MATHLETICS

F SERIES Student Book

Multiplication and Division

Name _____

Series F – Multiplication and Division

Contents

Series Authors:

Rachel Flenley
Nicola Herringer

Mental multiplication strategies – doubling strategy

Doubling is a useful strategy to use when multiplying.

To multiply a number by four, double it twice.

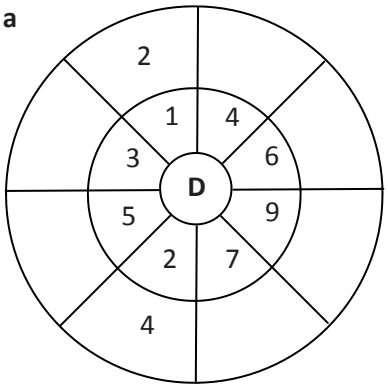
15 × 4 double once = 30
double twice = 60

To multiply a number by eight, double it three times.

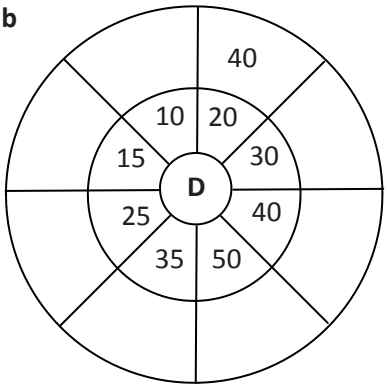
13 × 8 double once = 26
double twice = 52
double three times = 104

1 **Warm up with some doubling practice:**

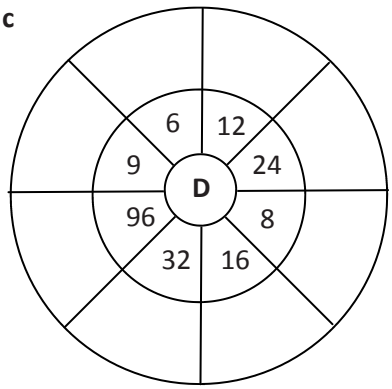
a



b



c



2 **Finish the doubling patterns:**

a 4	8	16		64	
b 3					96
c 5			40		
d 25	50				
e 7		28			224
f 75		300			

3 **Choose a number and create your own doubling pattern. How high can you go? What patterns can you see within your pattern?**

4 **Two sets of twins turn 12. They decide to have a joint birthday party with 1 giant cake but they all want their own candles. How many candles will they need?**

Mental multiplication strategies – doubling strategy

5 **Use the doubling strategy to solve these:**

		× 2	× 4
a	13 × 4	26	52
b	16 × 4		
c	24 × 4		
d	25 × 4		
e	32 × 4		
f	21 × 4		
g	35 × 4		

6 **Use the doubling strategy to solve these:**

		× 2	× 4	× 8
a	12 × 8	24		96
b	14 × 8			112
c	25 × 8			
d	21 × 8		84	
e	13 × 8			
f	16 × 8	32		

7 **Work out the answers in your head using the appropriate doubling strategy. Use a table like the one above if it helps.**

a 18 × 4 = ☐ **b** 16 × 4 = ☐ **c** 26 × 4 = ☐

d 24 × 8 = ☐ **e** 15 × 8 = ☐ **f** 22 × 8 = ☐

8 **Nick's dad offered him two methods of payment for helping with a 5 week landscaping project.**

Method 1: $24 a week for 5 weeks.

Method 2: $8 for the first week, then double the payment each week.

Which method would earn Nick the most money? Why?

Mental multiplication strategies – multiply by 10s, 100s and 1 000s

When we multiply by 10 we move the number one place value to the left.
When we multiply by 100 we move the number two place values to the left.
When we multiply by 1 000 we move the number three place values to the left.
Look at how this works with the number 45:

Ten Thousands	Thousands	Hundreds	Tens	Ones	
			4	5	
		4	5	0	× 10
	4	5	0	0	× 100
4	5	0	0	0	× 1 000

1 **Multiply the following numbers by 10, 100 and 1 000:**

a

T Th	Th	H	T	O	
			1	7	
					× 10
					× 100
					× 1 000

b

T Th	Th	H	T	O	
			4	3	
					× 10
					× 100
					× 1 000

c

T Th	Th	H	T	O	
			8	5	
					× 10
					× 100
					× 1 000

d

T Th	Th	H	T	O	
			9	9	
					× 10
					× 100
					× 1 000

2 **Try these:**

a 14 × 10 = ☐ **b** 14 × 100 = ☐ **c** 14 × 1 000 = ☐

d 92 × 10 = ☐ **e** 92 × 1 000 = ☐ **f** 92 × 100 = ☐

g 11 × 1 000 = ☐ **h** 11 × 100 = ☐ **i** 11 × 10 = ☐

3 **You'll need a partner and a calculator for this activity. Take turns giving each other problems such as "Show me 100 × 678". The person whose turn it is to solve the problem, writes down their prediction and you both check it on the calculator. 10 points for each correct answer, and the first person to 50 points wins.**

Mental multiplication strategies – multiply by 10s, 100s and 1 000s

It is also handy to know how to multiply multiples of 10 such as 20 or 200 in our heads.

4 × 2 helps us work out 4 × 20: 4 × 2 = 8 4 × 20 = 80

We can express this as 4 × 2 × 10 = 80 How would you work out 4 × 200?

4 **Use patterns to help you solve these:**

a	5 × 2	_____	5 × 20	_____	5 × 200	_____
b	2 × 9	_____	2 × 90	_____	2 × 900	_____
c	6 × $4	_____	6 × $40	_____	6 × $400	_____
d	8 × 3	_____	8 × 30	_____	8 × 300	_____
e	3 × $7	_____	3 × $70	_____	3 × $700	_____
f	2 × 8	_____	20 × 8	_____	200 × 8	_____
g	3 × 9	_____	30 × 9	_____	300 × 9	_____

5 **Answer these problems:**

a Jock runs 50 km per week. How far does he run over 10 weeks?

b Huy earns $20 pocket money per week. If he saves half of this, how much will he have saved at the end of 8 weeks?

c The sum of two numbers is 28. When you multiply them together, the answer is 160. What are the numbers?

6 **Finish these counting patterns:**

a	10	20	30	_____	_____	60
b	20	40	_____	80	_____	_____
c	30	60	_____	_____	150	_____
d	40	80	_____	_____	200	240
e	50	100	150	_____	_____	_____
f	100	200	_____	400	_____	_____
g	200	400	_____	_____	_____	1 200

Mental multiplication strategies – split strategy

Sometimes it's easier to split a number into parts and work with the parts separately.

