

# 2 Basic Operations

## 2.1 Place Value

This section deals with the revision of place value. Remember that we write decimal numbers in the form:

*Thousands Hundreds Tens Units • Tenths Hundredths Thousandths*

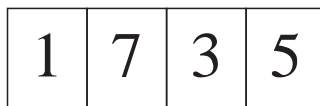


### Example 1

Here are some number cards:



You can use each card *once* to make the number 1735, like this:



- (a) What is the *biggest* number you can make with the four cards?
- (b) Explain why you *cannot* make an *even* number with the four cards.

(KS3/99/Ma/Tier 3-5/P2)



### Solution

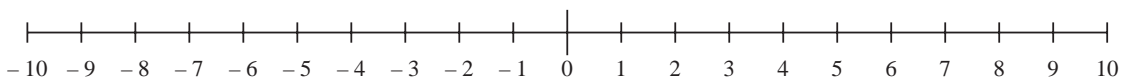
- (a) The biggest number, using all four cards, is

7531

(this is because  $7 > 5 > 3 > 1$ ).

- (b) To make an even number, the last digit must be even, but all four cards in this example show odd digits.

*Note:* It is often helpful to refer to a number line when comparing values; a number line can also show negative values:



*Remember* that the symbol  $<$  means 'less than' and  $>$  means 'greater than'.



## Example 2

Put the correct sign,  $<$  or  $=$  or  $>$ , into each sentence.

- (a)  $-7$  .....  $-2$   
 (b)  $3 - 2$  .....  $-5$   
 (c)  $3 - 5$  .....  $4 - 6$

(KS3/99/Ma/Tier 4-6/P1)



## Solution

- (a) From the number line shown,  $-7 < -2$ .  
 (b) Since  $3 - 2 = 1$ , the comparison is  $1 \dots -5$ , so that  $1 > -5$  (see number line).  
 (c) Here we compare  $-2$  .....  $-2$ , giving  $-2 = -2$ .



## Example 3

The arrow on this thermometer shows a temperature of  $10^\circ\text{C}$ .

- (a) Draw an arrow on the thermometer to show a temperature of  $24^\circ\text{C}$ .

Label the arrow  $24^\circ\text{C}$ .

- (b) Draw an arrow on the thermometer to show a temperature of  $-4^\circ\text{C}$ .

Label the arrow  $-4^\circ\text{C}$ .

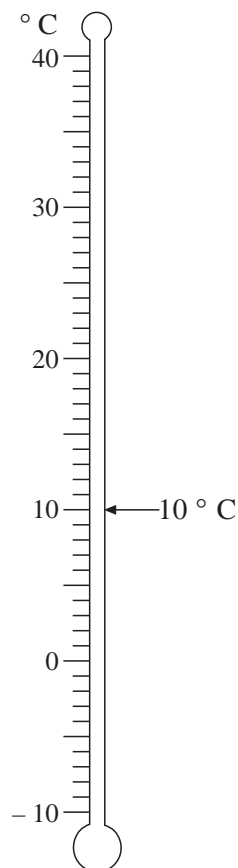
- (c) The temperature was  $-10^\circ\text{C}$ .

It went *up*  $15^\circ\text{C}$ .

What is the temperature now?

- (d) Write these temperatures in order, *coldest first*.

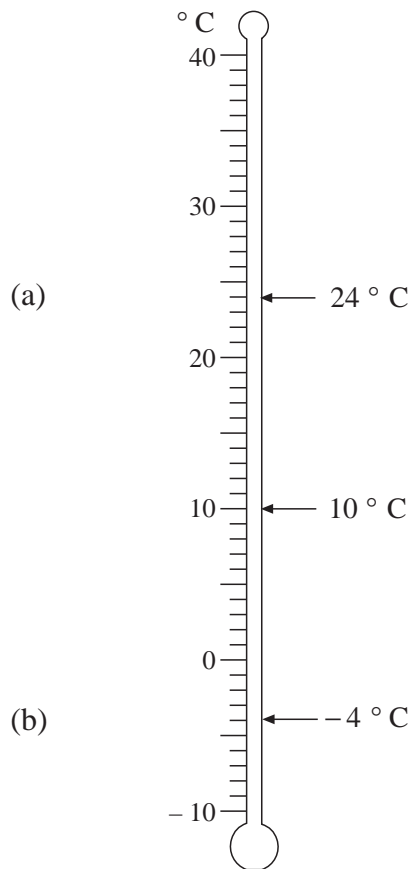
$3^\circ\text{C}$ ,  $-10^\circ\text{C}$ ,  $0^\circ\text{C}$ ,  $20^\circ\text{C}$ ,  $-1^\circ\text{C}$



(KS3/97/Ma/Tier 3-5/P1)



## Solution



(c)  $-10^{\circ}\text{C} + 15^{\circ}\text{C} = 5^{\circ}\text{C}$

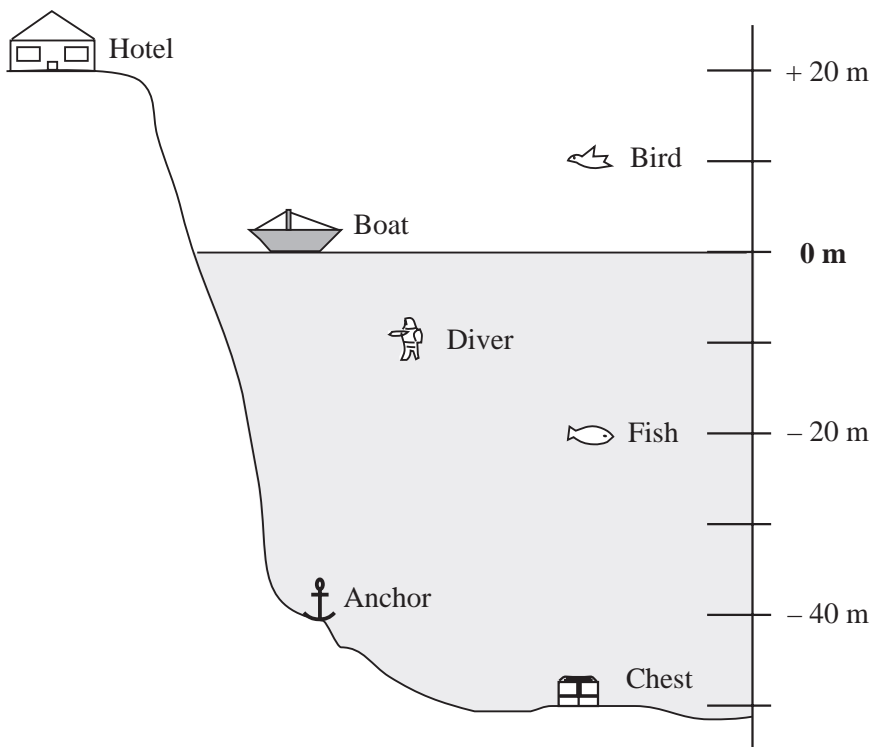
(d)  $-10^{\circ}\text{C}, -1^{\circ}\text{C}, 0^{\circ}\text{C}, 3^{\circ}\text{C}, 20^{\circ}\text{C}$



## Exercises

1. (a) Write the numbers:
  - (i) one hundred and eighty,
  - (ii) two hundred and twelve,
  - (iii) one hundred and eight,
  - (iv) ninety two
- (b) Using the numbers in (a), write them in order with the smallest first.

2. Ali drew a picture to show what there is above and below the sea at Aber.



The anchor is at about  $-40$  m.

- What is at about  $+10$  m ?
- What is at about  $-10$  m ?
- What is about  $30$  m higher than the chest?

(KS3/95/Ma/Levels 3-5/P1)

3. Write down each number sentence putting in the one of the signs,  $<$  or  $=$  or  $>$ , to make it correct.

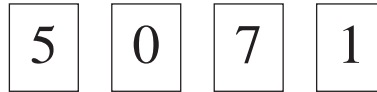
- $8 + 2 \dots\dots 7 + 6$
- $6 - 3 \dots\dots 1 + 2$
- $0 \dots\dots -3$

(KS3/99/Ma/Levels 3-5/P1)

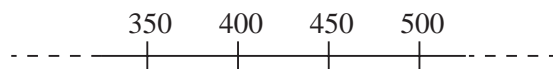
4. Write the following sums of money in pounds, in decimal form.

- Seventy two pounds, forty five pence.
- One hundred and three pounds, fifty pence.
- One hundred and thirty pounds, five pence.

5. Here are some number cards:



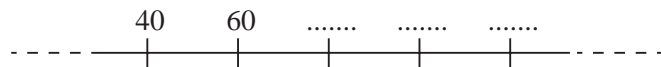
- (a) What is the *largest* possible number you can make, using all four cards?
- (b) What is the *smallest* possible number, using all four cards but starting with a non-zero digit?
- (c) What is the *smallest* possible number you can make, using only three of the cards and starting with a non-zero digit?
6. (a) Look at this part of a number line:



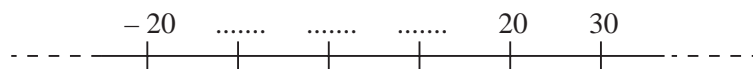
Copy and complete this sentence:

The numbers on this number line go *up* in steps of .....

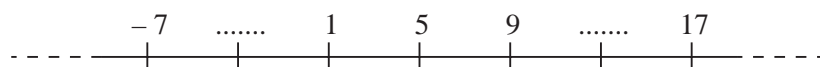
- (b) This is a *different* number line.  
What are the 3 missing numbers?



- (c) This is a *different* number line.  
What are the 3 missing numbers?



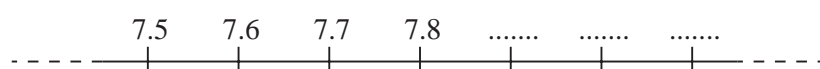
- (d) This is a *different* number line.  
What are the 2 missing numbers?



Copy and complete this sentence:

The numbers on this number line go *up* in steps of .....

- (e) This is a *different* number line.  
What are the 3 missing numbers?



Copy and complete this sentence:

The numbers on this number line go *up* in steps of .....

