

13 Money and Time

13.1 Money

In this section we revise basic arithmetic, working with *money*.



Example 1

- (a) What is the cost of 7 packets of crisps costing 24p each?
- (b) How much change do you get from £5 when paying for these crisps?



Solution

- (a) The cost of the crisps is found by multiplying 24 by 7.

$$\begin{array}{r} 24 \\ \times 7 \\ \hline 168 \end{array}$$

The cost is 168p or £1.68.

- (b) The change is found by subtracting £1.68 from £5.00.

$$\begin{array}{r} 5.00 \\ - 1.68 \\ \hline 3.32 \end{array}$$

The change is £3.32.



Example 2

Joshua buys a cheeseburger costing £1.59, a portion of chips costing 99p and a drink costing £1.15.

- (a) How much does he spend?
- (b) How much change does he get from a £10 note?



Solution

We add the three amounts, remembering to change the cost of the chips from pence into pounds.

$$\begin{array}{r} (a) \quad 1.59 \\ \quad 1.15 \\ + 0.99 \\ \hline 3.73 \end{array}$$

He spends a total of £3.73.

$$\begin{array}{r}
 \text{(b)} \quad 10.00 \\
 - \quad 3.73 \\
 \hline
 \quad 6.27
 \end{array}$$

He gets £6.27 change.



Example 3

5 boys are paid £38.60 for clearing rubbish from a garden. They share the money equally. How much does each boy receive?



Solution

We divide the total amount earned by the number of boys.

$$\begin{array}{r}
 7.72 \\
 5 \overline{) 38.60} \\
 \underline{35} \\
 38 \\
 \underline{35} \\
 360 \\
 \underline{350} \\
 100 \\
 \underline{100} \\
 0
 \end{array}$$

Each boy receives £7.72.



Example 4

Mandy buys 8 'Candichoc' bars. They cost a total of £3.04. How much does each 'Candichoc' bar cost?



Solution

We divide the total cost by the number of bars.

$$\begin{array}{r}
 0.38 \\
 8 \overline{) 3.04} \\
 \underline{24} \\
 60 \\
 \underline{56} \\
 40 \\
 \underline{40} \\
 0
 \end{array}$$

Each 'Candichoc' bar costs 38p.



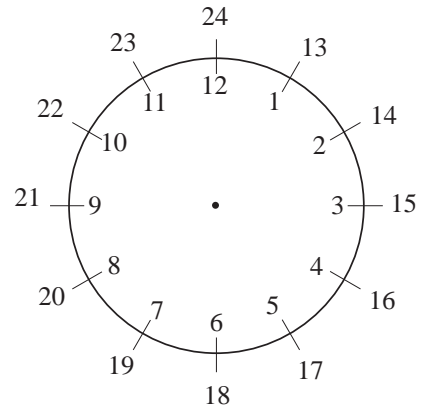
Exercises

- Anthony pays £1.35 to swim at a sports centre. He then buys a drink costing 79p and a packet of crisps costing 27p from the sports centre café.
 - How much does he spend altogether?
 - How much money does he have left if he had £6.30 when he entered the sports centre?
- A family buys 3 children's meals that cost £1.99 each and 2 value meals that cost £3.49 each. How much does the family spend altogether?

3. Jamil wants to buy a bike that costs £249.99. He has saved £192.50. How much more does he need to save before he can buy the bike?
4. A teacher buys a chocolate bar for each child in her class. The bars cost 34p each. There are 31 children in her class.
 - (a) How much does she spend?
 - (b) How much change does she get from a £20 note?
5. A tutor group raises £86.28 for charity. They decide to divide the money equally between 4 charities.
 - (a) What amount do they give to each charity?
 - (b) How much extra would they have to raise for each of the charities to be given £28 ?
6. Tickets for a school play cost £1.20 for children and £2.10 for adults. What would be the total cost of tickets for:
 - (a) 2 adults and 4 children,
 - (b) 3 adults and 2 children?
7. If £40.92 is divided equally between 12 people, how much do they each receive?
8. Three brothers divide £20 between them so that they each have exactly the same amount of money. A small amount is left over.
 - (a) What is the largest amount they can each receive?
 - (b) How much money is left over?
9. Six children are given a sum of money. They divide it equally so that they each receive £8.33 and there is 2p left over.
 - (a) What was the sum of money they were given?
 - (b) If £5 of the money had been given to a charity, what amount of money would each of the children have received?
10. Hannah wants to buy 12 bottles of lemonade for her birthday party. At her local supermarket, lemonade is on a *'buy one, get one at half price'* special offer. The bottles cost £1.18 each.
 - (a) How much does Hannah pay for the 12 bottles of lemonade?
 - (b) How much does she save because of the special offer?