Look at 64 × 8

Split the number into 60 and 4

Work out (60 × 8) and then (4 × 8)

Add the answers together 480 + 32 = 512

1 **Use the split strategy to answer the questions:**

a 46 × 4

(40 × 4) + (6 × 4)

_____ + _____

= ☐

b 74 × 5

(___ × ___) + (___ × ___)

_____ + _____

= ☐

c 48 × 4

(___ × ___) + (___ × ___)

_____ + _____

= ☐

d 37 × 7

(___ × ___) + (___ × ___)

_____ + _____

= ☐

e 62 × 8

(___ × ___) + (___ × ___)

_____ + _____

= ☐

f 91 × 5

(___ × ___) + (___ × ___)

_____ + _____

= ☐

2 **Use the split strategy to answer the questions. This time see if you can do the brackets in your head:**

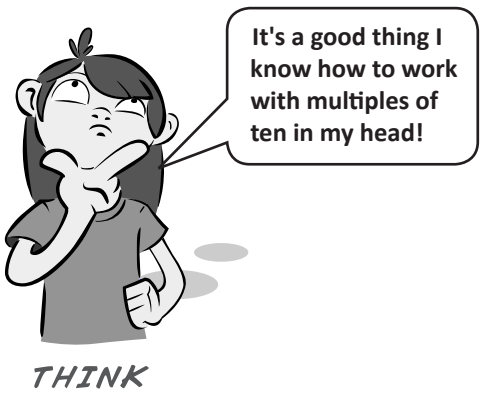
a 48 × 8 = _____ + _____ = ☐

b 52 × 7 = _____ + _____ = ☐

c 9 × 43 = _____ + _____ = ☐

d 8 × 29 = _____ + _____ = ☐

e 86 × 7 = _____ + _____ = ☐



3 **These problems have been worked out incorrectly. Circle where it all went wrong.**

a 37 × 6

(30 × 6) + (7 × 6)

180 + 13

= 193

b 17 × 5

(10 × 5) + (7 × 5)

70 + 35

= 105

c 32 × 9

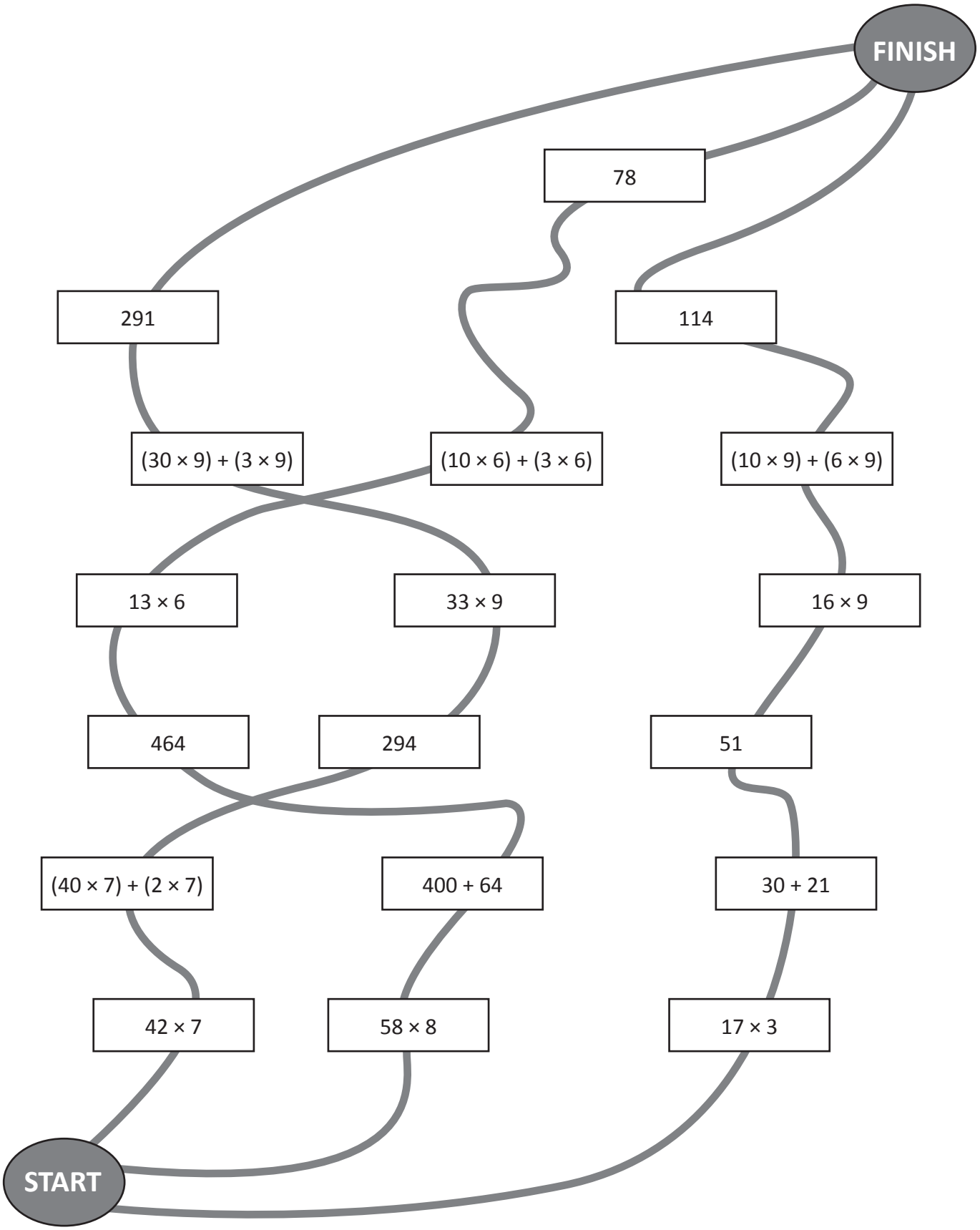
(30 × 9) + (2 × 9)

27 + 18

= 45

Mental multiplication strategies – split strategy

4 **Each trail contains 2 multiplication problems and steps to solve them. Only one trail has been solved correctly. There are errors in the other two. Find and colour the winning trail.**



Mental multiplication strategies – compensation strategy

When multiplying we can round to an easier number and then adjust.
Look how we do this with 4 × 29:
29 is close to 30. We can do 4 × 30 in our heads because we know 4 × 3 = 12
4 × 30 = 120
We have to take off 4 because we used one group of 4 too many: 120 – (1 × 4) = 116
4 × 29 = 116

1 **Use the compensation strategy to answer the questions. The first one has been done for you.**

a 19 × 3 = *20* × *3* – *3* = *57*

b 8 × 29 = _____ × _____ – _____ = _____

c 18 × 6 = _____ × _____ – _____ = _____

d 7 × 39 = _____ × _____ – _____ = _____

e 28 × 5 = _____ × _____ – _____ = _____

We can also adjust up. Look how we do this with 6 × 62:
62 is close to 60. We can do 6 × 60 in our heads because we know 6 × 6 = 36
6 × 60 = 360
We have to then add 2 more lots of 6: 360 + 12 = 372
6 × 62 = 372

2 **Use the compensation strategy and adjust up for these. The first one has been done for you.**

a 41 × 3 = *40* × *3* + *3* = *123*

b 81 × 4 = _____ × _____ + _____ = _____

c 22 × 9 = _____ × _____ + _____ = _____

d 32 × 9 = _____ × _____ + _____ = _____

e 7 × 62 = _____ × _____ + _____ = _____

Mental multiplication strategies – compensation strategy

3 **In this activity you'll work alongside a partner. You'll each need two dice and your own copy of this page. For each line, roll the dice to find the tens digit and then roll it again to find the multiplier. Your partner will do the same. Use the compensation strategy to mentally work out the answers to the problems.**

Tens	Ones		Multiplier		Answer
	1	×		=	
	9	×		=	
	2	×		=	
	1	×		=	
	8	×		=	
	1	×		=	
	9	×		=	
	8	×		=	
	2	×		=	
	1	×		=	

a Check each other's calculations. You may want to use a calculator.

b Now, use the calculator to add your answers. The person with the highest score wins.