## 2.2 Addition and Subtraction

This section deals with the revision of addition and subtraction of both whole numbers and decimals; we also look again at the use of brackets. You are *not* expected to use a calculator in this section.



### Example 1

Calculate:

(a)  $1142 + 363$

(b)  $4478 - 227$



### Solution

$$\begin{array}{r} \text{(a)} \quad 1142 \\ + \quad 363 \\ \hline 1505 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 4478 \\ - \quad 227 \\ \hline 4251 \\ \hline \end{array}$$

Note that it is important to *line up* the numbers with the *same place value*.



### Example 2

Calculate:

(a)  $14 - (8 + 3)$

(b)  $16 - (12 - 3)$



### Solution

Remember to carry out the calculations in the *brackets first*.

$$\begin{aligned} \text{(a)} \quad 14 - (8 + 3) &= 14 - 11 \\ &= 3 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 16 - (12 - 3) &= 16 - 9 \\ &= 7 \end{aligned}$$



### Example 3

Calculate:

(a)  $6.27 + 13.4$

(b)  $17.6 - 8.31$



### Solution

Remember to *line up* the decimal points.

$$\begin{array}{r} \text{(a)} \quad 6.27 \\ + 13.40 \\ \hline 19.67 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad \begin{array}{cccc} & 0 & 1 & 5 & 1 \\ & 1 & 7 & . & 6 & 0 \\ - & 8 & . & 3 & 1 \\ \hline & 9 & . & 2 & 9 \\ \hline \end{array} \end{array}$$



## Example 4

Ben has £17.50 when he goes out shopping. He spends £1.23 on sweets and £12.99 on a CD.

- (a) How much does he spend in total?  
 (b) How much money does he have left?



## Solution

(a)

$$\begin{array}{r} 1 \ . \ 23 \\ + 12 \ . \ 99 \\ \hline 14 \ . \ 22 \\ \hline 1 \quad 1 \end{array}$$

He spends a total of £14.22.

(b)

$$\begin{array}{r} 17 \ . \ 50 \\ - 14 \ . \ 22 \\ \hline 3 \ . \ 28 \end{array}$$

He has £3.28 left.



## Exercises

1. Calculate:

- |                 |                |                  |
|-----------------|----------------|------------------|
| (a) $16 + 47$   | (b) $32 + 18$  | (c) $19 + 15$    |
| (d) $66 + 82$   | (e) $37 + 92$  | (f) $44 + 126$   |
| (g) $572 + 116$ | (h) $362 + 97$ | (i) $421 + 362$  |
| (j) $46 + 712$  | (k) $381 + 56$ | (l) $182 + 1141$ |

2. Calculate:

- |                |                 |                 |
|----------------|-----------------|-----------------|
| (a) $66 - 4$   | (b) $78 - 3$    | (c) $49 - 7$    |
| (d) $72 - 21$  | (e) $47 - 25$   | (f) $88 - 36$   |
| (g) $41 - 22$  | (h) $83 - 47$   | (i) $76 - 57$   |
| (j) $121 - 92$ | (k) $742 - 151$ | (l) $311 - 286$ |

3. Calculate:

- |                   |                   |                    |
|-------------------|-------------------|--------------------|
| (a) $3.6 + 4.2$   | (b) $5.7 + 1.2$   | (c) $6.3 + 2.6$    |
| (d) $13.2 + 1.2$  | (e) $3.72 + 4.1$  | (f) $8.1 + 13.24$  |
| (g) $3.6 + 1.724$ | (h) $8.14 + 19.7$ | (i) $11.2 + 16.31$ |

4. Calculate:
- (a)  $4.7 - 2.4$                       (b)  $8.6 - 6.5$                       (c)  $3.9 - 1.4$   
(d)  $4.92 - 1.81$                       (e)  $6.91 - 2.3$                       (f)  $4.7 - 2.19$   
(g)  $3.7 - 2.17$                       (h)  $14.2 - 9.08$                       (i)  $5.6 - 4.72$
5. Calculate:
- (a)  $20 - (6 + 2)$                       (b)  $14 - (8 - 2)$   
(c)  $18 - (3 + 1)$                       (d)  $100 - (37 - 22)$   
(e)  $18 - (11 + 4)$                       (f)  $22 - (11 + 1)$   
(g)  $144 - (80 + 12)$                       (h)  $66 - (5 + 17)$   
(i)  $100 - (15 - 9)$                       (j)  $200 - (101 + 42)$
6. Copy the following calculations and fill in the missing numbers:
- (a)  $962 - \dots = 476$                       (b)  $\dots - 128 = 415$   
(c)  $3612 = \dots + 43$                       (d)  $7526 = \dots - 78$
7. Write one number at the end of each calculation to make it correct:
- (a)  $400 + 150 = 500 + \dots$                       (b)  $14 + 6 = 4 + \dots$   
(c)  $37 - 20 = 27 - \dots$                       (d)  $38 + 17 = 28 + \dots$   
(e)  $38 - 17 = 28 - \dots$                       (f)  $54 - 26 = 14 + \dots$
8. There are 32 pupils in class 7DC, 28 pupils in class 7BD and 29 pupils in class 7PD.  
How many pupils are there altogether in these 3 classes?
9. There are 74 people on a bus. At one stop 22 people get off. How many people are left on the bus?
10. Ben spends £4.27 in one shop and £15.99 in another shop.  
(a) How much does he spend altogether?  
(b) If he started with £25, how much money does he have left?
11. Bella buys a value burger meal that costs £3.28 for herself and a fun meal that costs £2.25 for her sister.  
(a) How much does she spend altogether?  
(b) How much change should she get from a £10 note?



12. A triangle has sides of length 18.8 cm, 14 cm and 12.75 cm. Calculate the perimeter of the triangle.
13. Look at these number cards:

+3	0	-5	+9
+2	-8	+7	-2

- (a) Choose a card to give the answer 4.

$$\boxed{+2} + \boxed{-5} + \boxed{\phantom{0}} = 4$$

- (b) Choose a card to give the *lowest* possible answer.  
Write out the calculation and work out the answer.

$$\boxed{-2} + \boxed{\phantom{0}} = \dots$$

- (c) Choose a card to give the *lowest* possible answer.  
Write out the calculation and work out the answer.

$$\boxed{-2} - \boxed{\phantom{0}} = \dots$$

- (d) Now choose a card to give the *highest* possible answer.  
Write out the calculation and work out the answer.

$$\boxed{-2} - \boxed{\phantom{0}} = \dots$$

(KS3/97/Ma/Tier 4-6/P1)

## 2.3 Multiplication and Division

In this section we review multiplication and division. Again, you are *not* expected to use a calculator.



### Example 1

Calculate:

- (a)  $41 \times 10$  (b)  $4.712 \times 100$   
 (c)  $62 \div 100$  (d)  $23.7 \div 10$



### Solution

- (a)  $41 \times 10 = 410$  (b)  $4.712 \times 100 = 471.2$   
 (c)  $62 \div 100 = 0.62$  (d)  $23.7 \div 10 = 2.37$



### Example 2

Calculate:

- (a)  $12 \times 24$  (b)  $37 \times 15$



### Solution

- (a) 
$$\begin{array}{r} 12 \\ \times 24 \\ \hline 48 \\ 240 \\ \hline 288 \end{array}$$
- (b) 
$$\begin{array}{r} 37 \\ \times 15 \\ \hline 185 \\ 370 \\ \hline 555 \end{array}$$

*Note:* With all these examples, there are many ways of obtaining the correct answer; for example, in (a) above:

$$\begin{aligned} 12 \times 24 &= (10 + 2) \times 24 \\ &= (10 \times 24) + (2 \times 24) \\ &= 240 + 48 \\ &= 288 \end{aligned}$$

However, we have used the written algorithm for long multiplication as it will *always* work, whereas short-cut methods do not necessarily generalise.



### Example 3

Calculate:

(a)  $4.7 \times 5$

(b)  $6.4 \times 2.3$



### Solution

(a) Since

$$\begin{array}{r} 47 \\ \times 5 \\ \hline 235 \\ \hline 23 \end{array}$$

then

$$4.7 \times 5 = \frac{47 \times 5}{10} = \frac{235}{10} = 23.5$$

(b) Since

$$\begin{array}{r} 64 \\ \times 23 \\ \hline 192 \\ 1280 \\ \hline 1472 \\ \hline 1 \end{array}$$

then

$$6.4 \times 2.3 = \frac{64}{10} \times \frac{23}{10} = \frac{64 \times 23}{100} = \frac{1472}{100} = 14.72$$

*Note:* When dividing by 10, the decimal point is moved one place to the left; when dividing by 100 the decimal point is moved 2 places to the left, and so on.



### Example 4

Calculate:

(a)  $124 \div 4$

(b)  $615 \div 5$



### Solution

(a) 
$$4 \overline{) 124} \begin{array}{l} 31 \\ 12 \\ \hline 4 \end{array}$$

(b) 
$$5 \overline{) 615} \begin{array}{l} 123 \\ 615 \\ \hline 0 \end{array}$$

Again, you can use short-cut methods; for example, in (b) above:

$$\begin{aligned}
 615 \div 5 &= 615 \div \left(\frac{10}{2}\right) \\
 &= (2 \times 615) \div 10 \quad (\text{i.e. dividing by 5 is equivalent to} \\
 &\quad \text{multiplying by 2 and then dividing} \\
 &\quad \text{by 10)} \\
 &= 1230 \div 10 \\
 &= 123
 \end{aligned}$$

However, using the *standard method* for division will *always* give the correct answer.



### Example 5

A chocolate bar costs 32p. Calculate the cost of 7 chocolate bars.



### Solution

$$\begin{array}{r}
 32 \\
 \times 7 \\
 \hline
 224 \\
 \hline
 21
 \end{array}$$

The cost is 224p or £2.24.