13.2 Time

In this section we revise the use of the 24-hour clock and consider problems involving *time* and *time zones*.



Example 1

Convert the following times to 24-hour clock times:

- (a) 7:30 a.m.
- (b) 11:45 p.m.
- (c) 3:52 p.m.



Solution

- (a) 0730
- (b) Add 12 to the hours to give 2345.
- (c) Add 12 to the hours to give 1552.



Example 2

Convert the following times from 24-hour clock to 'a.m.' or 'p.m.' times:

- (a) 1426
- (b) 0352
- (c) 1833



Solution

- (a) Subtract 12 from the hours to give 2:26 p.m.
- (b) 3:52 a.m.
- (c) Subtract 12 from the hours to give 6:33 p.m.

Note that a colon (:) is used to separate the hours from the minutes when using the 12-hour clock, whereas 24-hour clock times are written without a colon.



Example 3

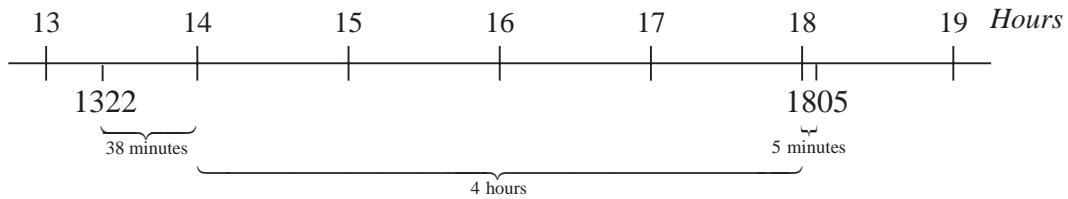
Molly leaves Huddersfield at 1322 and arrives in London at 1805. How long does her journey take?



Solution

Method A

From 1322 to 1722 is 4 hours.
 From 1722 to 1805 is 43 minutes.
 Her journey takes 4 hours 43 minutes.

Method B

$$38 \text{ mins} + 5 \text{ minutes} = 43 \text{ minutes}$$

$$\text{Total time} = 4 \text{ hours } 43 \text{ minutes}$$

**Example 4**

The time in the United Arab Emirates is 4 hours ahead of the time in the UK.

- What is the time in the United Arab Emirates when it is 3:00 p.m. in the UK?
- If it is 2:45 p.m. in the United Arab Emirates, what is the time in the UK?

**Solution**

- The time in the United Arab Emirates is 4 hours ahead, so it is 7:00 p.m.
- Four hours behind 2:45 p.m. is 10:45 a.m.

**Exercises**

- Convert the following times to 24-hour clock times:
 - 6:45 a.m.
 - 6:45 p.m.
 - 2:20 p.m.
 - 11:40 p.m.
 - 10:30 a.m.
 - 10:15 p.m.
- Write the following 24-hour clock times in 12-hour clock times, using 'a.m.' or 'p.m.':
 - 1642
 - 0832
 - 1042
 - 2236
 - 2318
 - 1520
- Which of the 24-hour clock times below are *not* possible times. Explain why.
 - 1372
 - 1758
 - 2302
 - 2536

4. David gets on a train at 0845 and gets off at 1132. For how long is he on the train?
5. A journey starts at 1532 and ends at 1830. How long does the journey take?
6. Marco boards a ferry at 1842 and gets off at 0633 the next day. For how long is he on the ferry?
7. In Venezuela the time is 4 hours behind the time in the UK.
 - (a) What is the time in Venezuela when it is 3:00 p.m. in the UK?
 - (b) What is the time in the UK when it is 2:30 p.m. in Venezuela?
 - (c) What is the time in the UK when it is 11:15 p.m. in Venezuela?
8. The time in Norway is 1 hour ahead of the UK. It takes $3\frac{1}{2}$ hours to fly from the UK to Norway.
 - (a) A plane leaves the UK at 10:15 a.m. (UK time). What is the time in Norway when it lands there?
 - (b) The plane flies back and lands in the UK at 7:22 p.m. (UK time). At what time did the plane leave Norway?
9. The time in Paraguay is 4 hours behind the UK.
The time in Macao is 8 hours ahead of the UK.
 - (a) What is the time in Macao when it is 6:00 a.m. in Paraguay?
 - (b) What is the time in Paraguay when it is 3:30 p.m. in Macao?
 - (c) What is the time in Macao when it is 8:30 p.m. in Paraguay?
10. A ferry takes $26\frac{1}{2}$ hours to travel from the UK to Spain. The time in Spain is 1 hour ahead of the UK.
When do you arrive in Spain if you leave the UK at:
 - (a) 0830 on Monday
 - (b) 1742 on Friday
 - (c) 2342 on Sunday?

