Lesson - Time and money

Year: Year 4

Hello, I am Otto! Time and money are used by everybody, every single day. We need to know when the bus leaves and how much our lunch costs. In this chapter you learn to read the time on analogue and digital clocks, to use the 24-hour clock, to work out how long things take, and to add, subtract and multiply amounts of money.

Starter activity

You get on a train at 14:35 and you get off at 16:10. How long was the journey? How much did the tickets cost if each ticket cost £8.50 and there were 3 of you? You need both time and money skills to answer. By the end of this chapter you will be able to solve problems like this with confidence.

Units of time

Key fact: units of time

- 60 seconds = 1 minute and 60 minutes = 1 hour.
- 24 hours = 1 day and 7 days = 1 week.
- 12 months = 1 year. A year has 365 days (366 in a leap year) and 52 weeks.
- The months have 30 days (April, June, September, November), 31 days (January, March, May, July, August, October, December) or 28 days (February; 29 in a leap year).

To change from a bigger unit to a smaller unit you multiply. To change from a smaller unit to a bigger unit you divide. So 3 hours = 3 × 60 = 180 minutes, and 240 seconds = 240 ÷ 60 = 4 minutes.

Example 1

Change 2 hours 15 minutes into minutes, and 150 minutes into hours and minutes.

2 hours = 2 × 60 = 120 minutes, so 2 h 15 min = 120 + 15 = **135 minutes**. For 150 minutes: 150 ÷ 60 = 2 remainder 30, so **2 hours 30 minutes**.

Reading clocks



The short hand is the hour hand. The long hand is the minute hand. Here the minute hand points to 7, which means 35 minutes past the hour. The hour hand is between 8 and 9. We say "twenty-five to nine" or "eight thirty-five". As a digital time this is 8:35.

Method: telling the time

1. Look at the hour hand to see which hour it has passed.
2. Look at the minute hand. Count in fives round the clock face from the 12: each number is 5 more minutes.
3. If the minute hand is on the right-hand side (up to 30 minutes), say "past". If it is on the left-hand side, say "to" and count the minutes to the next hour.
4. Write the digital time with the hour, a colon and the minutes, for example 8:35.

12-hour and 24-hour clocks

Definition: the 24-hour clock

The **24-hour clock** goes from 00:00 (midnight) to 23:59. Each time has four digits: two for the hours and two for the minutes. Times after 12 noon do not need "am" or "pm", because they carry on counting: 1 pm is 13:00, 2 pm is 14:00 and so on.

Rule: changing between 12-hour and 24-hour times

- For times in the morning (am), the hours stay the same: 7:30 am is 07:30. At midnight, 12:00 am is 00:00.
- For times from 1 pm onwards, add 12 to the hour: 4:45 pm is 16:45.
- To go back from 24-hour to 12-hour, subtract 12 from the hours for times after 12:59: 21:10 is 9:10 pm.
- Noon, 12:00 pm, is 12:00 on the 24-hour clock.

Example 2

Write 6:20 pm and 11:05 pm on the 24-hour clock, and 15:40 on the 12-hour clock.

6:20 pm: add 12 to 6 to get 18, so **18:20**. 11:05 pm: 11 + 12 = 23, so **23:05**. 15:40: subtract 12 from 15 to get 3, and the time is after noon, so **3:40 pm**.

Roman numerals on clocks

Many old clocks show the hours with Roman numerals: I, II, III, IV (or IIII), V, VI, VII, VIII, IX, X, XI and XII. The minute hand still points to the same places, so the 7 position is VII and means 35 minutes past.

How long does it take?

Method: finding a time interval (duration)

1. Draw a time line, with the start time on the left and the end time on the right.
2. Count on to the next whole hour (bridging through the hour).
3. Then count on the whole hours, and then the minutes after the last whole hour.
4. Add up the minutes and the hours. Change 60 minutes into 1 hour if needed.

Example 3

A film starts at 14:35 and ends at 16:10. How long does it last?

From 14:35 to 15:00 is 25 minutes. From 15:00 to 16:00 is 1 hour. From 16:00 to 16:10 is 10 minutes. Add: 25 min + 1 h + 10 min = 1 h 35 min = **1 hour 35 minutes**. Check using minutes: 16:10 = 970 minutes after midnight and 14:35 = 875 minutes, and 970 − 875 = 95 minutes = 1 h 35 min.

Example 4

A bus leaves at 08:50. The journey takes 1 hour 45 minutes. When does it arrive?

From 08:50 add 10 minutes to reach 09:00. There are 1 h 45 min − 10 min = 1 h 35 min left. 09:00 + 1 h = 10:00 and 10:00 + 35 min = 10:35. The bus arrives at **10:35**.

Watch out

Time is not like ordinary numbers. There are 60 minutes in an hour, not 100. So 2:50 plus 20 minutes is 3:10, not 2:70! Always bridge through the next hour when you add minutes to a time.

Money

Definition: pounds and pence

In the UK, money is counted in **pounds (£)** and **pence (p)**. There are 100 pence in 1 pound. We write amounts with a decimal point: £3.45 means 3 pounds and 45 pence. The coins are 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2. Notes are £5, £10, £20 and £50.



These coins make £2 + £1 + 50p + 20p + 10p + 5p = £3.85.

Rule: working with money

- Always write pounds with two decimal places: £4.50, not £4.5.
- To add or subtract money, line up the decimal points, just as you do in the column method.
- To change pence to pounds divide by 100: 365p = £3.65. To change pounds to pence multiply by 100: £2.80 = 280p.
- To multiply, work in pence if it is easier: 4 × £1.25 = 4 × 125p = 500p = £5.00.

Example 5

Sam buys a drink for £1.85 and a sandwich for £3.40. How much does he spend? How much change does he get from a £10 note?

Total: £1.85 + £3.40 = **£5.25**. (Ones: 5 + 0 = 5; tens: 8 + 4 = 12, write 2 and carry 1; pounds: 1 + 3 + 1 = 5.) Change: count on from £5.25 to £10. £5.25 + 75p = £6.00, then + £4 = £10.00, and 75p + £4 = **£4.75**.

Example 6

Three friends each buy a ticket for £4.75. What is the total cost?

3 × £4.75. Work in pence: 3 × 475p = 1 425p. 1 425p = £14.25. So the total is **£14.25**. Check: 3 × £5 = £15, and 3 × 25p = 75p less, so £15 − £0.75 = £14.25.

Did you know?

The word pound comes from a Latin word for weight, because the first pound was a pound weight of silver. The abbreviation £ is a fancy letter L, from the Latin word libra. The penny used to be written d, from another Roman coin, the denarius. Britain changed its money to decimal money in 1971, when there were 100 new pence in the pound.

Otto's tip

When you work out a duration, always draw a time line and bridge through the next hour. For money, change everything to pence if the calculation is tricky, and change back to pounds at the end. And always check that your answer is sensible: a sandwich is not likely to cost £35!