### Exercises

1. Calculate:

- |                      |                      |                        |
|----------------------|----------------------|------------------------|
| (a) $6 \times 10$    | (b) $17 \times 100$  | (c) $8 \times 1000$    |
| (d) $14 \times 10$   | (e) $321 \times 10$  | (f) $4.2 \times 10$    |
| (g) $3.6 \times 100$ | (h) $14.7 \times 10$ | (i) $0.461 \times 100$ |

2. Calculate:

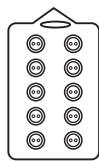
- |                     |                      |                     |
|---------------------|----------------------|---------------------|
| (a) $4700 \div 10$  | (b) $360 \div 10$    | (c) $421 \div 10$   |
| (d) $16.8 \div 10$  | (e) $476 \div 100$   | (f) $5600 \div 100$ |
| (g) $56.2 \div 100$ | (h) $113.6 \div 100$ | (i) $0.652 \div 10$ |

3. Calculate:

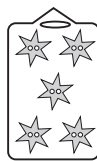
- |                    |                    |                    |
|--------------------|--------------------|--------------------|
| (a) $15 \times 6$  | (b) $34 \times 2$  | (c) $82 \times 7$  |
| (d) $37 \times 5$  | (e) $19 \times 6$  | (f) $82 \times 4$  |
| (g) $16 \times 12$ | (h) $24 \times 14$ | (i) $32 \times 24$ |
| (j) $66 \times 47$ | (k) $84 \times 28$ | (l) $62 \times 29$ |

4. Calculate:
- |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|
| (a) $4.7 \times 2$    | (b) $6.3 \times 5$    | (c) $11.4 \times 5$   |
| (d) $12.7 \times 3$   | (e) $14.8 \times 4$   | (f) $22.1 \times 7$   |
| (g) $1.2 \times 3.7$  | (h) $4.2 \times 5.9$  | (i) $1.24 \times 1.6$ |
| (j) $7.23 \times 1.4$ | (k) $18.2 \times 3.2$ | (l) $27.6 \times 4.2$ |
5. Calculate:
- |                   |                  |                  |
|-------------------|------------------|------------------|
| (a) $12 \div 4$   | (b) $81 \div 9$  | (c) $42 \div 7$  |
| (d) $24 \div 8$   | (e) $64 \div 8$  | (f) $45 \div 5$  |
| (g) $75 \div 5$   | (h) $86 \div 2$  | (i) $98 \div 7$  |
| (j) $128 \div 4$  | (k) $248 \div 4$ | (l) $497 \div 7$ |
| (m) $1917 \div 9$ | (n) $411 \div 3$ | (o) $855 \div 5$ |
6. Write out each of these calculations, filling in the missing numbers:
- |                             |                          |
|-----------------------------|--------------------------|
| (a) $6 \times \dots = 120$  | (b) $\dots \div 8 = 7$   |
| (c) $26 \times \dots = 962$ | (d) $\dots \div 24 = 16$ |
7. Write one number at the end of each calculation to make it correct:
- |                                     |   |
|-------------------------------------|---|
| (a) $6 \times 5 = 3 \times \dots$   | (b) $40 \times 10 = 4 \times \dots$     |
| (c) $5 \times 30 = 25 \times \dots$ | (d) $7000 \div 100 = 700 \div \dots$    |
| (e) $480 \div 20 = 2400 \div \dots$ | (f) $355 \times 12 = 1420 \times \dots$ |
8. A packet of crisps costs 32p. Calculate the cost of:
- |                |                |                 |
|----------------|----------------|-----------------|
| (a) 3 packets, | (b) 7 packets, | (c) 25 packets. |
|----------------|----------------|-----------------|
9. A meal at a burger bar costs £2.95. Calculate the cost of:
- |              |              |              |
|--------------|--------------|--------------|
| (a) 2 meals, | (b) 3 meals, | (c) 5 meals. |
|--------------|--------------|--------------|
10. Joseph counts the number of sweets in a packet and find that there are 22. How many sweets are there in total in:
- |                |                  |                 |
|----------------|------------------|-----------------|
| (a) 6 packets, | (b) 100 packets, | (c) 17 packets? |
|----------------|------------------|-----------------|
11. Three brothers are given 102 football stickers by their uncle. If they share them equally, how many stickers will they each have?

12. Four children are paid £42.60 for working as gardeners. How much will they each have if they share the money equally?
13. Stamps are 19p each.  
Gwyn wants to buy 9 stamps.  
He knows that he will have to pay *less* than £2.
- (a) Write down how you can tell that he will have to pay less than £2 *without* working out the exact answer.
- (b) Gwyn buys 9 stamps at 19p each.  
Without using a calculator, work out exactly how much he must pay.  
(KS3/95/Ma/Levels 4-6/P2)
14. Gwen makes kites to sell.  
She sells the kites for £4.75 each.
- (a) Gwen sells 26 kites.  
Without using a calculator, work out how much money she gets for the 26 kites.
- (b) Gwen has a box of 250 staples.  
She uses 16 staples to make each kite.  
Without using a calculator, work out how many complete kites she can make using the 250 staples.  
(KS3/96/Ma/Tier 3-5/P1)
15. Here are some buttons on cards.



10  
round buttons  
on a card



5  
star buttons  
on a card



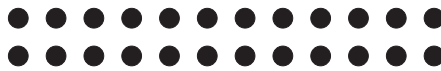
2  
flower buttons  
on a card

- (a) Marc bought 9 cards of *star* buttons.  
How many buttons did he buy altogether?
- (b) Lee bought 8 cards of *round* buttons and  
2 cards of *flower* buttons.  
How many buttons did he buy altogether?

- (c) Sally bought *exactly* 16 buttons.  
They were all the *same sort* of button.  
What sort of buttons did Sally buy?
- (d) Pat bought *exactly* 15 buttons.  
They were all the *same sort* of button.  
What sort of buttons did Pat buy?
- (e) Pinder wants to buy *exactly* 20 buttons.  
They must all be the *same sort* of button.  
Pinder could buy:  
2 cards of *round* buttons.  
Write down *two* other possible answers for Pinder.

(KS3/96/Ma/Tier 3-5/P1)

16. Megan wants to plant 24 seeds.  
She can plant them in 2 rows, with 12 seeds in each row.



- (a) Draw a diagram to show how she can plant 24 seeds in 3 rows, with the same number of seeds in each row.
- (b) Draw a diagram to show a *different* way that Megan can plant 24 seeds in a *different number* of rows, with the same number of seeds in each row.
- (c) Copy and complete the table to show how many rows Megan can make with 24 seeds, and how many seeds there are in each row.

<i>Number of rows</i>	<i>Number of seeds in each row</i>
1 row	24 seeds in a row
2 rows	12 seeds in a row
..... rows	..... seeds in a row
..... rows	..... seeds in a row
..... rows	..... seeds in a row
8 rows	3 seeds in a row
12 rows	2 seeds in a row
24 rows	1 seed in a row

(d) Megan says:

*"I can plant 24 seeds in 5 rows, with the same number of seeds in each row."*

Explain why Megan is wrong.

You can write your answer, or draw a diagram.

(KS3/96/Ma/Tier 3-5/P2)

## 2.4 Problems in Context

Problems in context are dealt with in this section. You will need to decide which operation is required to solve each problem: you may need to *add*, *subtract*, *multiply* or *divide*. However, it is still recommended that you tackle these problems without a calculator, perhaps using it only to check your answers.



### Example 1

It costs £1.25 for a child to go into a swimming pool. How much does it cost for 7 children to go in?



### Solution

$$(a) \quad \begin{array}{r} 1.25 \\ \times \quad 7 \\ \hline 8.75 \\ \hline 1 \quad 3 \end{array}$$

The cost will be £8.75.



### Example 2

There are 242 passengers on a train. At a station, 36 people get off and 27 people board the train. How many people are now on the train?



### Solution

$$\begin{aligned} 242 - 36 + 27 &= 206 + 27 \\ &= 233 \end{aligned}$$

So 233 people are now on the train.





### Example 3

Four children want to buy a computer game that costs £24.80. How much money must each of them contribute if they share the cost equally between them?



### Solution

$$4 \overline{) 24.80} \quad \begin{array}{r} 6.20 \\ 24.80 \\ \hline \end{array}$$

Each child must pay £6.20.



### Exercises

- A blank tape costs 65p. Calculate the cost of:
  - 4 tapes,
  - 7 tapes,
  - 9 tapes.
- Alec spends £14.27 in a shop. He pays with a £20 note. How much change should he get?
- The cost of a carpet is £7.99 per square metre. Calculate the cost of:
  - 4 square metres,
  - 10 square metres,
  - 9 square metres.
- Simon is saving up to buy a tent that costs £72. So far he has saved £54.50. How much more does he need to save?
- Two neighbours agree to share equally the cost of a new fence. The fence costs £142. How much do they each have to pay?
- A cake weighs 824 grams. It is divided into 4 equal parts. How much does each part weigh?
- A car is driven at a speed of 45 mph. How far does it travel in:
  - 2 hours,
  - 5 hours,
  - 3.5 hours ?
- Cinema tickets cost £7 each. How many tickets could you buy with £63 ?

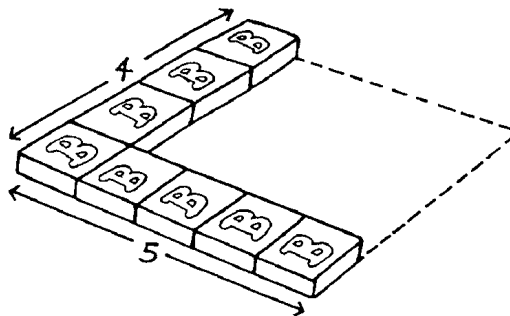
9. Cans of drink cost 42p each.
- (a) How much would 6 cans cost?
  - (b) Jane's mum pays for 6 cans with a £5 note. How much change should she have?
10. A school trip is arranged for 43 pupils accompanied by 2 teachers. A minibus carries 16 passengers. Three minibuses are booked for the trip. How many empty seats are there in the minibuses?
11. (a) A shop sells plants at 95p each.  
Find the cost of 35 plants.
- (b) The shop also sells trees at £17 each.  
Mr Bailey has £250.  
He wants to buy as many trees as possible.  
*How many trees can Mr Bailey buy?*
- (KS3/97/Ma/Tier 3-5/P1)
12. (a) Lucy had dinner.  
It cost £13.40.  
She paid with a £20 note.  
How much change should Lucy get?
- (b) (i) 14 people had the set meal at the cafe at a cost of £6.40 each.  
How much did they pay altogether?
- (ii) Another group of people had the set meal.  
Altogether they paid £32.  
How many people were in the group?
- (KS3/97/Ma/Tier3-5/P2)
13. Five people shared a bag of apples.  
Each person had the *same number* of apples.  
There were none left
- (a) How many apples could have been in the bag?
  - (b) Write another number of apples which could have been in the bag.
  - (c) Write another number of apples which could have been in the bag.

