

My Y5 Home Maths Learning Pack

My Name is: _____

My Mathletics log on is: _____

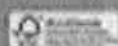
My Mathletics password is: _____

My Education City log on is: _____

My Education City password is: _____

Multiplication Square

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144



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Numeracy Vocabulary

Add

and
increase
sum
total
plus
together
more



Subtract

difference between
take away
minus
fewer
reduce
decrease
take from



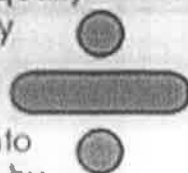
Multiply

multiplied by
groups of
times
product
lots of
times table

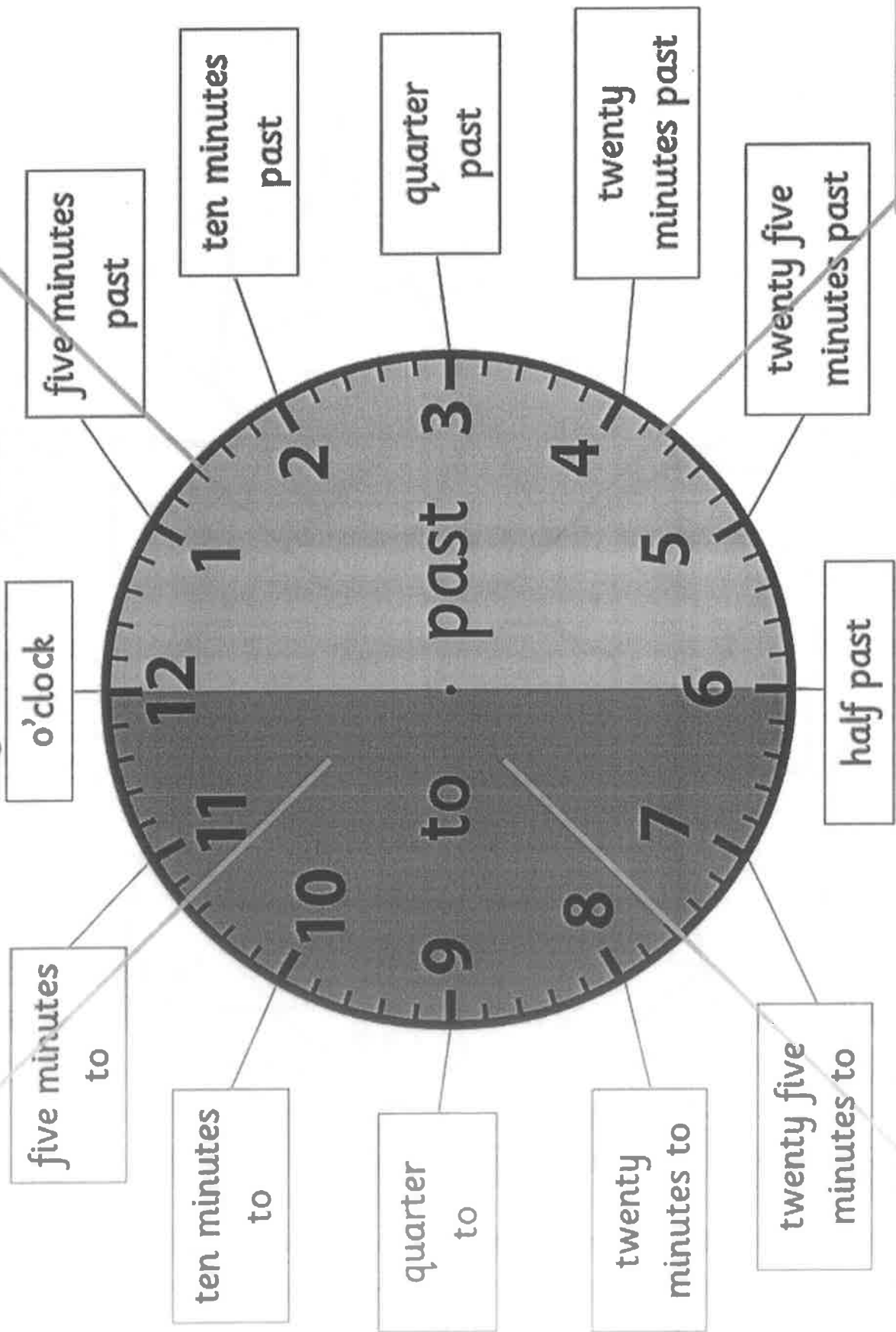


Divide

share equally
divide by
group
share
divide into
divisible by



Telling the Time



Colour by Multiplication

Do the multiplication calculation and colour the shape in the correct colour.