Mental multiplication strategies – factors and multiples

Factors are the numbers we multiply together to get to another number:

factor × factor = whole number

How many factors does the number 12 have? 4 × 3 = 12, 6 × 2 = 12, 1 × 12 = 12

4, 3, 6, 2, 1 and 12 are all factors of 12.

1 **List the factors of these numbers:**

a 18

b 25

c 14

d 9

e 16

f 15

g 30

h 42

2 **Fill the gaps in these sentences. The first one has been done for you.**

a 1 or 16 or 2 or 8 or 4 people can share 16 lollipops evenly.

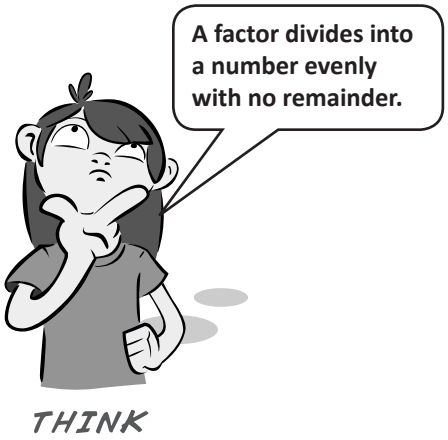
b _____ or _____ or _____ or _____ or _____ or _____ people can share 20 slices of pie evenly.

c _____ or _____ or _____ or _____ or _____ or _____ or _____ or _____ people can share 24 cherries.

d _____ or _____ or _____ or _____ or _____ or _____ or _____ or _____ people can share 30 pencils.

e _____ or _____ people can share 5 balls evenly.

3 **Use a calculator to help you find as many factors of 384 as you can:**



Mental multiplication strategies – factors and multiples

Multiples are the answers we get when we multiply 2 factors.
Think about the 3 times tables where 3 is always a factor.
What are the multiples of 3?
3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 and 36 …

3 × factor = multiple

4 **Fill in the gaps on these multiple boards:**

a

4
8
16

b

5
10

c

9
63

d

7
35

Numbers can be either factors or multiples depending on where they sit in the number sentence.

5 **Choose 2 numbers between 2 and 5 and put them in the first frame as factors. Your answer is the multiple. Now take that multiple and make it a factor in another number sentence. Write in the other factor and solve the problem. Then make the answer a factor again. Can you fill the grid? Use a calculator for the larger problems. The first one has been done for you.**

a	3 × 4 = 12	12 × 2 = 24	24 × 2 = 48
b	× =	× =	× =
c	× =	× =	× =
d	× =	× =	× =

Mental division strategies – use multiplication facts

Knowing our multiplication facts helps us with division as they do the reverse of each other. They are inverse operations.

$3 \times 5 = 15$ $\quad\quad$ $15 \div 5 = 3$

1 **Use your knowledge of multiplication facts to help answer these division questions:**

a $56 \div 7$ → $\_\_8\_\_ \times 7 = 56$ → $56 \div 7 =$ ☐

b $121 \div 11$ → $\_\_\_\_\_ \times 11 = 121$ → $121 \div 11 =$ ☐

c $72 \div 8$ → $\_\_\_\_\_ \times 8 = 72$ → $72 \div 8 =$ ☐

d $49 \div 7$ → $\_\_\_\_\_ \times 7 = 49$ → $49 \div 7 =$ ☐

e $36 \div 9$ → $\_\_\_\_\_ \times 9 = 36$ → $36 \div 9 =$ ☐

f $64 \div 8$ → $\_\_\_\_\_ \times 8 = 64$ → $64 \div 8 =$ ☐

g $108 \div 12$ → $\_\_\_\_\_ \times 12 = 108$ → $108 \div 12 =$ ☐

2 **Now try these:**

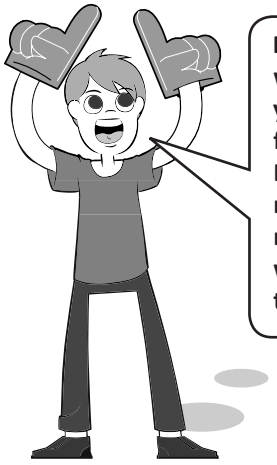
a $81 \div 9 =$ ☐ $\quad$ **b** $40 \div 5 =$ ☐

c $21 \div 3 =$ ☐ $\quad$ **d** $54 \div 6 =$ ☐

e $42 \div 7 =$ ☐ $\quad$ **f** $63 \div 9 =$ ☐

g $36 \div 4 =$ ☐ $\quad$ **h** $45 \div 9 =$ ☐

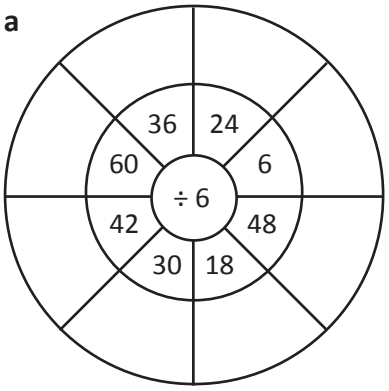
i $39 \div 3 =$ ☐ $\quad$ **j** $24 \div 6 =$ ☐



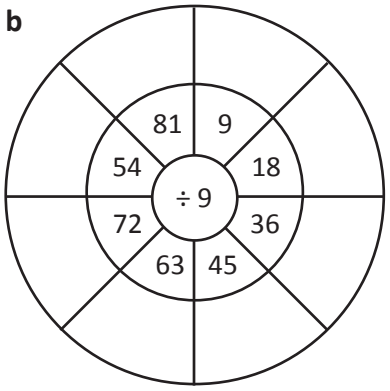
Doing maths without knowing your multiplication facts is hard. Learning them makes your life much easier. It's worth persevering to conquer them!

3 **Fill in the division wheels. Use multiplication facts to help you.**

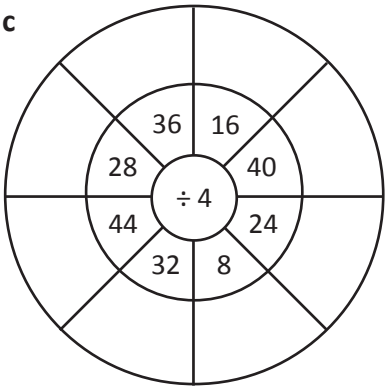
a



b



c



Mental division strategies – use multiplication facts

Knowing our families of facts is also helpful.