The five people shared a box of sweets.  
 There were more than 100 sweets in the box.  
 Each person had the same number of sweets.  
 There were none left.

- (d) Anna says: "I think there were 113 sweets in the box."  
 Explain why Anna must be wrong.
- (e) Write *two* different numbers of sweets which could have been in the box.
- (f) How can anyone tell that your numbers could be divided by 5 just by looking at how they end?

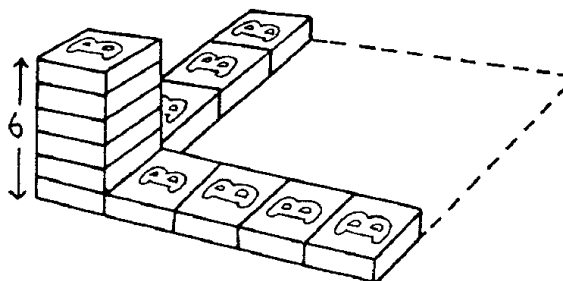
(KS3/94/Ma/Tier3-5/P2)

14. (a) Carl is putting packs of biscuits into a box.  
 He starts to put in the bottom layer.  
 The box holds 5 packs *across* and is 4 packs *wide*.



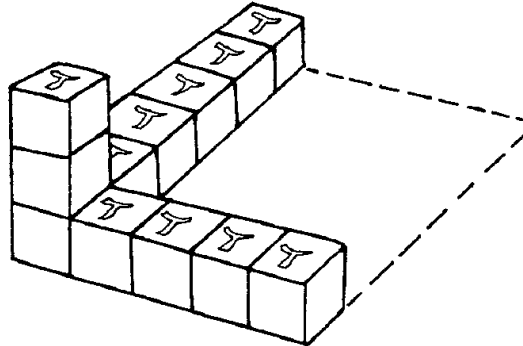
How many packs will fit altogether on the bottom layer?

The box holds 6 layers.



How many packs will fit in the box when it is *full*?

- (b) Aziz is putting packs of tea into a box.  
 The box holds *5 packs across* and is *6 packs wide*.  
 The box holds *3 layers*.



How many packs of tea will fit in the box when it is *full*?

- (c) Copy the words below, filling in the gaps to show one way of filling a *different* box with 24 packs in 2 layers.

total: 24 packs  
 2 layers  
 ..... packs across  
 ..... packs wide

(KS3/97/Ma/Tier4-6/P2)

15. (a) A shop sells video tapes for £2.50 each.  
 What is the cost of 16 video tapes?
- (b) The shop sells audio cassettes.  
 Each cassette costs £1.49.  
 What is the cost of 4 cassettes?
- (c) How many cassettes can you buy with £12?
- (d) The shop also sells cassettes in packs of three.  
 A pack costs £3.99.  
 How many packs can you buy with £12?
- (e) What is the *greatest number* of cassettes you can buy with £15?  
 You can buy some packs and some single cassettes.

(KS3/98/Ma/Tier 3-5/P1)

16. Bill, Ravi and Eric are three divers in a competition.

Each type of dive has a *dive rating*.

*Easy dives* have a *low* rating; *hard dives* have a *high* rating.

Every dive is marked by five judges who each give a mark out of 10.

*How to calculate the score for a dive:*

1. Look at all five marks. Remove the highest and the lowest marks.
2. Add together the middle three marks to give a total.
3. Multiply this total by the dive rating.

- (a) Bill does a dive with a dive rating of 3.34.

The judges give the marks 7.0 7.5 8.0 8.0 8.5

What is Bill's score?

- (b) Ravi scored 82.68 on his first dive.

The dive had a dive rating of 3.18.

What was the *total* of the middle three marks given by the judges?

- (c) Eric is getting ready to take his final dive.

He needs to score at least 102.69 to win the competition.

Eric decides to do a dive with a dive rating of 3.26.

Explain why Eric has made a poor decision.

Show your working.

(KS3/96Ma/Tier 4-6/P1)

17. A class is planning a trip to a funfair.

The pupils have found out the prices at these two funfairs:

<p><b><i>Milltown Funfair</i></b></p> <p>Entry: £2.20</p> <p>plus</p> <p>Rides: 60p each</p>
--

<p><b><i>Seaview Funfair</i></b></p> <p>Entry: £4.50</p> <p>plus</p> <p>Rides: 20p each</p>
---

The teacher says that there will be time for 8 rides.

- (a) How much money do you need to get in to Milldown Funfair and have 8 rides?
- (b) How much money do you need to get in to Seaview Funfair and have 8 rides?

Ben has only £5 to get in and pay for his rides.

- (c) How many rides would Ben get at each funfair?

(KS3/94/Ma/Tier 3-5/P1)

## UNIT 2 *Basic Operations*

## Activities

---

### **Activities**

- 2.1 Secret Letter
- 2.2 Division Networks
- 2.3 Chip Shop Supper
- 2.4 Chinese Choices
- 2.4A Chinese Takeaway Menu
- Notes and Solutions (1 page)

# ACTIVITY 2.1

## *Secret Letter*

In the multiplication grid below, shade the boxes with incorrect answers. The boxes you shade will form a letter. What letter is it?

×	5	4	0	9	2	6	1	7	3	8
3	15	12	0	21	5	81	1	21	9	24
7	35	28	7	63	14	42	7	14	21	56
6	30	24	6	54	12	36	6	42	18	48
1	5	4	1	9	2	6	1	7	3	8
0	0	0	0	9	2	6	1	0	0	0
5	25	20	0	45	10	30	5	30	15	40
2	10	8	0	18	4	12	2	9	6	16
8	40	32	0	72	16	48	8	50	24	64
4	20	16	4	36	8	24	5	28	12	32
9	45	36	0	18	16	45	9	63	27	72

### *Extension*

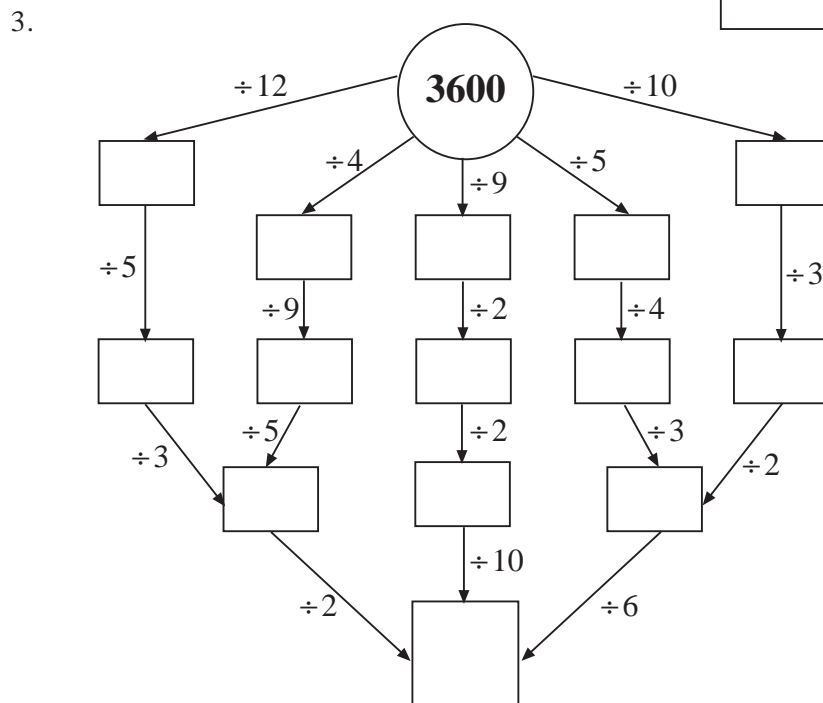
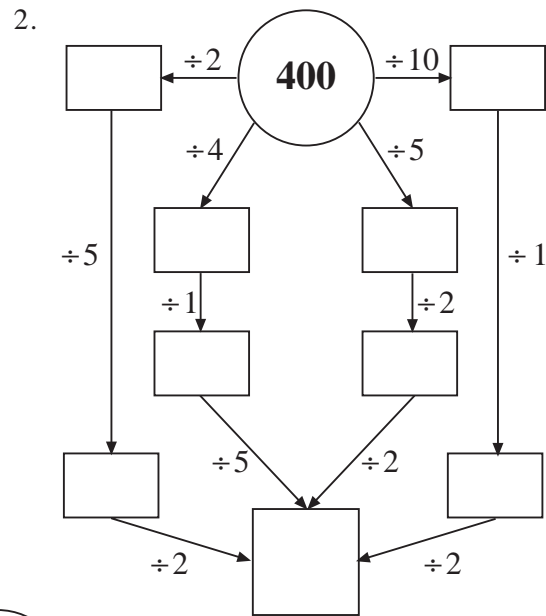
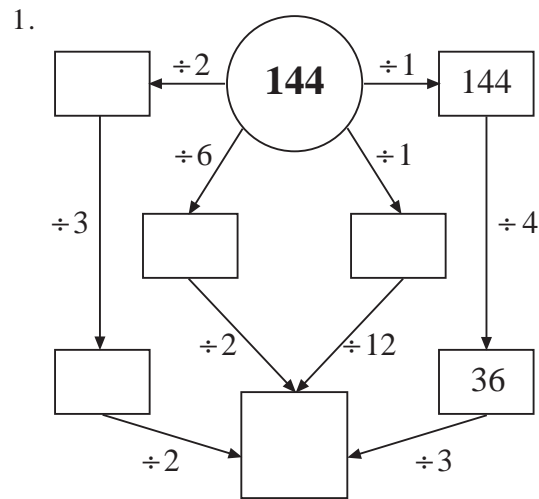
Design another multiplication table with some incorrect answers so that their boxes make up a letter.

# ACTIVITY 2.2

## Division Networks

Without using a calculator, complete each diagram as quickly as possible by filling in each box with the correct number.