0-10

light blue

11-20

purple

21-30

pink

31-40

yellow

41-50

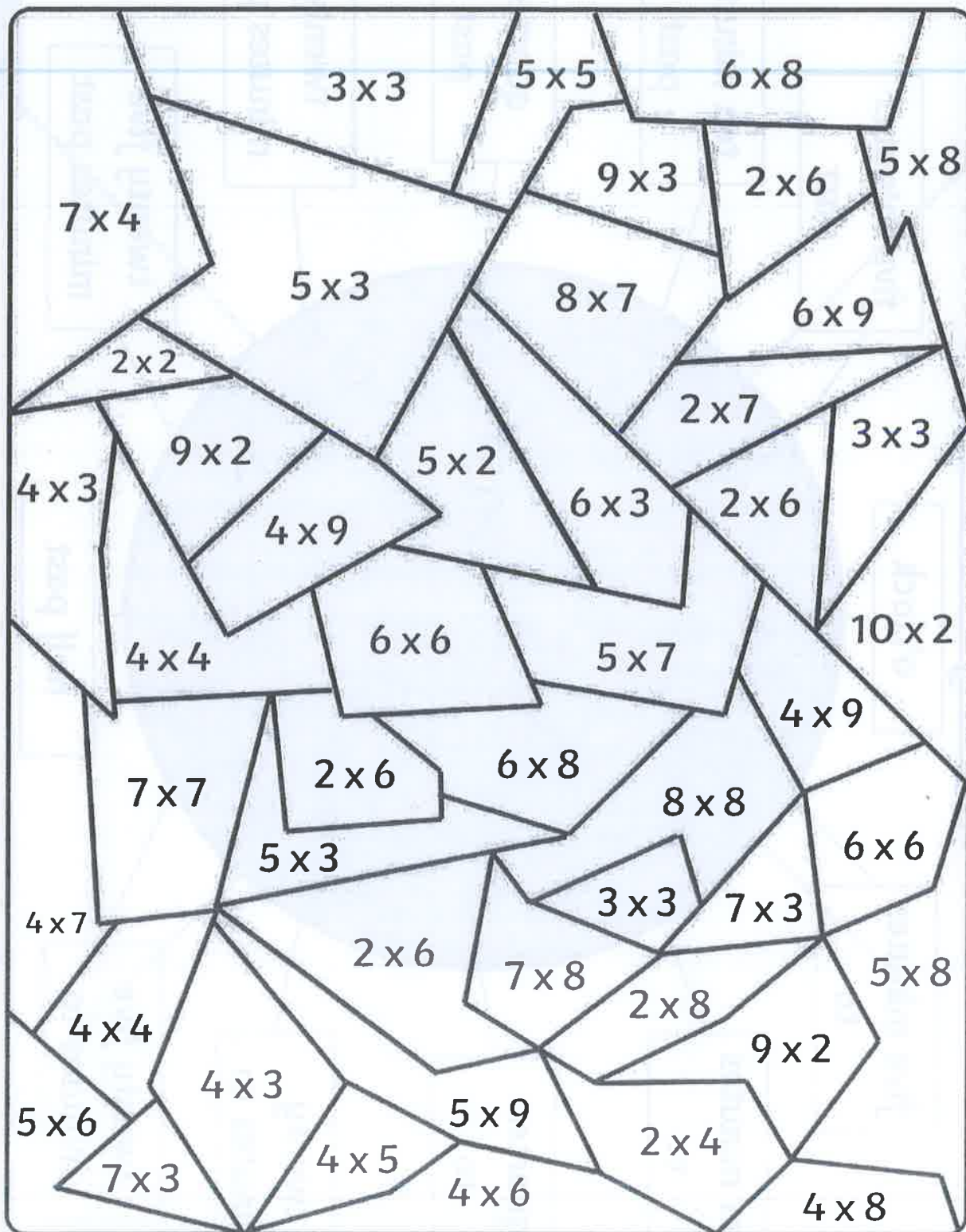
green

51-60

orange

61-70

dark blue

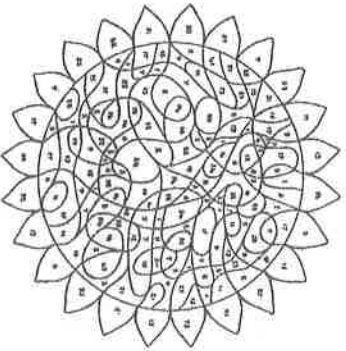


1	X	2	=
2	X	2	=
3	X	2	=
4	X	2	=
5	X	2	=
6	X	2	=
7	X	2	=
8	X	2	=
9	X	2	=
10	X	2	=
11	X	2	=
12	X	2	=

Complete this table.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

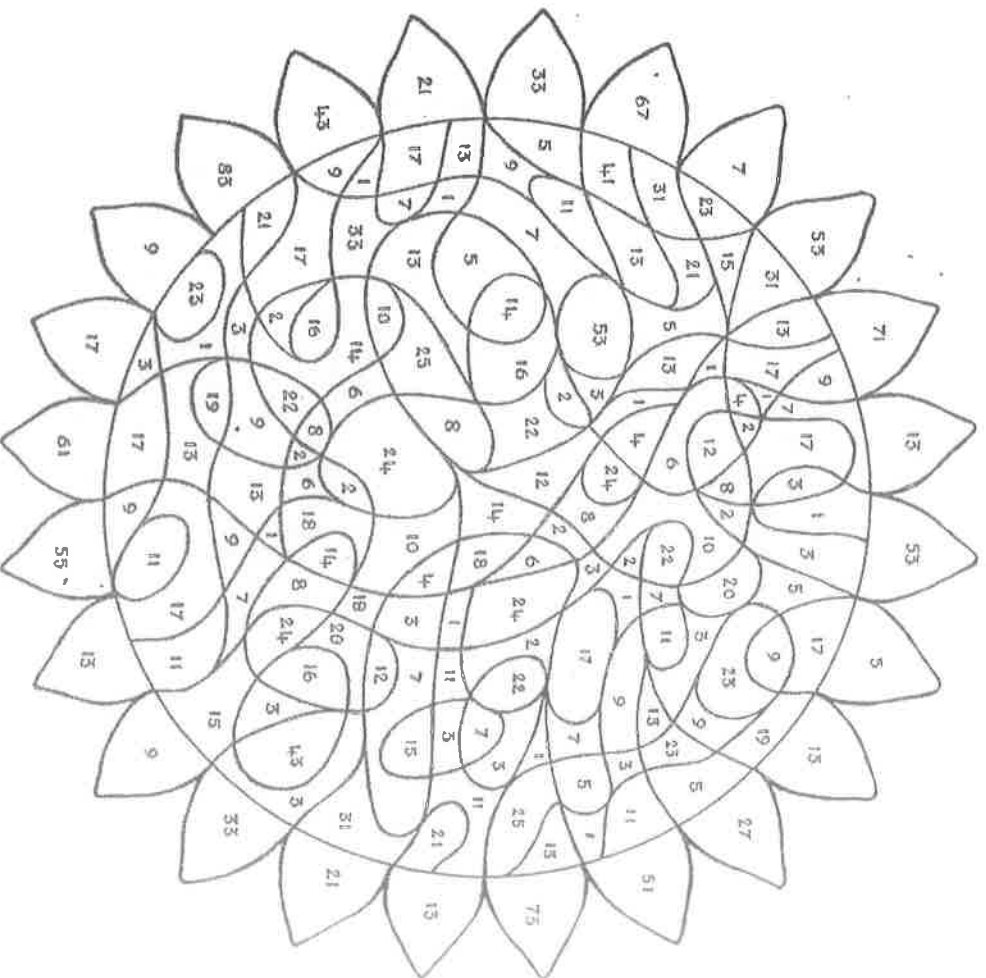
Make a pattern by colouring all the numbers which are multiples of 2.



Solve the puzzle picture opposite by colouring just those numbers which divide by 2.
What can you see?

Picture Puzzle

2 X table



Three times table

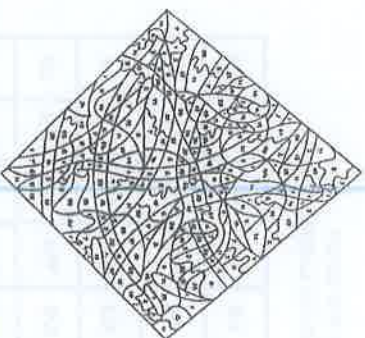
1	X 3 =
2	X 3 =
3	X 3 =
4	X 3 =
5	X 3 =
6	X 3 =
7	X 3 =
8	X 3 =
9	X 3 =
10	X 3 =
11	X 3 =
12	X 3 =

Complete this table.