3 × 5 = 15 5 × 3 = 15 15 ÷ 5 = 3 15 ÷ 3 = 5

4 **Complete the following patterns. How many more multiplication and division facts can you find, given the first fact?**

a 7 × 8 = 56

8 × 7 = ☐

56 ÷ ☐ = 8

☐ ÷ 7 = 8

b 8 × 9 = 72

9 × 8 = ☐

72 ÷ ☐ = 9

☐ ÷ 9 = 8

c 7 × 9 = 63

9 × 7 = ☐

63 ÷ ☐ = 9

☐ ÷ 9 = 7

5 **Write down another multiplication fact and two division facts for each question.**

a 6 × 7 = 42

b 5 × 9 = 45

c 9 × 6 = 54

d 17 × 8 = 136

e 12 × 8 = 96

f 11 × 21 = 231

6 **Look at these two division facts:** **20 ÷ 5 = 4** **and** **20 ÷ 4 = 5**

Imagine you're explaining to a younger child how they're related yet different. How would you do it? What would you say/write/draw?

Mental division strategies – divide by 10s, 100s and 1 000s

When we divide by 10 we move the number one place value to the right.
When we divide by 100 we move the number two place values to the right.
When we divide by 1 000 we move the number three place values to the right.
Look what happens to 45 000 when we apply these rules:

Ten Thousands	Thousands	Hundreds	Tens	Ones	
4	5	0	0	0	
	4	5	0	0	÷ 10
		4	5	0	÷ 100
			4	5	÷ 1 000

1 **Divide the following numbers by 10, 100 and 1 000:**

a

T Th	Th	H	T	O	
4	5	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

b

T Th	Th	H	T	O	
4	3	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

c

T Th	Th	H	T	O	
8	5	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

d

T Th	Th	H	T	O	
8	8	0	0	0	
					÷ 10
					÷ 100
					÷ 1 000

2 **Draw lines to match the answers with the questions:**

a What number is one thousand times smaller than 32 000?

b What number is one hundred times smaller than 32 000?

c What number is one hundred times smaller than 95 000?

d What number is ten times smaller than 95 000?

e What number is one hundred times smaller than 8 800?

f What number is ten times smaller than 8 800?

9 500

88

950

880

320

32

Mental division strategies – halving strategy

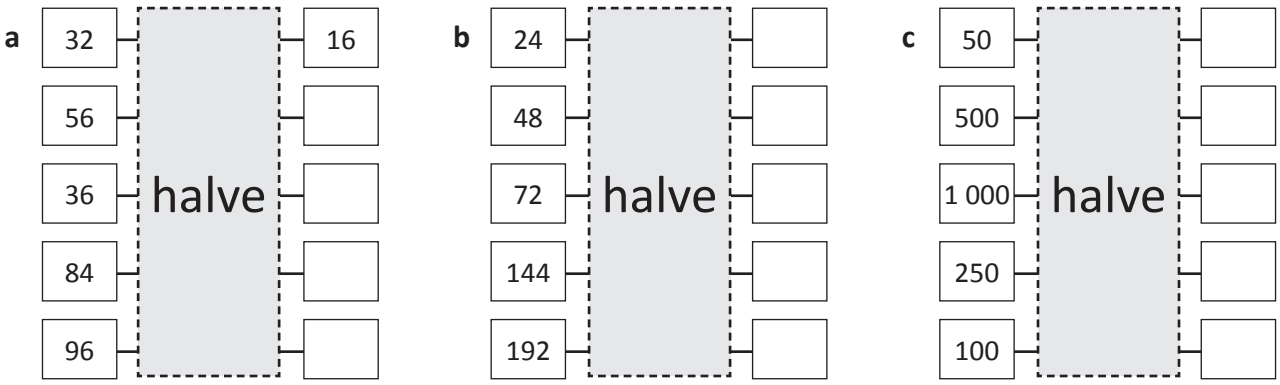
When the two numbers seem too large to work with in our heads, we can halve them till we get to a division fact we recognise. Both numbers must be even for this to work.

126 ÷ 14

(half 126) ÷ (half 14)

63 ÷ 7 = 9

1 **Practise your halving. The first one has been done for you.**



2 **Halve each number to get to a recognisable division fact. The first one has been done for you.**

a 112 ÷ 14 — *56* ÷ *7* = *8*

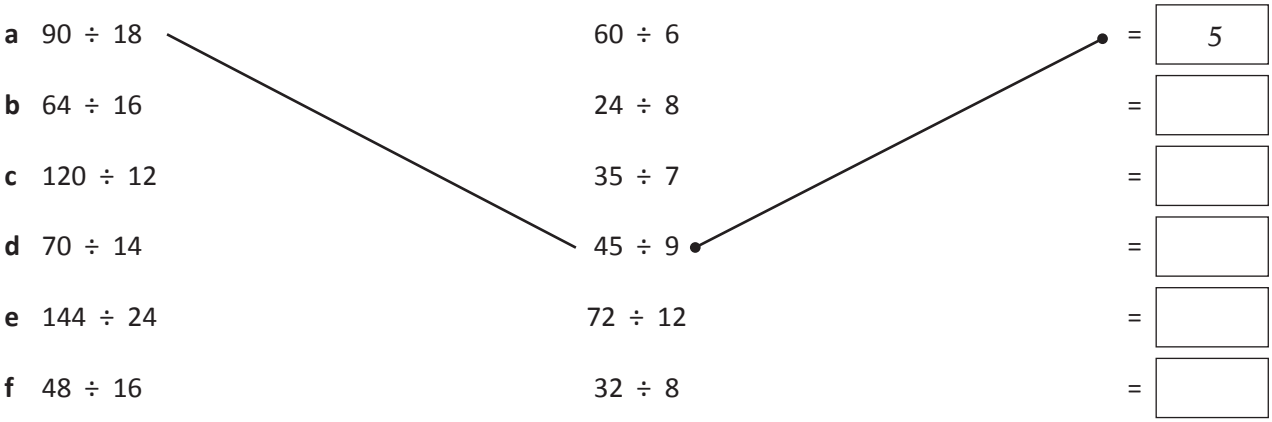
b 144 ÷ 16 — _____ ÷ _____ =

c 96 ÷ 12 — _____ ÷ _____ =

d 220 ÷ 4 — _____ ÷ _____ =

e 162 ÷ 18 — _____ ÷ _____ =

3 **Match the problems with their halved equivalents. Then solve the problem. The first one has been done for you.**



Mental division strategies – halving strategy

Sometimes we need to keep halving until we reach an easy division fact.

144 ÷ 36 → 72 ÷ 18 → 36 ÷ 9 = 4

4 **Keep halving until you get to a fact you can work with. If you can do it in your head, just fill in the last box. Otherwise, use the lines to help you.**