The first part of question 1 has been done for you.



### Extension

Design your own network and give it to a friend to complete.



## ACTIVITY 2.3

## Chip Shop Supper

---

Your teacher decides to treat himself and 5 friends to a takeaway from the local fish and chip shop.

Select a sample of 5 'friends' from the class and calculate the cost using their choices, your choice and the menu below.

### *MENU*

Fish and Chips	Large . . . . .	£3.80
	Medium . . . . .	£3.20
	Small . . . . .	£3.00
Beef Pie and Chips . . . . .		£1.99
Chicken Pie and Chips . . . . .		£1.89
Sausages (2) and Chips . . . . .		£2.19
Pasty and Chips . . . . .		£2.09
Fishcake and Chips . . . . .		£1.65
Burger and Chips . . . . .		£3.15
Chicken Portion and Chips . . . . .		£4.85

### *Extras*

Mushy Peas . . . . .	49p
Baked Beans . . . . .	59p
Curry Sauce . . . . .	47p

## ACTIVITY 2.4

## *Chinese Choices*

---

Sheet 2.4A shows the menu for a Chinese takeaway.

You have £35 to spend on a meal for 5 people. You should choose a number of dishes that they can all share. Spend *as near to* £35 as possible, but *no more* than £35. The 5 people's likes and dislikes are listed below.

Tim *will eat anything; his special favourite is duck.*

Halim *is a vegetarian.*

Rosie *does not eat beef.*

Alison *eats no meat other than chicken.*

Jai *likes curries; he does not like chicken.*

## ACTIVITY 2.4A

## Chinese Takeaway Menu

### Sweet and Sour Dishes

Sweet and Sour Pork .....	£3.50
Sweet and Sour Chicken .....	£3.60
Sweet and Sour King Prawn .....	£4.40
Sweet and Sour Spare Ribs .....	£4.20
Sweet and Sour Pork ( <i>Hong Kong Style</i> ) .....	£4.00
Sweet and Sour King Prawn ( <i>Hong Kong Style</i> ) .....	£4.50

### Curry Dishes

Special Curried King Prawn .....	£4.20
Special Curried Chicken .....	£4.00
Curried King Prawn .....	£4.00
Curried Prawn .....	£3.40
Curried Chicken .....	£3.40
Curried Beef .....	£3.50
Special Curried Mixed Meat .....	£4.20
Curried Mushroom and Vegetables .....	£3.20

### Chop Suey Dishes

King Prawn Chop Suey .....	£4.40
Prawn Chop Suey .....	£3.75
Chicken Chop Suey .....	£3.60
Beef Chop Suey .....	£3.75
Char Siu Chop Suey ( <i>Chinese Roast Pork</i> ) .....	£3.75
Special Chinese Mixed Vegetable Chop Suey....	£4.50
Chow's Special Chop Suey .....	£4.50

### Egg Foo Young Dishes

Chow's Special Foo Young .....	£4.50
King Prawn Foo Young .....	£4.45
Prawn Foo Young .....	£3.75
Chicken Foo Young .....	£3.60
Mushroom Foo Young .....	£3.50

### Fried Rice Dishes

Chow's Special Fried Rice .....	£4.50
King Prawn Fried Rice .....	£4.40
Prawn Fried Rice .....	£3.80
Chicken Fried Rice .....	£3.80
Young Chow Fried Rice .....	£3.90
Beef Fried Rice .....	£3.90
Singapore Fried Rice ( <i>Hot Dish</i> ) .....	£3.90

### Duckling Dishes

Sow Chu Duckling .....	£6.00
Roast Duckling on Beansprouts .....	£4.50
Roast Duckling with Mushrooms .....	£4.50
Roast Duckling with Pineapple .....	£4.50
Roast Duckling with Bamboo Shoots and Water Chestnuts) .....	£4.50
Roast Duckling with Pineapple and Pickled Ginger	£4.80
Roast Duckling in Yellow Bean Sauce .....	£5.00

### Chinese Appetisers

Chicken and Mushroom Soup .....	£1.45
Chicken and Sweetcorn Soup .....	£1.45
Chicken and Noodle Soup .....	£1.45
Crab Meat and Sweetcorn Soup .....	£2.20
Hot and Sour Soup .....	£1.80
Barbecue Spare Ribs of Pork in Honey .....	£4.20
Prawn Cocktail .....	£2.00

### Chicken Dishes

Sow Chu Chicken .....	£5.30
Special Lemon Chicken .....	£4.00
Roast Chicken on Beansprouts .....	£3.60
Fried Chicken with Cashewnuts .....	£4.00
Fried Chicken with Mushrooms .....	£3.60
Fried Chicken with Black Bean Sauce .....	£3.95
Fried Chicken with Bamboo Shoots .....	£3.60
Fried Chicken with Mushrooms and Pork .....	£4.00
Fried Chicken with Chinese Mushrooms .....	£4.20
Roast Chicken and Chinese Roast Pork .....	£3.60
Fried Chicken with Broccoli in Oyster Sauce ...	£4.20
Fried Chicken with Chinese Vegetables .....	£4.00

### Pork and Beef Dishes

Barbecued Spare Ribs of Pork in Sauce .....	£4.20
King Do Spare Ribs of Pork .....	£4.20
Fried Beef with Onions .....	£3.75
Fried Beef with Mushrooms .....	£3.75
Fried Beef with Broccoli in Oyster Sauce .....	£4.50
Fried Beef with Chinese Mixed Vegetables .....	£4.00
Fried Beef with Black Bean Sauce and Peppers..	£4.00

### King Prawn Dishes

Fried King Prawn with Chinese Mushrooms ....	£4.60
Fried King Prawn with Bamboo Shoots and Water Chestnuts .....	£4.40
Fried King Prawn with Cashewnuts .....	£4.60
Fried King Prawn with Black Bean Sauce .....	£4.50
Fried King Prawn and Chinese Roast Pork .....	£4.50

### Extra Portions

Egg Fried Rice .....	£1.50
Boiled Rice .....	£1.25
Fried Soft Noodles with Beansprouts .....	£2.00
Bamboo Shoots and Water Chestnuts .....	£1.80
Mushrooms .....	£1.80
Fried Onions .....	£1.80
Beansprouts .....	£1.80

### Sweets

Pineapple Fritter with Syrup .....	£1.40
Banana Fritter with Syrup .....	£1.40

# ACTIVITIES 2.1 - 2.4

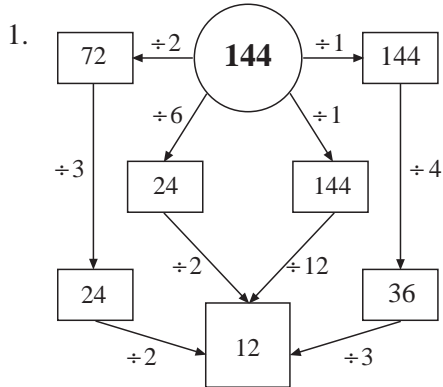
# Notes and Solutions

Notes and solutions given only where appropriate.

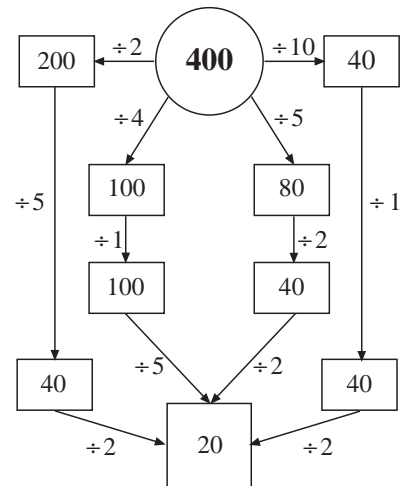
### 2.1

×	5	4	0	9	2	6	1	7	3	8
3	15	12	0	21	5	81	1	21	9	24
7	35	28	7	63	14	42	7	14	21	56
6	30	24	6	54	12	36	6	42	18	48
1	5	4	1	9	2	6	1	7	3	8
0	0	0	0	9	2	6	1	0	0	0
5	25	20	0	45	10	30	5	30	15	40
2	10	8	0	18	4	12	2	9	6	16
8	40	32	0	72	16	48	8	50	24	64
4	20	16	4	36	8	24	5	28	12	32
9	45	36	0	18	16	45	9	63	27	72

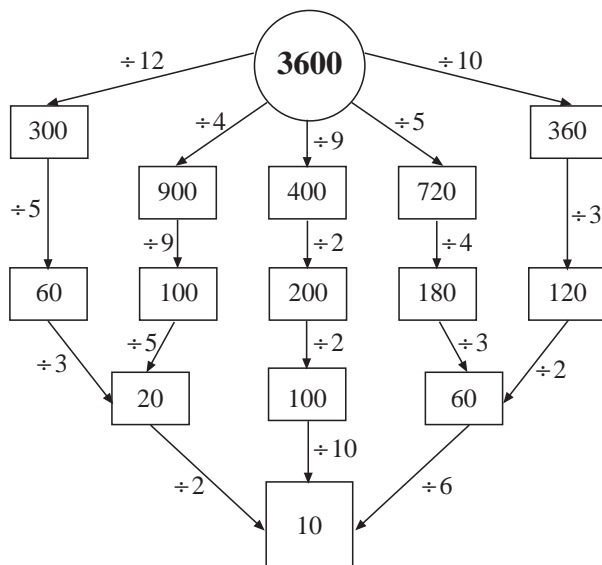
### 2.2



2.



3.



**UNIT 2**    *Basic Operations***Extra Exercises 2.1**

---

1. Calculate:

(a)  $88 + 104$

(b)  $99 + 216$

(c)  $47 + 328$

(d)  $572 + 1049$

(e)  $627 + 33$

(f)  $471 + 362$

(g)  $3.8 + 4.71$

(h)  $52.3 + 3.62$

(i)  $56.4 + 21.32$

2. Calculate:

(a)  $48 - 23$

(b)  $178 - 52$

(c)  $164 - 132$

(d)  $80 - 57$

(e)  $92 - 25$

(f)  $64 - 37$

(g)  $142 - 93$

(h)  $264 - 159$

(i)  $1002 - 427$

(j)  $14.7 - 3.6$

(k)  $15.28 - 1.5$

(l)  $16.2 - 3.17$

3. Calculate:

(a)  $30 - (11 + 2)$

(b)  $46 - (21 - 7)$

(c)  $82 - (9 + 41)$

(d)  $92 - (11 + 42)$

4. Millie spends £4.76 on lunch and £2.95 on a magazine.

(a) How much does she spend altogether?