Multiples of three

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

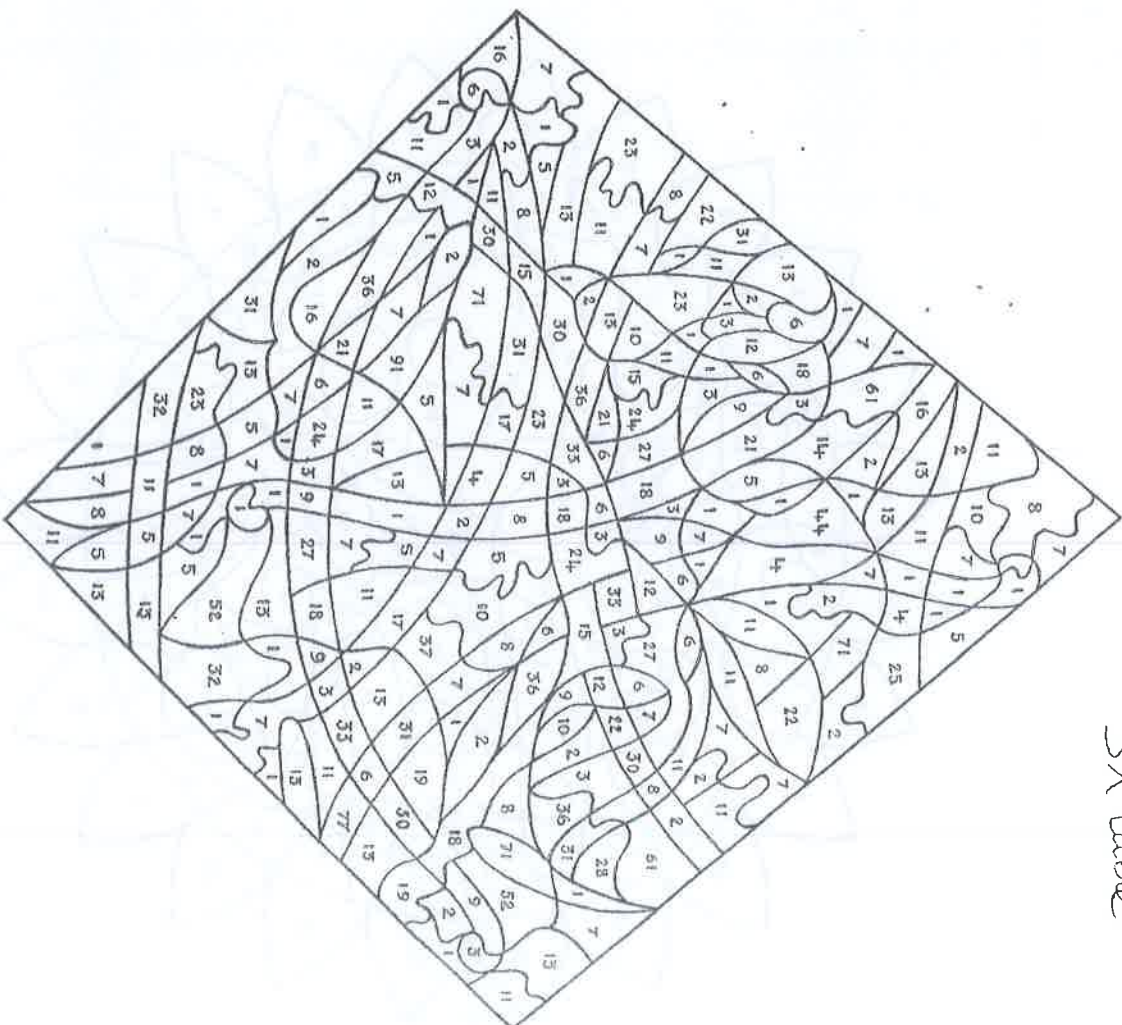
Make a pattern by colouring all the numbers which are multiples of 3.



Solve the puzzle picture opposite by colouring just those numbers which divide by 3.
What can you see?

Picture Puzzle

3 X table



Four times table

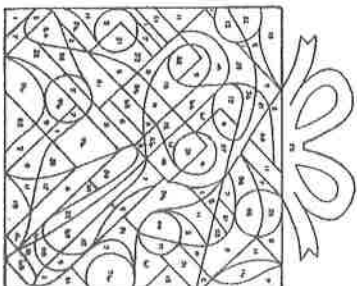
1	x 4	=
2	x 4	=
3	x 4	=
4	x 4	=
5	x 4	=
6	x 4	=
7	x 4	=
8	x 4	=
9	x 4	=
10	x 4	=
11	x 4	=
12	x 4	=

Complete this table.