a 216 ÷ 36 = _____ ÷ _____ = _____ ÷ _____ = ☐

b 196 ÷ 28 = _____ ÷ _____ = _____ ÷ _____ = ☐

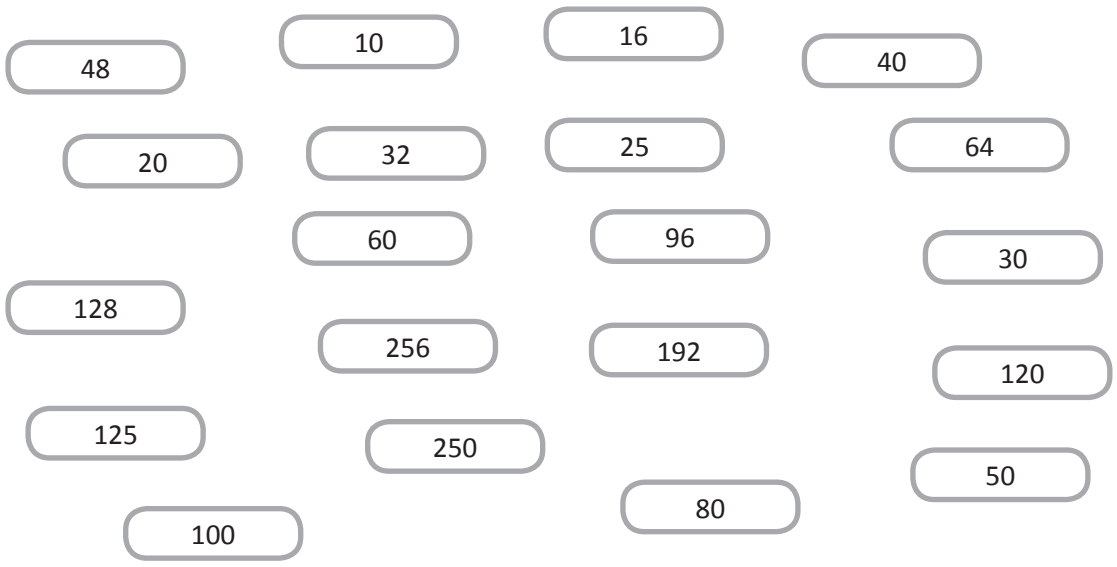
c 224 ÷ 32 = _____ ÷ _____ = _____ ÷ _____ = ☐

d 168 ÷ 24 = _____ ÷ _____ = _____ ÷ _____ = ☐

e 144 ÷ 36 = _____ ÷ _____ = _____ ÷ _____ = ☐

f 288 ÷ 72 = _____ ÷ _____ = _____ ÷ _____ = ☐

5 **Draw lines to connect numbers that could be doubled or halved to reach each other.**



6 **Work with a partner to solve this problem using halving:**

You have an after school job at the local candy shop, making up the mixed lollipop bags. Today, you have to evenly share 288 freckles among 48 bags. How many freckles will you put in each bag? Show each halved sum.

Mental division strategies – split strategy

Division problems also become easier if you split the number to be divided into recognisable facts.

Look at the problem 144 ÷ 9

Can we divide 144 into 2 multiples of 9?

We can divide it into 54 and 90. These are both easily divided by 9. Then we add the two answers together.

144 ÷ 9

90 (÷9) + 54 (÷9)

10 + 6 = 16

1 **Use the split strategy to divide these numbers. Use the clues to guide you:**

a 112 ÷ 8

80 (÷8) + 32 (÷8) = ☐

b 85 ÷ 5

50 (÷5) + ____ (÷5) = 7 = ☐

c 78 ÷ 6

____ (÷6) + 18 (÷6) = 10 = ☐

d 64 ÷ 4

24 (÷4) + ____ (÷4) = ☐

e 91 ÷ 7

21 (÷7) + ____ (÷7) = ☐

f 144 ÷ 8

80 (÷8) + 64 (÷8) = ☐

2 **Now try these:**

a 90 ÷ 6

60 ÷ 6 = 10

30 ÷ 6 = 5

= ☐

b 105 ÷ 7

70 ÷ ____ = 10

____ ÷ ____ = 5

= ☐

c 72 ÷ 4

____ ÷ ____ = 12

24 ÷ ____ = 6

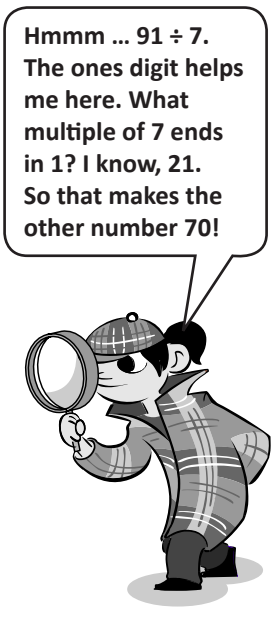
= ☐

d 144 ÷ 8

____ ÷ ____ = 10

96 ÷ ____ = 8

= ☐



Mental division strategies – split strategy

3 **Play this game with a partner. Use one copy of this page between you. Cut out the problems on the left and stack them face up. Cut out and spread the other cards face up. Work together (or race) to find two numbers you could divide to solve the problem on the top card of the pile. One card in the pair will be grey, the other white. For example, if the problem was 76 ÷ 4, you could locate 36 and 40.**

96 ÷ 4	45	90
75 ÷ 5	25	21
87 ÷ 3	60	50
98 ÷ 7	80	70
135 ÷ 9	55	36
78 ÷ 6	30	60
112 ÷ 8	60	60
51 ÷ 3	27	32
95 ÷ 5	24	40
84 ÷ 6	28	18

Mental division strategies – tests of divisibility

Divisibility tests tell us if a number can be divided evenly by another (that is with no remainders).

1 **Use the rules to test out the numbers in the last column. The first two have been done for you:**

Divisible by	Rule	Test
2	A number is divisible by 2 if it's even (ends in 0, 2, 4, 6 or 8).	Is 458 divisible by 2? *Yes, because it ends in an even number.*
3	A number is divisible by 3 if the sum of its digits is divisible by 3.	Is 7 281 divisible by 3? 7 + 2 + 8 + 1 = 18 *Yes, because 18 is divisible by 3.*
4	A number is divisible by 4 if the number made by the last 2 digits is divisible by 4.	Is 3 912 divisible by 4?
5	A number is divisible by 5 if there's a 0 or 5 in the ones place.	Is 455 divisible by 5?
8	A number is divisible by 8 if the last 3 digits are divisible by 8.	Is 74 160 divisible by 8?
9	A number is divisible by 9 if the sum of its digits is divisible by 9.	Is 6 345 divisible by 9?
10	A number is divisible by 10 if there is a zero in the ones place.	Is 5 680 divisible by 10?

Mental division strategies – tests of divisibility

2 **These numbers can all be divided with no remainders. Work with a partner to find the rule/s that can be used to divide them. Fill in the tables.**

36	90	84	99	50	72
456	330	888	120	981	548
1 025	3 486	6 993	1 256	9 050	10 072

÷ 4

÷ 9

÷ 5

÷ 3

÷ 8

Written methods – multiplication

	H	T	O
	$^{1}1$	$^{1}5$	6
×			3
	4	6	8

Contracted multiplication is one way to solve a multiplication problem.

First we use our mental strategies to estimate an easier problem:
3 × 150 = 450. The answer will be around 450.

We start with the ones. 3 × 6 is 18 ones. We rename this as 1 ten and 8 ones.

We put 8 in the ones column and carry the 1 to the tens column.

3 × 5 plus the carried 1 is 16 tens. We rename this as 1 hundred and 6 tens.

We put 6 in the tens column and carry the 1 to the hundreds column.

3 × 1 plus the carried 1 is 4 hundreds. We put 4 in the hundreds column.