(b) How much change should she get from a £10 note?

5. Harry has £5.62; he spends £1.85. How much money does he have left?

**UNIT 2**    *Basic Operations***Extra Exercises 2.2**

---

1. Calculate:

(a)  $36 \times 1000$

(b)  $470 \div 10$

(c)  $8000 \div 100$

(d)  $4.2 \times 100$

(e)  $8.2 \div 10$

(f)  $14 \div 1000$

2. Calculate:

(a)  $6 \times 9$

(b)  $14 \times 3$

(c)  $25 \times 6$

(d)  $33 \times 12$

(e)  $14 \times 28$

(f)  $29 \times 47$

(g)  $4.2 \times 3$

(h)  $6.2 \times 1.6$

(i)  $5.3 \times 4.2$

3. Calculate:

(a)  $48 \div 3$

(b)  $84 \div 6$

(c)  $225 \div 5$

(d)  $102 \div 6$

(e)  $753 \div 3$

(f)  $744 \div 6$

(g)  $16.8 \div 7$

(h)  $27.2 \div 8$

(i)  $8.47 \div 7$

4. Cans of drink cost 55p each. Calculate the cost of:

(a) 3 cans of drink,

(b) 7 cans of drink,

(c) 13 cans of drink.

5. A school fair raises £255.81. The money is divided equally between 3 charities. How much is given to each of the charities?

**UNIT 2**    *Basic Operations***Extra Exercises 2.3**

---

1. Postcards cost 14p each. Calculate the cost of:  
(a) 3 postcards,                      (b) 18 postcards,                      (c) 100 postcards.
2. Julie and Emma go shopping with a £20 note. Julie spends £4.82 and Emma spends £12.62. How much money do they have left?
3. The mass of a melon is 900 grams. It is cut into 6 equal parts. What is the mass of each part?
4. Ben, Josh and Paul go looking for conkers. They find a total of 57. If they share them equally, how many conkers will each boy get?
5. Four boys must pay £50 for repairs to a greenhouse that they have broken with a cricket ball. How much must they each pay if they share the cost equally?
6. A school trip costs £5.80 per pupil. A total of 82 children go on the trip. How much money is paid in total for this trip?
7. It costs a school £115 to hire a 50-seater coach. How much must they charge each pupil to cover this cost?
8. Calculate the total cost of 120 new textbooks that cost £4.90 each.

## Extra Exercises 2.1 Answers

---

- |    |           |           |           |        |
|----|-----------|-----------|-----------|--------|
| 1. | (a) 192   | (b) 315   | (c) 375   |        |
|    | (d) 1621  | (e) 660   | (f) 833   |        |
|    | (g) 8.51  | (h) 55.92 | (i) 77.72 |        |
| 2. | (a) 25    | (b) 126   | (c) 32    |        |
|    | (d) 23    | (e) 67    | (f) 27    |        |
|    | (g) 49    | (h) 105   | (i) 575   |        |
|    | (j) 11.1  | (k) 13.78 | (l) 13.03 |        |
| 3. | (a) 17    | (b) 32    | (c) 32    | (d) 39 |
| 4. | (a) £7.71 | (b) £2.29 |           |        |
| 5. | £3.77     |           |           |        |

## Extra Exercises 2.2 Answers

---

- |    |            |           |           |  |
|----|------------|-----------|-----------|--|
| 1. | (a) 36 000 | (b) 47    | (c) 80    |  |
|    | (d) 420    | (e) 0.82  | (f) 0.014 |  |
| 2. | (a) 54     | (b) 42    | (c) 150   |  |
|    | (d) 396    | (e) 392   | (f) 1363  |  |
|    | (g) 12.6   | (h) 9.92  | (i) 22.26 |  |
| 3. | (a) 16     | (b) 14    | (c) 45    |  |
|    | (d) 17     | (e) 251   | (f) 124   |  |
|    | (g) 2.4    | (h) 3.4   | (i) 1.21  |  |
| 4. | (a) £1.65  | (b) £3.85 | (c) £7.15 |  |
| 5. | £85.27     |           |           |  |

## Extra Exercises 2.3 Answers

---

- |    |            |           |         |
|----|------------|-----------|---------|
| 1. | (a) 42p    | (b) £2.52 | (c) £14 |
| 2. | £2.56      |           |         |
| 3. | 150 grams  |           |         |
| 4. | 19 conkers |           |         |
| 5. | £12.50     |           |         |
| 6. | £475.60    |           |         |
| 7. | £2.30      |           |         |
| 8. | £588       |           |         |
-



## UNIT 2 *Basic Operations*

## Lesson Plans

# St

*These are based on 45/50 minute lessons.*

<i>Lesson No.</i>	<i>Suggested Plan</i>	<i>References</i>
<b>1.</b>	<b>Place Value</b>	
	Revise concept	
	Worked example - interactively	PB 2.1 Example 1
	Exercises	PB 2.1, Q5
	Review answers	
	Worked example - interactively	PB 2.1 Example 2
	Exercises	PB 2.1, Q3
	Review answers	
	Set homework	PB 2.1, Q2 and Q6
<b>2.</b>	<b>Addition and Subtraction</b>	
	Discuss homework	
	Revise concepts	OS 2.1
	Exercises	Choose from PB 2.2, Q1, Q2, Q3, Q4
	Review answers	
	Use of brackets	OS 2.2
	Exercises	PB 2.2, Q5
	Review answers	
	Exercises	PB 2.2, Q13
	Review answers	
	Set homework	Complete PB 2.2, Q13 and /or PB 2.3, Q13
	<b>3.</b>	<b>Multiplication and Division</b>
Discuss homework		
Introduction - interactively		OS 2.3
Activity		Activity 2.1
Review answers		
Algorithms for multiplication and division		OS 2.4
Exercises		PB 2.3, Q14
Review answers		
Exercises		PB 2.3, Q15
Review answers		
Set homework	PB 2.3, Q16 or Activity 2.2	

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**UNIT 2** *Basic Operations*
**Lesson Plans****St**

<i>Lesson No.</i>	<i>Suggested Plan</i>	<i>References</i>
<b>4.</b>	<b>Problems in Context</b> Discuss homework Introduction - interactively Exercises Review answers Exercises Review answers Mental Test Review answers Set homework	OS 2.5 PB 2.4, Q11  PB 2.4, Q12  M 2.1  PB 2.4, Q13 and Q15 or Activity 2.3 or Activity 2.4
<b>5.</b>	<b>Revision Test</b> Discuss homework Revision Test	RT 2.1
<b>7.</b>	<b>Recap</b> Give back marked tests Go over test questions interactively Revise topics	

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**UNIT 2** *Basic Operations*
**Lesson Plans**

<i>Lesson No.</i>	<i>Suggested Plan</i>	<i>References</i>
<b>1.</b>	<b>Place Value</b>	
	Revise concept	
	Worked example - interactively	PB 2.1 Example 1
	Exercises	PB 2.1, Q5
	Review answers	
	Worked example - interactively	PB 2.1 Example 2
	Exercises	PB 2.1, Q3
	Review answers	
	Exercises	PB 2.1, Q2
	Review answers	
Set homework	PB 2.1, Q5 and Q6	
<b>2.</b>	<b>Addition and Subtraction</b>	
	Discuss homework	
	Revise concepts	OS 2.1
	Exercises	Choose from PB 2.2, Q1, Q2, Q3, Q4
	Review answers	
	Use of brackets	OS 2.2
	Exercises	PB 2.2, Q5
	Review answers	
	Exercises	PB 2.2, Q13
	Review answers	
Set homework	PB 2.3, Q13 and Q14	
<b>3.</b>	<b>Multiplication and Division</b>	
	Discuss homework	
	Introduction - interactively	OS 2.3
	Activity	Activity 2.1
	Review answers	
	Algorithms for multiplication and division	OS 2.4
	Exercises	PB 2.3, Q15
	Review answers	
	Activity	Activity 2.2
	Review answers	
Set homework	PB 2.3, Q16	

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**UNIT 2** *Basic Operations*
**Lesson Plans**

<i>Lesson No.</i>	<i>Suggested Plan</i>	<i>References</i>
<b>4.</b>	<b>Problems in Context</b> Discuss homework Introduction - interactively Exercises Review answers Exercises Review answers Mental Test Review answers Activity Set homework	OS 2.5 PB 2.4, Q11  PB 2.4, Q12  M 2.2  Activity 2.3 or Activity 2.4 PB 2.4, Q14 and Q16
<b>5.</b>	<b>Revision Test</b> Discuss homework Revision Test	RT 2.2
<b>7.</b>	<b>Recap</b> Give back marked tests Go over test questions interactively Revise topics	

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**UNIT 2** *Basic Operations***Lesson Plans****E**

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*Lesson No.*    *Suggested Plan**References*

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There should be little need for many lessons here but it might be worth using, for example,

Mental Test

M 2.3

Exercises

PB 2.4, Q 14 and Q16

Revision Test

RT 2.3

as part of a revision lesson, or for homework.

