will it arrive?

2   5-Hour Time

One day, aliens land in your city. Their clocks only have 5 hours, where ours have 12. Using their 5-hour clocks, answer the questions below.

1. After waiting in a long line for 3 hours, you look at your watch to see that it is 1 o'clock. What time did you get in line?

2. If you have to start work at 4 and you work for 9 hours, what time will you be done?

3. Suppose you order a book online at 2, and you are told that it will arrive in 53 hours. What time will it arrive?