13.3 Time and Money

In this section we consider problems that involve both *time* and *money*.



Example 1

One day, Zoe works from 0930 until 1800.

She is paid £5.20 per hour.

How much does she earn for her day's work?

**Solution**

From 0930 until 1800 is $8\frac{1}{2}$ hours, so Zoe earns $\pounds 5.20 \times 8.5$.

$$\begin{array}{r} \text{Now,} \quad 520 \\ \times \quad 85 \\ \hline 2600 \\ 41600 \\ \hline 44200 \end{array}$$

So $5.20 \times 8.5 = 44.200$, and Zoe earns $\pounds 44.20$.

**Example 2**

Robert works 40 hours each week and is paid $\pounds 5.10$ per hour.

He is given a 5% pay rise.

How much more does he earn per week after his pay rise?

**Solution**

$$\begin{array}{r} \text{Each week, Robert earns} \quad 510 \\ 40 \times \pounds 5.10 = \pounds 204.00 \quad \times \quad 40 \\ \hline 20400 \end{array}$$

His increase each week

$$\begin{aligned} 5\% \text{ of } \pounds 204 &= \frac{5}{100} \times \pounds 204 \\ &= \pounds 10.20 \end{aligned}$$

**Example 3**

Esther is paid $\pounds 4.50$ per hour. She can work for up to 30 hours per week.

- What is the maximum amount of money she can earn in a week?
- How many hours should she work if she wants to earn $\pounds 90$?

**Solution**

$$\begin{array}{r} \text{(a) The most she can earn in one week is} \quad 450 \\ 30 \times \pounds 4.50 = \pounds 135 \quad \times \quad 30 \\ \hline 13500 \end{array}$$

$$\begin{aligned} \text{(b)} \quad £90 \div 4.50 &= 900 \div 45 \\ &= 20 \text{ hours} \end{aligned}$$

$$\begin{array}{r} 020 \\ 45 \overline{)900} \end{array}$$



Exercises

1. The following table shows the times that people in a factory work on one day, and the rate they are paid per hour.

	<i>Start Work</i>	<i>Finish Work</i>	<i>Hourly Rate</i>
Janice	0830	1530	£3.80
Martin	0745	1415	£5.00
Gail	0950	1720	£4.20

How much does each person earn on this day?

2. Des can choose between two jobs:
Job A pays £3.80 per hour for 40 hours per week,
Job B pays £4.50 per hour for 32 hours per week.
 For which job will Des earn the most money per week?
3. Heidi works as a cleaner at a hotel. She is paid £4.20 per hour. One day she starts work at 0645 and finishes at 1045. How much does she earn on that day?
4. Briony earns £5 per hour working 12 hours per week in an evening job.
 (a) How much does she earn per week?
 (b) If she is given a 6% pay rise, how much does she now earn each week?

5. Bill works the following hours in one week:

Monday	0745	to	1300
Tuesday	1400	to	2315
Wednesday	0630	to	1245
Thursday	0745	to	1430
Friday	1300	to	2330

He is paid £6.50 per hour.

- (a) How many hours does he work during the week?
 (b) How much does he earn for the week's work?

6. Kelly works from 0850 until 1400 on 6 days each week. She earns £4.30 per hour.

- (a) How many hours does she work per week?
- (b) How much does she earn per week?

Kelly is given a 10% pay rise.

- (c) How much does she now earn per week?

7. In a year, Tony works 20 hours per week for 46 weeks and is paid a total of £5520.

- (a) How many hours does he work per year?
- (b) How much is he paid per hour?
- (c) If his wages are increased by 2%, how much will he now earn per year?

8. Sara works 30 hours per week, for which she is paid £135.

- (a) How much is she paid per hour?

Her earnings increase to £140.40 per week.

- (b) How much is she now paid per hour?
- (c) Calculate the percentage increase in her earnings.

9. Ali is paid £14.70 for working from 0845 until 1215.

- (a) How much is he paid per hour?
- (b) How much would he be paid for working from 0840 until 1300 ?
- (c) What would be his hourly rate of pay, if it was increased by 3% ? Give your answer to the nearest pence.

10. Karen is paid £3.50 per hour for the first 40 hours she works in a week. She is paid an extra 25% per hour for any additional hours she works.

How much does she earn for the week if she works the hours listed below:

Monday	0855	to	1650
Tuesday	0840	to	1710
Wednesday	0915	to	1805
Thursday	0855	to	1905
Friday	0900	to	1835

Give your answer to the nearest pence.