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## UNIT 2 Basic Operations

## Mental Tests

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### M 2.1 Standard Route *(no calculator)*

1. Calculate  $2 \times 43$ . (86)
  2. Calculate  $100 \times 21$ . (2100)
  3. Calculate  $9 + 14$ . (23)
  4. Calculate  $22 + 13$ . (35)
  5. Calculate  $4 \times 9$ . (36)
  6. Calculate  $8 \times 3$ . (24)
  7. Calculate  $41 \div 10$ . (4.1)
  8. Calculate  $99 + 24$ . (123)
  9. Calculate  $28 \div 4$ . (7)
  10. Calculate  $20 \div 5$ . (4)
- 

### M 2.2 Academic Route *(no calculator)*

1. Calculate  $39 \times 2$ . (78)
  2. Calculate  $8.6 \times 1000$ . (8600)
  3. Calculate  $6.2 \div 10$ . (0.62)
  4. Calculate  $98 + 56$ . (154)
  5. Calculate  $9 \times 8$ . (72)
  6. Calculate  $14 \times 4$ . (56)
  7. Calculate  $162 - 97$ . (65)
  8. Calculate  $88 \div 8$ . (11)
  9. Calculate  $72 \div 4$ . (18)
  10. Calculate  $284 \div 2$ . (142)
-

## UNIT 2 Basic Operations

## Mental Tests

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### M 2.3 Express Route *(no calculator)*

1. Calculate  $0.06 \times 1000$ . (60)
  2. Calculate  $1.7 \div 100$ . (0.017)
  3. Calculate  $14 \times 5$ . (70)
  4. Calculate  $199 + 299$ . (498)
  5. Calculate  $135 \div 5$ . (27)
  6. Calculate  $12 \times 7$ . (84)
  7. Calculate  $246 \div 6$ . (41)
  8. Calculate  $350 - 129$ . (221)
  9. Calculate  $19 \times 5$ . (95)
  10. Calculate  $101 \times 12$ . (1212)
-

## UNIT 2 *Basic Operations*

## Overhead Slides

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### **Overhead Slides**

- 2.1 Addition and Subtraction 1
- 2.2 Addition and Subtraction 2
- 2.3 Multiplication and Division 1
- 2.4 Multiplication and Division 2
- 2.5 Problems in Context



## OS 2.1

*Addition and Subtraction 1*

Complete the following calculations:

A.

$$\begin{array}{r} 3214 \\ + 517 \\ \hline \\ \hline \end{array}$$

B.

$$\begin{array}{r} 4289 \\ - 143 \\ \hline \\ \hline \end{array}$$

C.

$$\begin{array}{r} 4217 \\ - 1364 \\ \hline \\ \hline \end{array}$$

D.

$$\begin{array}{r} 16.24 \\ + 10.10 \\ \hline \\ \hline \end{array}$$

E.

$$\begin{array}{r} 21.471 \\ - 11.520 \\ \hline \\ \hline \end{array}$$

F.

$$\begin{array}{r} 4.631 \\ - 3.740 \\ \hline \\ \hline \end{array}$$

**OS 2.2***Addition and Subtraction 2*

---

Complete the following calculations:

$$\begin{aligned} \text{A. } 30 - (5 + 7) &= 30 - \\ &= \end{aligned}$$

$$\begin{aligned} \text{B. } 60 - (30 - 15) &= 60 - \\ &= \end{aligned}$$

$$\begin{aligned} \text{C. } (100 + 6) - (47 + 2) &= \quad - \\ &= \end{aligned}$$

$$\begin{aligned} \text{D. } (100 - 6) + (47 - 2) &= \quad + \\ &= \end{aligned}$$

**OS 2.3***Multiplication and Division 1*

---

Complete the following calculations:

A.  $162 \times 100 =$

B.  $842 \times 10 =$

C.  $8.62 \times 10 =$

D.  $3.1 \times 1000 =$

E.  $150 \div 10 =$

F.  $1.7 \div 10 =$

G.  $154 \div 100 =$

H.  $324 \div 1000 =$

## OS 2.4

*Multiplication and Division 2*

---

Complete the following calculations:

A. 
$$\begin{array}{r} 123 \\ \times \quad 42 \\ \hline \end{array}$$

B. 
$$\begin{array}{r} 13.7 \\ \times \quad 2.6 \\ \hline \end{array}$$

C. 
$$4 \overline{) 84}$$

D. 
$$5 \overline{) 135}$$

E. 
$$7 \overline{) 868}$$

F. 
$$3 \overline{) 254}$$

**OS 2.5***Problems in Context*

---

A. It costs £3.95 to watch a film.

How much will it cost for 5 people to watch the film?

B. Some children raise £168.93. They share it equally between 3 charities. How much money does each charity get?

Practice Book *UNIT 2 Basic Operations*

## Answers

**2.1 Place Value**

1. (a) (i) 180 (ii) 212 (iii) 108 (iv) 92  
(b) 92, 108, 180, 212
2. (a) Bird (b) Diver (c) Fish
3. (a)  $8 + 2 < 7 + 6$  (b)  $6 - 3 = 1 + 2$  (c)  $0 > -3$
4. (a) £72.45 (b) £103.50 (c) £130.05
5. (a) 7510 (b) 1057 (c) 105
6. (a) The numbers on this number line go up in steps of 50.  
(b) 80, 100, 120 (c) -10, 0, 10  
(d) -3 and 13. The numbers on this number line go up in steps of 10.  
(e) 7.9, 8.0 and 8.1. The numbers on this number line go up in steps of 0.1.

**2.2 Addition and Subtraction**

1. (a) 63 (b) 50 (c) 34 (d) 148  
(e) 129 (f) 170 (g) 688 (h) 459  
(i) 783 (j) 758 (k) 437 (l) 1323
2. (a) 62 (b) 75 (c) 42 (d) 51  
(e) 22 (f) 52 (g) 19 (h) 36  
(i) 19 (j) 29 (k) 591 (l) 25
3. (a) 7.8 (b) 6.9 (c) 8.9 (d) 14.4 (e) 7.82  
(f) 21.34 (g) 5.324 (h) 27.84 (i) 27.51
4. (a) 2.3 (b) 2.1 (c) 2.5 (d) 3.11 (e) 4.61  
(f) 2.51 (g) 1.53 (h) 5.12 (i) 0.88
5. (a) 12 (b) 8 (c) 14 (d) 85 (e) 3  
(f) 10 (g) 52 (h) 44 (i) 94 (j) 57
6. (a) 486 (b) 543 (c) 3569 (d) 7604
7. (a) 50 (b) 16 (c) 10 (d) 27  
(e) 7 (f) 14
8. 89 pupils

## 2.2

## Answers

---



9. 52 people
10. (a) £20.26 (b) £4.74
11. (a) £5.53 (b) £4.47
12. 45.55 cm
13. (a) +7 (b) Choose -8, giving  $-2 + (-8) = -10$   
(c) Choose +9, giving  $-2 - (+9) = -11$   
(d) Choose -8, giving  $-2 - (-8) = +6$

## 2.3 Multiplication and Division

1. (a) 60 (b) 1700 (c) 8000 (d) 140 (e) 3210  
(f) 42 (g) 360 (h) 147 (i) 46.1
2. (a) 470 (b) 36 (c) 42.1 (d) 1.68 (e) 4.76  
(f) 56 (g) 0.562 (h) 1.136 (i) 0.0652
3. (a) 90 (b) 68 (c) 574 (d) 185  
(e) 114 (f) 328 (g) 192 (h) 336  
(i) 768 (j) 3102 (k) 2352 (l) 1798
4. (a) 9.4 (b) 31.5 (c) 57 (d) 38.1  
(d) 59.2 (f) 154.7 (g) 4.44 (h) 24.78  
(i) 1.984 (j) 10.122 (k) 58.24 (l) 115.92
5. (a) 3 (b) 9 (c) 6 (d) 3  
(e) 8 (f) 9 (g) 15 (h) 43  
(i) 14 (j) 32 (k) 62 (l) 71  
(m) 213 (n) 137 (o) 171
6. (a) 20 (b) 56 (c) 37 (d) 384
7. (a) 10 (b) 100 (c) 6 (d) 10  
(e) 100 (f) 3

## 2.3

## Answers

8. (a) £0.96 (b) £2.24 (c) £8.00
9. (a) £5.90 (b) £8.85 (c) £14.75
10. (a) 132 (b) 2200 (c) 374
11. 34
12. £10.65
13. (a) Because 9 stamps cost less than 10 stamps which cost £1.90, which is less than £2.  
(b) £1.71
14. (a) £123.50  
(b)  $250 \div 16 = 15$  remainder 10, so Gwen can make 15 kites (with 10 staples left over).
15. (a) 45 (b) 84 (c) flower buttons (d) star buttons  
(e) 4 cards of star buttons or 10 cards of flower buttons
16. (a)  (b) e.g.   
(c) 3, 8; 4, 6; 6, 4  
(d) Megan is wrong because 24 is not a multiple of 5, or because she will be able to plant 4 rows of 5 seeds with 4 seeds left over, since  $24 \div 5 = 4$  remainder 4.

## 2.4 Problems in Context

1. (a) £2.60 (b) £4.55 (c) £5.85
2. £5.73
3. (a) £31.96 (b) £79.90 (c) £71.91
4. £17.50
5. £71
6. 206 grams
7. (a) 90 miles (b) 225 miles (c) 157.5 miles



## 2.4

## Answers

8. 9 tickets
9. (a) £2.52 (b) £2.48
10. 3 empty seats
11. (a) £33.25 (b) 14 trees (with £12 left over)
12. (a) £6.60 (b) (i) £89.60 (ii) 5 people
13. (a) Any positive multiple of 5 (b) Any other positive multiple of 5  
 (c) Any other positive multiple of 5  
 (d) Anna is wrong because 113 is not a multiple of 5.  
 (e) Any two multiples of 5 over 100, e.g. 105 and 110  
 (f) You can tell they can be divided by 5 because the last (units) digit is either 5 and 0.
14. (a) 20 packs on the bottom layer. 120 packs in the full box.  
 (b) 90 packs of tea.  
 (c) Total: 24 packs  
           2 layers  
           6 packs across (or 4) (or 12) } or reverse pairing  
           2 packs wide (or 3) (or 1) }
15. (a) £40 (b) £5.96 (c) 8 cassettes (with 8p change)  
 (d) 3 packs (with 3p change)  
 (e) 11 cassettes (3 packs of 3 and 2 single cassettes, leaving 5p change)
16. (a) 78.49 (b) 26  
 (c)  $102.69 \div 3.26 = 31.5$ , which means that he must get a total of 31.5 from his middle three marks. The highest he can get is  $3 \times 10 = 30$ , so 31.5 is impossible, i.e. he cannot win with this dive.
17. (a) £7 (b) £6.10  
 (c) At Milldown Funfair, Ben would get 4 rides.  
 At Seaview Funfair, Ben would get 2 rides.