Multiples of four

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

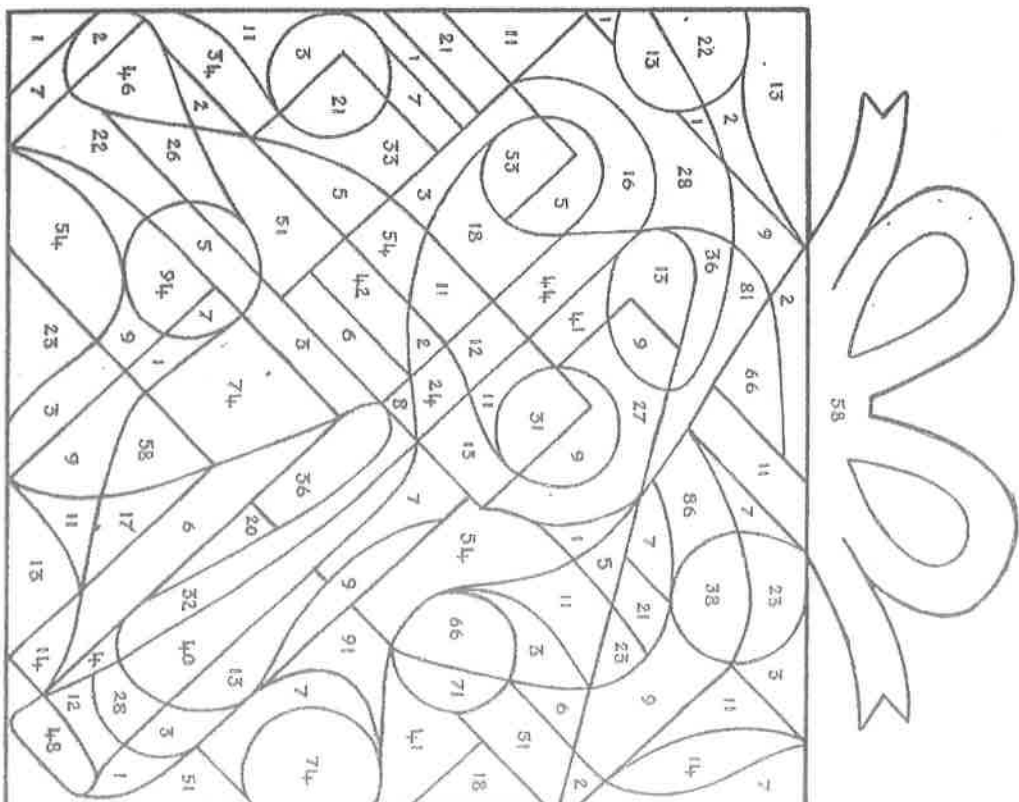
Make a pattern by colouring all the numbers which are multiples of 4.



Solve the puzzle picture opposite by colouring just those numbers which divide by 4.
What can you see?

Picture Puzzle

4 x table



Five times table

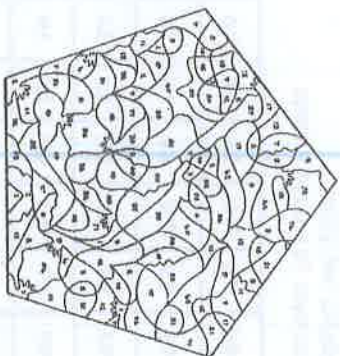
1	X	5	=
2	X	5	=
3	X	5	=
4	X	5	=
5	X	5	=
6	X	5	=
7	X	5	=
8	X	5	=
9	X	5	=
10	X	5	=
11	X	5	=
12	X	5	=

Complete this table.