1 **Solve these problems using contracted multiplication. Estimate first:**

a e:

	H	T	O
	3	2	7
×			3

b e:

	H	T	O
	2	4	7
×			4

c e:

	H	T	O
	1	5	4
×			5

d e:

	H	T	O
	3	1	5
×			3

e e:

	H	T	O
	2	8	6
×			2

f e:

	H	T	O
	1	9	4
×			5

2 **Solve these word problems. Show how you worked them out:**

a Dan's dad has resorted to bribery to counteract Dan's PlayStation addiction. For every evening, Dan spends away from the PlayStation, his dad pays him $3. So far, Dan has racked up an impressive 27 nights (though he looks like breaking any day now). How much money does this equate to?

b Dan's mum thinks she might get in on the action too and pays Dan $4 for every week that he puts his dishes in the dishwasher and his dirty clothes in the basket. Dan is less keen on this plan but does manage 33 weeks in 1 year. How much has he made out of this scheme?

Written methods – multiplication

3 **Below are Jess and Harry's tests. Check them and give them a mark out of 5. If they made mistakes, give them some feedback as to where they went wrong.**

Jess

$$\begin{array}{r} {}^{1}{}^{1} \\ 387 \\ \times \quad 2 \\ \hline 774 \end{array}$$

$$\begin{array}{r} \\ 119 \\ \times \quad 7 \\ \hline 773 \end{array}$$

$$\begin{array}{r} \\ 203 \\ \times \quad 3 \\ \hline 609 \end{array}$$

$$\begin{array}{r} {}^{1} \\ 436 \\ \times \quad 3 \\ \hline 1208 \end{array}$$

$$\begin{array}{r} \\ 401 \\ \times \quad 7 \\ \hline 2807 \end{array}$$

Harry

$$\begin{array}{r} {}^{1}{}^{1} \\ 387 \\ \times \quad 2 \\ \hline 774 \end{array}$$

$$\begin{array}{r} {}^{1}{}^{6} \\ 119 \\ \times \quad 7 \\ \hline 833 \end{array}$$

$$\begin{array}{r} \\ 203 \\ \times \quad 3 \\ \hline 69 \end{array}$$

$$\begin{array}{r} {}^{1}{}^{1} \\ 436 \\ \times \quad 3 \\ \hline 1308 \end{array}$$

$$\begin{array}{r} \\ 401 \\ \times \quad 7 \\ \hline 287 \end{array}$$

Written methods – extended multiplication

	H	T	O	
	2	3	4	
×			3	
		1	2	← (3 × 4)
		9	0	← (3 × 30)
	6	0	0	← (3 × 200)
	7	0	2	

Extended multiplication is another way of solving problems. In extended muliplication we multiply the ones, tens and hundreds separately then add the answers together.

1 **Use a calculator to help you work out the values you could expect when multiplying the following. Tick the columns:**

		T TH	TH	H	T	O
a	a one by a one → 9 × 7					
b	a ten by a one → 43 × 5					
c	a hundred by a one → 126 × 7					
d	a ten by a ten → 13 × 72					
e	a ten by a hundred → 55 × 120					

2 **Complete using extended multiplication. Estimate first:**

a e: _____

	2	4	5	
×			2	
				(2 × 5)
				(2 × 40)
				(2 × 200)

b e: _____

		4	5	2
×				7
				(7 × 2)
				(7 × 50)
				(7 × 400)

c e: _____

		3	2	7
×				8
				(8 × 7)
				(8 × 20)
				(8 × 300)

d e: _____

	2	7	9	
×			2	
				(2 × _____)
				(2 × _____)
				(2 × _____)

e e: _____

		4	1	2
×				9
				(9 × _____)
				(9 × _____)
				(9 × _____)

Written methods – extended multiplication

3 **Use extended multiplication to solve these problems:**

a Jack and his 2 friends bought tickets to the World Cup. Each ticket costs $124. How much did they spend altogether?

e:

b Jack has a paper round and earns $7 per day. He works for 18 days and saves it all. Has he earned enough to pay for his World Cup ticket?

e:

c Yusuf's highest Level 1 Live Mathletics score is 112. Yep, he's fast. If he scores this 7 times in a row, how many correct answers has he achieved?

e:

d Kyra's class of 24 all had to stay in for 11 minutes of their recess. Something to do with too much talking. How many minutes is this in total?

e:

4 **Once you have the hang of extended multiplication, you can apply it to larger numbers. Try these:**

a

		2	4	5	
×			3	2	
					(2 × 5)
					(2 × 40)
					(2 × 200)
					(30 × 5)
					(30 × 40)
					(30 × 200)

b

		3	2	9	
×			4	3	
					(3 × 9)
					(3 × 20)
					(3 × 300)
					(40 × 9)
					(40 × 20)
					(40 × 300)

c

		2	3	8	
×			5	2	
					(2 × 8)
					(2 × 30)
					(2 × 200)
					(50 × 8)
					(50 × 30)
					(50 × 200)

Written methods – division

In short division, we use our knowledge of multiplication to help us. We can split 936 into 900 + 30 + 6.

	3	1	2
3	9	3	6

900 divided by 3 is 300, so we put a 3 in the hundreds place.
30 divided by 3 is 10, so we put a 1 in the tens place.
6 divided by 3 is 2, so we put a 2 in the ones place. **936 ÷ 3 = 312**

1 **Divide these numbers:**

a

4	8	4

b

5	5	5

c

3	9	3

d

9	9	9	0

e

4	4	8	4

f

6	6	6	6

g

3	9	9	9

h

2	4	6	2

i

3	6	9	3

Sometimes it's easier to split the numbers differently. We can also split 936 into 900 + 36.

	3	1	2
3	9	3	6

900 divided by 3 is 300 so we put a 3 in the hundreds place
36 divided by 3 is 12. We put the 1 in the tens place and the 2 in the ones place.
936 ÷ 3 = 312

In these problems, if there are no tens in a number we put a 0 in to show this and also to hold the place of the other numbers!

2 **Decide how you'll split these numbers and then divide. Remember to put in zeros as needed.**

a

5	5	1	5

b

3	6	6	9

c

9	9	2	7

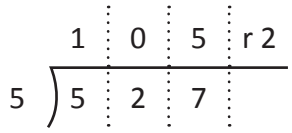
d

e

4	8	1	2

Written methods – division with remainders

Sometimes numbers don't divide evenly. The amount left over is called the **remainder**.



Look at 527 divided by 5.

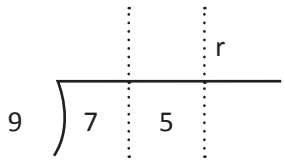
500 divided by 5 is 100.

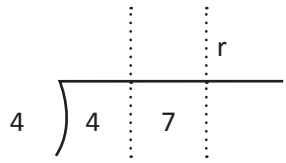
27 divided by 5 is 5 with 2 left over (this is the remainder).

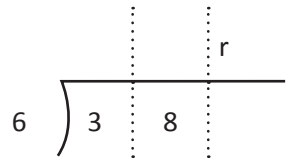
This can be written as r 2.

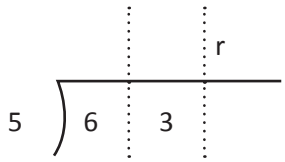
527 ÷ 5 = 105 r 2.