**UNIT 2** *Basic Operations***Revision Test 2.1**  
**(Standard)**

---

1. Calculate:

(a)  $32 + 17$

(b)  $47 - 13$

(c)  $8 \times 2$

(d)  $14 \times 3$

(e)  $3.6 + 0.72$

(f)  $33 - 19$

(g)  $143 + 2463$

(h)  $407 - 123$

(i)  $16 \times 12$

*(15 marks)*

2. A packet of crisps costs 27p. Jerry buys 3 packets.

(a) How much does Jerry have to pay for the crisps?

(b) How much change should he have from a £1 coin?

*(4 marks)*

3. A bus has 50 seats. There are 28 people on the bus when it gets to a bus stop.

At the bus stop, no-one gets off and 13 people get on.

(a) How many people are now on the bus?

(b) How many empty seats are there on the bus?

*(4 marks)*

4. Pencils cost 20p each.

(a) Mrs Hayle buys 10 pencils. How much does this cost?

(b) James buys 4 pencils. How much does he have to pay?

*(4 marks)*

5. Ben goes on holiday for 3 weeks. He has £24 to spend. He decides to spend the same amount each week.

(a) How much should he spend each week?

(b) How much does he have left at the end of the first week?

*(3 marks)*

**UNIT 2** *Basic Operations***Revision Test 2.2**  
(Academic)

1. Calculate:

- |                     |                  |                   |
|---------------------|------------------|-------------------|
| (a) $8 \times 7$    | (b) $14 + 22$    | (c) $69 - 34$     |
| (d) $14 \times 23$  | (e) $3.7 - 2.14$ | (f) $2469 + 2974$ |
| (g) $142 \times 12$ | (h) $75 \div 5$  | (i) $144 \div 4$  |

(15 marks)

2. A standard burger meal costs £3.79; it can be made into a 'go-large' meal by paying an extra 30p. Sarah buys one standard burger meal and one 'go-large' meal.

- (a) How much does she have to pay?  
(b) How much change does she get from a £10 note?

(4 marks)

3. John, Ian and Andy share a Chinese takeaway meal. They buy:

<i>Sow Chu Chicken</i>	£5.30
<i>King Prawn Chop Suey</i>	£4.90
<i>Singapore Fried Rice</i>	£3.63

- (a) Calculate the total cost of the meal.  
(b) Calculate the change from a £20 note.  
(c) How much should each of the boys pay, if they share the cost of the meal equally between them?

(6 marks)

4. To watch a film at a local cinema costs £3.95 per person. Calculate the cost for 6 people to watch a film.

(2 marks)

5. Halim is paid travelling expenses of 32.6p per mile. How much would he be paid for travelling 22.4 miles? Give your answer to the nearest penny.

(3 marks)

**UNIT 2** *Basic Operations***Revision Test 2.3**  
(Express)

1. Calculate:

- |                     |                      |                    |
|---------------------|----------------------|--------------------|
| (a) $9 \times 8$    | (b) $63 \div 9$      | (c) $42 \times 30$ |
| (d) $164 \times 28$ | (e) $4.7 \times 1.2$ | (f) $8.6 - 3.04$   |
| (g) $942 \div 6$    | (h) $54 \div 1.2$    | (i) $158.4 \div 9$ |

(15 marks)

2. Tickets for entry to a swimming pool cost £1.25 for children and £2.29 for adults.

- (a) Calculate the cost of tickets for 2 adults and 3 children.  
(b) How much change should be received if a £20 note is used to pay for the 5 tickets in (a).

(5 marks)

3. Apples are sold for 96p per kilo.

- (a) Calculate the cost of 3.7 kg of these apples, giving your answer to the nearest pence.  
(b) Calculate the mass of a bag of apples that is sold for £2.40.

(4 marks)

4. Rope is sold at a cost of 39.5p per metre. Calculate the cost of 10.4 m of rope, giving your answer to the nearest penny.

(3 marks)

5. A group of 7 people win £1017.24 in a competition, and share it equally between them. How much do they each receive?

(3 marks)

## Revision Test 2.1 (Standard)

## Answers

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- |        |                             |       |            |
|--------|-----------------------------|-------|------------|
| 1. (a) | $32 + 17 = 49$              | B1    |            |
| (b)    | $47 - 13 = 34$              | B1    |            |
| (c)    | $8 \times 2 = 16$           | B1    |            |
| (d)    | $14 \times 3 = 42$          | M1 A1 |            |
| (e)    | $3.6 + 0.72 = 4.32$         | M1 A1 |            |
| (f)    | $33 - 19 = 14$              | M1 A1 |            |
| (g)    | $143 + 2463 = 2606$         | M1 A1 |            |
| (h)    | $407 - 123 = 284$           | M1 A1 |            |
| (i)    | $16 \times 12 = 192$        | M1 A1 | (15 marks) |
|        |                             |       |            |
| 2. (a) | $27p \times 3 = 81p$        | M1 A1 |            |
| (b)    | $100p - 81p = 19p$          | M1 A1 | (4 marks)  |
|        |                             |       |            |
| 3. (a) | $28 + 13 = 41$ people       | M1 A1 |            |
| (b)    | $50 - 41 = 9$ empty seats   | M1 A1 | (4 marks)  |
|        |                             |       |            |
| 4. (a) | $20p \times 10 = \text{£}2$ | M1 A1 |            |
| (b)    | $20p \times 4 = 80p$        | M1 A1 | (4 marks)  |
|        |                             |       |            |
| 5. (a) | $24 \div 3 = \text{£}8$     | M1 A1 |            |
| (b)    | $\text{£}16$                | B1    | (3 marks)  |
- (TOTAL MARKS 30)**

## Revision Test 2.2 (Academic)

## Answers

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- |        |  |          |            |
|--------|--|----------|------------|
| 1. (a) | $8 \times 7 = 56$  | B1       |            |
| (b)    | $14 + 22 = 36$   | B1       |            |
| (c)    | $69 - 34 = 35$   | B1       |            |
| (d)    | $14 \times 23 = 322$   | M1 A1    |            |
| (e)    | $3.7 - 2.14 = 1.56$  | M1 A1    |            |
| (f)    | $2469 + 2974 = 5443$   | M1 A1    |            |
| (g)    | $142 \times 12 = 1704$                                       | M1 A1    |            |
| (h)    | $75 \div 5 = 15$   | M1 A1    |            |
| (i)    | $144 \div 4 = 36$  | M1 A1    | (15 marks) |
|        |  |          |            |
| 2. (a) | $\pounds 3.79 + \pounds 4.09 = \pounds 7.88$                 | M1 A1    |            |
| (b)    | $\pounds 10 - \pounds 7.88 = \pounds 2.12$                   | M1 A1    | (4 marks)  |
|        |  |          |            |
| 3. (a) | $\pounds 5.30 + \pounds 4.90 + \pounds 3.63 = \pounds 13.83$ | M1 A1    |            |
| (b)    | $\pounds 20 - \pounds 13.83 = \pounds 6.17$                  | M1 A1    |            |
| (c)    | $\pounds 13.83 \div 3 = \pounds 4.61$                        | M1 A1    | (6 marks)  |
|        |  |          |            |
| 4.     | $\pounds 3.95 \times 6 = \pounds 23.70$                      | M1 A1    | (2 marks)  |
|        |  |          |            |
| 5.     | $32.6\text{p} \times 22.4 = \pounds 7.30$ (to nearest penny) | M1 A1 A1 | (3 marks)  |
- (TOTAL MARKS 30)**

## Revision Test 2.3 (Express)

## Answers

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- |        |  |          |            |
|--------|--|----------|------------|
| 1. (a) | $9 \times 8 = 72$  | B1       |            |
| (b)    | $63 \div 9 = 7$  | B1       |            |
| (c)    | $42 \times 30 = 1260$  | B1       |            |
| (d)    | $164 \times 28 = 4592$   | M1 A1    |            |
| (e)    | $4.7 \times 1.2 = 5.64$  | M1 A1    |            |
| (f)    | $8.6 - 3.04 = 5.56$  | M1 A1    |            |
| (g)    | $942 \div 6 = 157$   | M1 A1    |            |
| (h)    | $54 \div 1.2 = 45$   | M1 A1    |            |
| (i)    | $158.4 \div 9 = 17.6$  | M1 A1    | (15 marks) |
| 2. (a) | $\pounds 2.29 \times 2 + \pounds 1.25 \times 3 = \pounds 4.58 + \pounds 3.75 = \pounds 8.33$ | M1 A1 A1 |            |
| (b)    | $\pounds 20 - \pounds 8.33 = \pounds 11.67$  | M1 A1    | (5 marks)  |
| 3. (a) | $3.7 \times 96\text{p} = 355.2\text{p}$<br>Cost = $\pounds 3.55$                             | M1 A1    |            |
| (b)    | $240 \div 96 = 2.5 \text{ kg}$   | M1 A1    | (4 marks)  |
| 4.     | $10.4 \times 39.5\text{p} = \pounds 4.11$  | M1 A1 A1 | (3 marks)  |
| 5.     | $\pounds 1017.24 \div 7 = \pounds 145.32$  | M1 A1 A1 | (3 marks)  |
- (TOTAL MARKS 30)**

## UNIT 2 *Basic Operations*

## Teaching Notes

### *Historical Background and Introduction*

For most students, this should be a fairly quick revision lesson covering the basic concepts of arithmetic of both whole numbers and decimals and their applications in many problems. Students on the *Standard Route* might need additional time for reinforcement and revision, as any misconceptions *must* be sorted out at this stage.

<i>Routes</i>	<b>Standard</b>	<b>Academic</b>	<b>Express</b>
2.1 Place Value	✓	(✓)	×
2.2 Addition and Subtraction	✓	(✓)	×
2.3 Multiplication and Division	✓	(✓)	×
2.4 Problems in Context	✓	(✓)	×

### *Language*

No new language is introduced in this unit.

### *Misconceptions*

Many of the weaker students will have a variety of misconceptions, and it is important that they are corrected at this stage. Further progress will be impeded if this is not done!

### *Challenging Questions*

The following questions are more challenging than others in the same section:

	<i>Section</i>	<i>Question No.</i>	<i>Page</i>
<i>Practice Book Y9A</i>	2.1	5, 6	20
" "	2.2	13	24
" "	2.3	15, 16	29/30
" "	2.4	14	34