Multiples of five

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

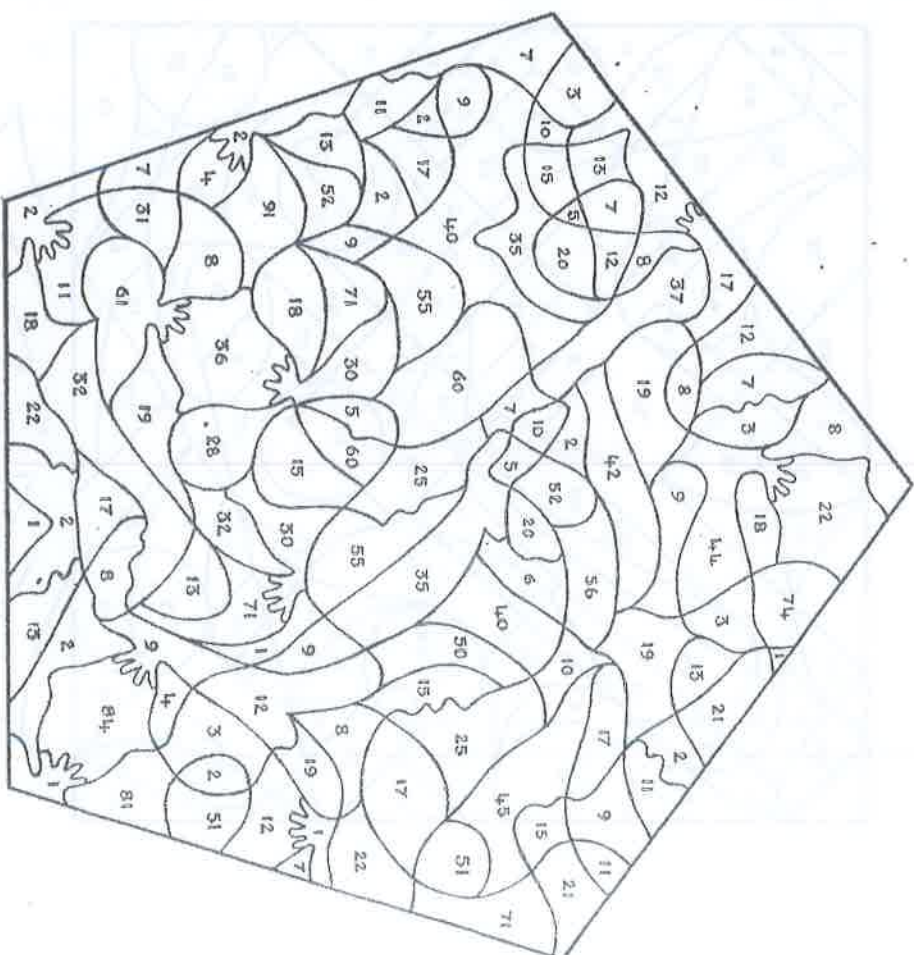
Make a pattern by colouring all the numbers which are multiples of 5.



Solve the puzzle picture opposite by colouring just those numbers which divide by 5.
What can you see?

Picture Puzzle

5 x table



Six times table

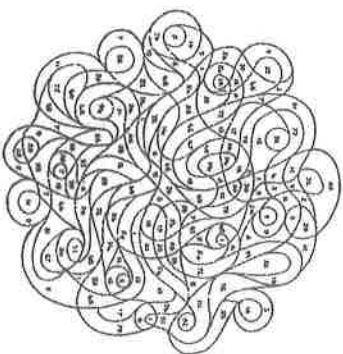
1	× 6	=
2	× 6	=
3	× 6	=
4	× 6	=
5	× 6	=
6	× 6	=
7	× 6	=
8	× 6	=
9	× 6	=
10	× 6	=
11	× 6	=
12	× 6	=

Complete this table.

Multiples of six

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

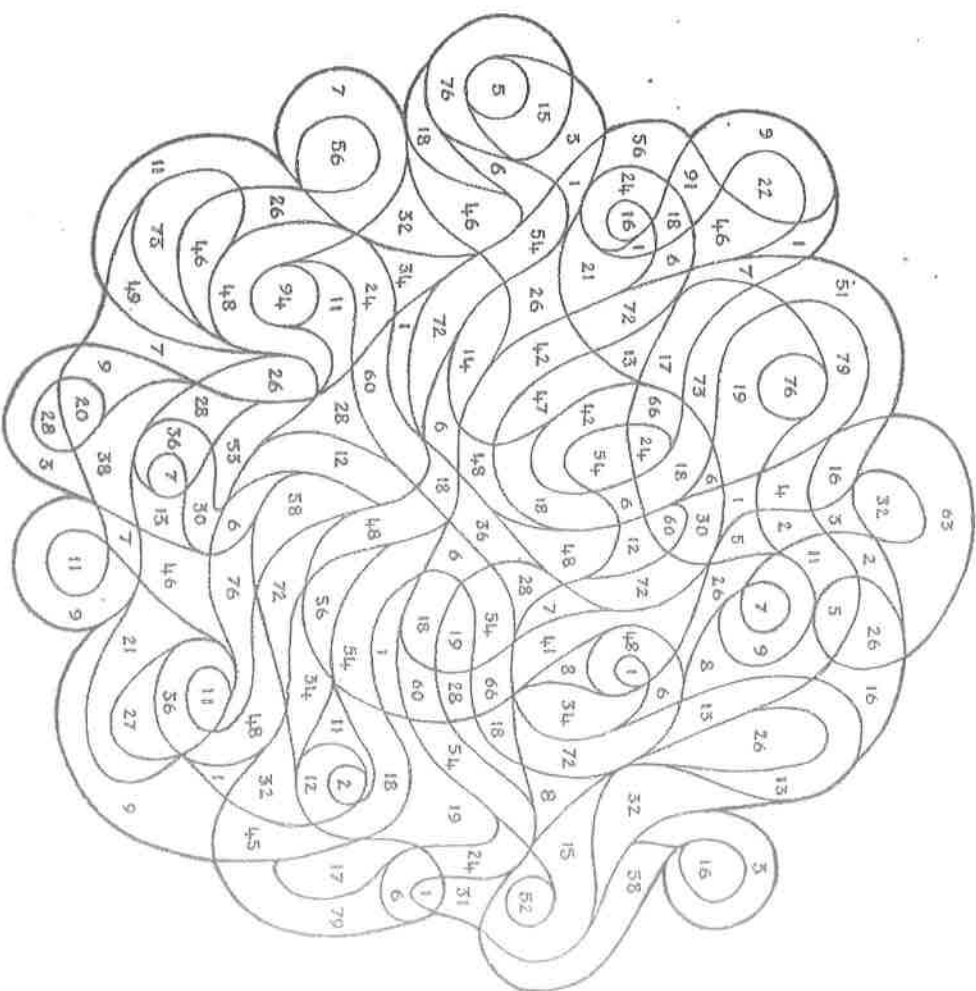
Make a pattern by colouring all the numbers which are multiples of 6.