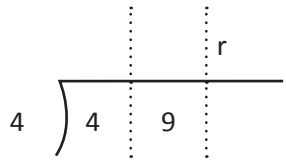
1 **Divide these 2 digit numbers. Each problem will have a remainder.**

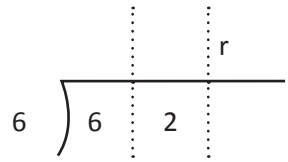
a


b


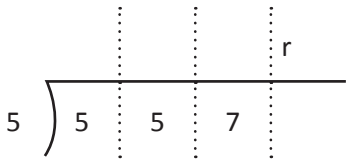
c


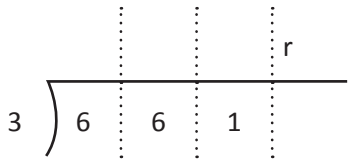
d


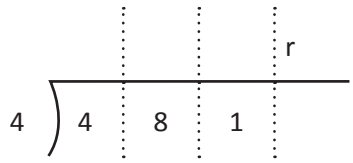
e


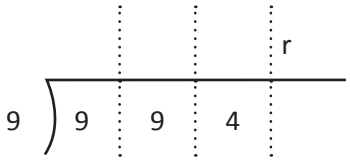
f


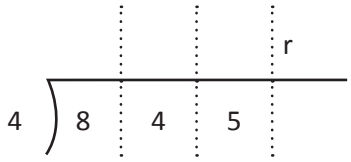
2 **Divide these 3 digit numbers. Each problem will have a remainder.**

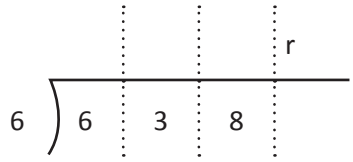
a


b


c


d


e


f


3 **Solve these problems:**

a Giovanni's Nonna has given him a bag of gold coins to share among him and his two sisters. There are 47 gold coins altogether. How many does each child get if they're shared evenly? How would you suggest they deal with the remainder?

_____

b You have 59 jubes to add to party bags. Each bag gets 5 jubes. How many full party bags can you make?

Written methods – division with remainders

There are 3 ways of expressing remainders. How we do it depends on how we'd deal with the problem in the real world. Look at:

$$\begin{array}{r} 1\,0\,5\ \text{r}\,2 \\ 5\overline{)\,5\,2\,7} \end{array}$$

4 **One way is to write *r 2* as in the example above. We use this when we don't care about being absolutely precise and when the remainder can't be easily broken up. An example would be sharing 527 jelly beans among 5 people. Solve these problems expressing the remainders as *r*.**

a Share 126 blue pencils among 4 people.

b Share 215 paper clips among 7 people.

5 **We can also express a remainder as a fraction. We do this when we can easily share the remainder. For example, 19 cakes shared among 3 people is 6 and one third each. Solve these problems expressing the remainder as a fraction:**

a Share 13 pizzas among 4 people.

b Share 50 sandwiches among 3 people.

$$\begin{array}{r} 6\ \frac{1}{3} \\ 3\overline{)\,1\,9} \end{array}$$

REMEMBER

6 **We express remainders as decimals when we must be absolutely precise. Sharing dollar amounts is a good example of this. We add the cents after the decimal point to help us. Try these:**

a Share 12 dollars among 4 people.

$$4\overline{)\,1\,2.0\,0}$$

b Share 27 dollars between 2 people.

$$2\overline{)\,2\,7.0\,0}$$

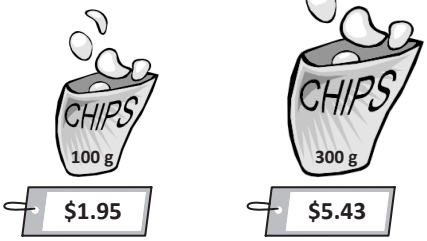
THINK

Written methods – solving problems

We regularly come across multiplication and division problems in our everyday life. It doesn't matter which strategy we use to solve them, we can choose the one that suits us or the problem best.

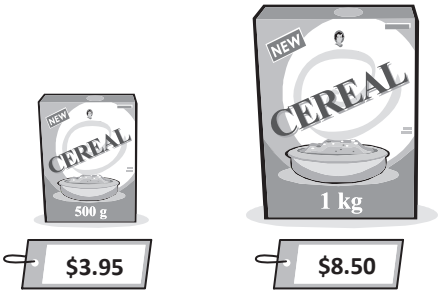
1 **One real-life problem is comparing prices to find the best deal. It's easy if the prices and amounts are the same but what if the amounts are different? Use a strategy to help you find the best deal on these:**

a



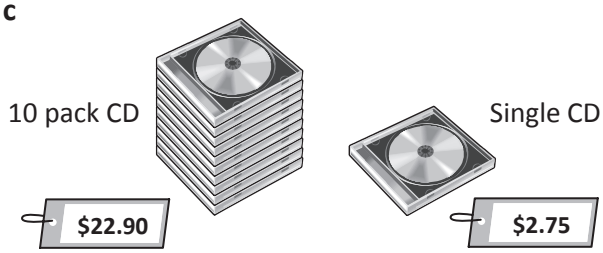
Best deal is _____

b



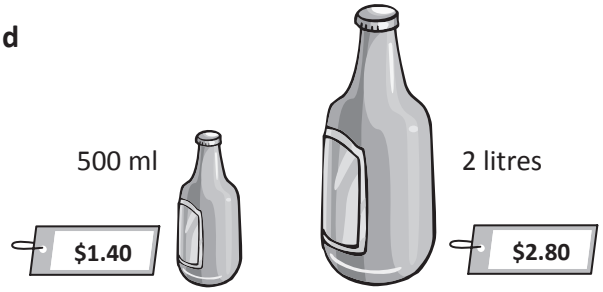
Best deal is _____

c



Best deal is _____

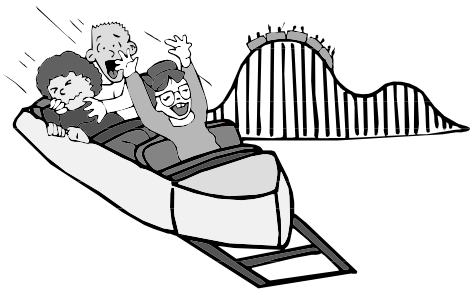
d



Best deal is _____

2 **You go to the service station with your weekly pocket money of $5. When you take a $1.75 chocolate bar to the counter, they offer you the special of 3 bars for $4.50. Which is a better deal? Show why.**

Written methods – solving problems



3 **You're planning a trip to the Wet and Wild theme park and there are many ticket options. Use a strategy of your choice and the price list below to answer the following questions:**

Entry	
1-day pass	**$32**
2-day pass	**$48**
Annual pass	**$99**
Individual rides	**$12**
10-ride pass	**$95**
Order online	**$5 discount**

Extras	
5-minute helicopter ride	**$42**
10-minute helicopter ride	**$74**
30-minute helicopter ride	**$209**
Sunset cruise	**$12**
Lunch cruise	**$22**
Swim with the dolphins	**$75**

a If you buy a 2-day pass, what is the cost per day?

b How much cheaper is this option than buying two 1-day passes?

c If you bought an annual pass, how many times would you need to visit to make it a better option than buying either a 1-day or 2-day pass?

d What if you choose just the rides? How much would you save if you bought the 10-ride pass instead of the individual rides?

e If you took a 5-minute helicopter ride, what would be the cost per minute?

f What about if you chose the 10-minute flight option? What would be the cost per minute?

g Plan a day's itinerary for you and a partner. How much will this cost?