Solve the puzzle picture opposite by colouring just those numbers which divide by 6.
What can you see?

Picture Puzzle

6 x table



Seven times table

1	$\times 7 =$
2	$\times 7 =$
3	$\times 7 =$
4	$\times 7 =$
5	$\times 7 =$
6	$\times 7 =$
$\times 7 =$	
8	$\times 7 =$
9	$\times 7 =$
10	$\times 7 =$
11	$\times 7 =$
12	$\times 7 =$

Complete this table.

Multiples of seven

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

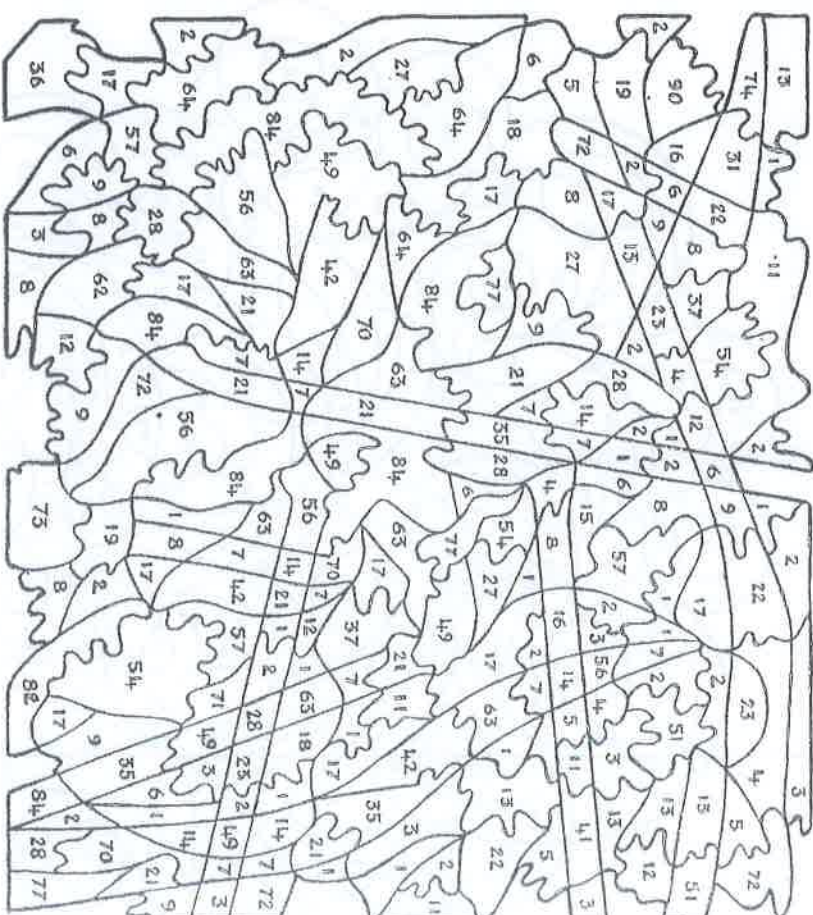
Make a pattern by colouring all the numbers which are multiples of 7.



Solve the puzzle picture opposite by colouring just those numbers which divide by 7.
What can you see?