Crack the code

apply

What to do

Use the code below to work out the hidden message.

___	___	___	___	___	___	___	___	___	___		___	___		___	___	___
2	1	3	6	4	5	3	8	7	9		8	9		10	12	11

A × A = A	**A is** _____	F = H + L	**F =** _____
M × M = M + M	**M is** _____	E = F ÷ 2	**E =** _____
T – M = A	**T is** _____	2 × L = I	**I =** _____
T + T = H	**H is** _____	(2 × L) – A = C	**C =** _____
H – M = L	**L is** _____	F + A = N	**N =** _____
3 × L = U	**U is** _____	3 × T = S	**S =** _____

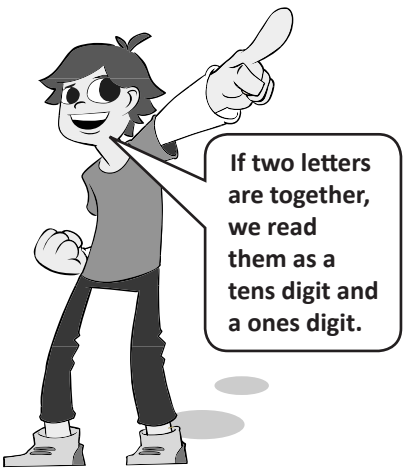
DISCOVER

What to do

Try this one:

___	___	___	___	___	___	___	___	___	___		___	___	___
2	9	4	12	13	8	2	7	4	9		2	12	3

___	___	___	___	___	___		___	___		___	___	___	___	___	
4	2	6	6	3	12		0	8		9	1	2	5	3	



A × A = A + A	**A is** _____	L + E = S	**S is** _____
A + A = T	**T is** _____	N – N = I	**I is** _____
T × 2 = N	**N is** _____	U – A = C	**C is** _____
AT ÷ N = E	**E is** _____	S – N = P	**P is** _____
2 × E = L	**L is** _____	2 × U – P = O	**O is** _____
E + T = U	**U is** _____	S + E = R	**R is** _____

Smart buttons — apply

Getting ready

In this activity, you'll use your knowledge of multiplication, division, subtraction and addition to find as many number statements you can to create one number.

What to do

Using ONLY the number 2, +, ×, – and ÷ keys on your calculator, find as many ways as you can to create the number 13.
For example, you could make:

22 + 2 + 2 = 26 ÷ 2 = 13

Record your statements on a piece of paper.

Now, compare your answers with a partner's. How many did they find? Can you supplement each other's lists?

What's the longest statement? What's the shortest?

What to do

Choose another number to make and see how many statements you can find *or* challenge a partner to a competition. Set a time limit and see who can find the most ways to make 15 within the time span.

Bugs — investigate

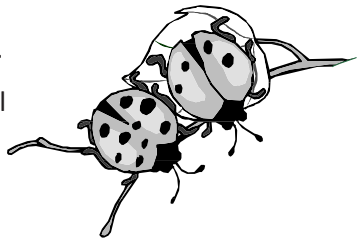
Getting ready

Use your knowledge of multiples to help you work out how many boy bugs and girl bugs there are in the problem below. Listing all the multiples is a strategy that would help.

What to do

Girl bugs have 4 splodges on their backs, boy bugs have 9.

Altogether there are 48 splodges. Work out how many girl bugs and how many boy bugs there are.



What to do next

What if girl bugs have 8 splodges and boy bugs have 6 and there are 120 splodges altogether? How many different answers can you find?

Puzzles — apply

What to do

Use your knowledge of multiplication to work out the missing values:

a

$$\begin{array}{r} 2\ 8 \\ \times\quad 3 \\ \hline 8\ \square \end{array}$$

b

$$\begin{array}{r} 7\ \square \\ \times\quad 4 \\ \hline 2\ 8\ 8 \end{array}$$

c

$$\begin{array}{r} \square\ 7 \\ \times\quad 5 \\ \hline 2\ 3\ 5 \end{array}$$

d

$$\begin{array}{r} 8\ \square \\ \times\quad 9 \\ \hline 7\ 2\ 9 \end{array}$$

e

$$\begin{array}{r} 6\ 8 \\ \times\quad \square \\ \hline 2\ 0\ 4 \end{array}$$

f

$$\begin{array}{r} \square\ 2\ 3 \\ \times\quad \square \\ \hline 6\ 5\ 8\ 4 \end{array}$$

g

$$\begin{array}{r} 2\ 6\ 1 \\ \times\quad \square \\ \hline \square\ \square\ 4\ 4 \end{array}$$

h

$$\begin{array}{r} 4\ 2 \\ \times\quad \square\ 3 \\ \hline 1\ 2\ 6 \\ \square\ 6\ 8\ 0 \\ \hline \square\ \square\ \square\ \square \end{array}$$

i

$$\begin{array}{r} 5\ 6 \\ \times\quad 2\ 7 \\ \hline 3\ 9\ 2 \\ \square\ \square\ \square\ \square \\ \hline \square\ \square\ \square\ \square \end{array}$$

What to do

Fill in the multiplication and division tables by working out the missing digits. The arrows show you some good starting places.

×			7	6
	20	16	14	
5		40		
				36
3	30			

×		8	9	
12	24			
3				12
	14			
			54	

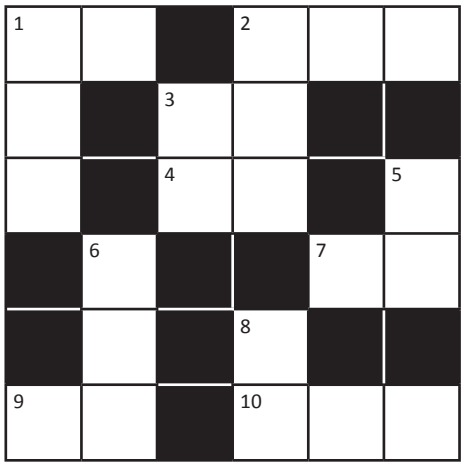
×			3	
4				32
		14		
	45		27	
12		24		

×			9	
	6			
11	33	44		
			63	
8				64

Puzzles — apply

What to do

Complete this crossnumber puzzle:



Across

1 60 ÷ 5

2 25 × 5

3 7 × 6

4 15 × 6

7 7 × 3

9 9 × 6

10 6 × 50

Down

1 11 × 11

2 12 × 10

3 7 × 7

5 66 ÷ 6

6 12 × 12

8 39 ÷ 3

What to do

Test your speed and accuracy. Race against a partner or the clock to complete each table:

÷ 8	
56	
16	
64	
80	
32	
72	
24	
8	

Time:

÷ 3	
9	
6	
18	
12	
24	
30	
27	
33	

Time:

÷ 7	
21	
7	
14	
70	
49	
28	
42	
35	

Time:

What to do

Use the "guess, check and improve" strategy to solve this problem. You could use a calculator to help if you wish.

Tracey paid $3.10 for 7 lolly snakes and 4 sherbets. Madison paid $2.95 for 4 lolly snakes and 7 sherbets. How much does one lolly snake cost? How much does one sherbet cost?