Picture Puzzle

7 X Table



Eight times table

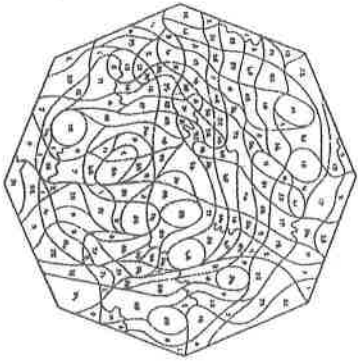
1	$\times 8 =$
2	$\times 8 =$
3	$\times 8 =$
4	$\times 8 =$
5	$\times 8 =$
6	$\times 8 =$
7	$\times 8 =$
8	$\times 8 =$
9	$\times 8 =$
10	$\times 8 =$
11	$\times 8 =$
12	$\times 8 =$

Complete this table.

Multiples of eight

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

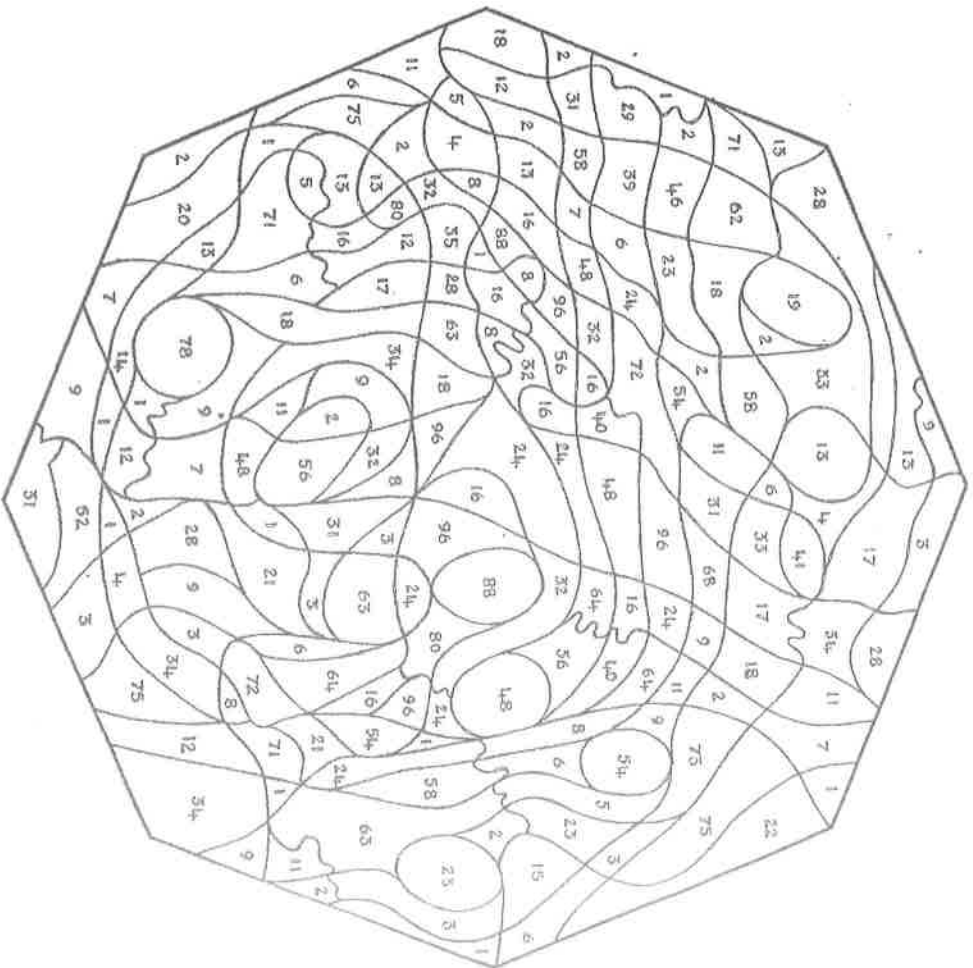
Make a pattern by colouring all the numbers which are multiples of 8.



Solve the puzzle picture opposite by colouring just those numbers which divide by 8.
What can you see?

Picture Puzzle

8 x table



Nine times table

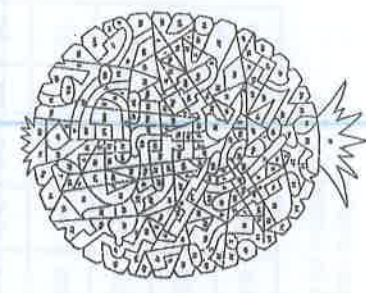
1 X 9 =
2 X 9 =
3 X 9 =
4 X 9 =
5 X 9 =
6 X 9 =
7 X 9 =
8 X 9 =
9 X 9 =
10 X 9 =
11 X 9 =
12 X 9 =

Complete this table.

Multiples of nine

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

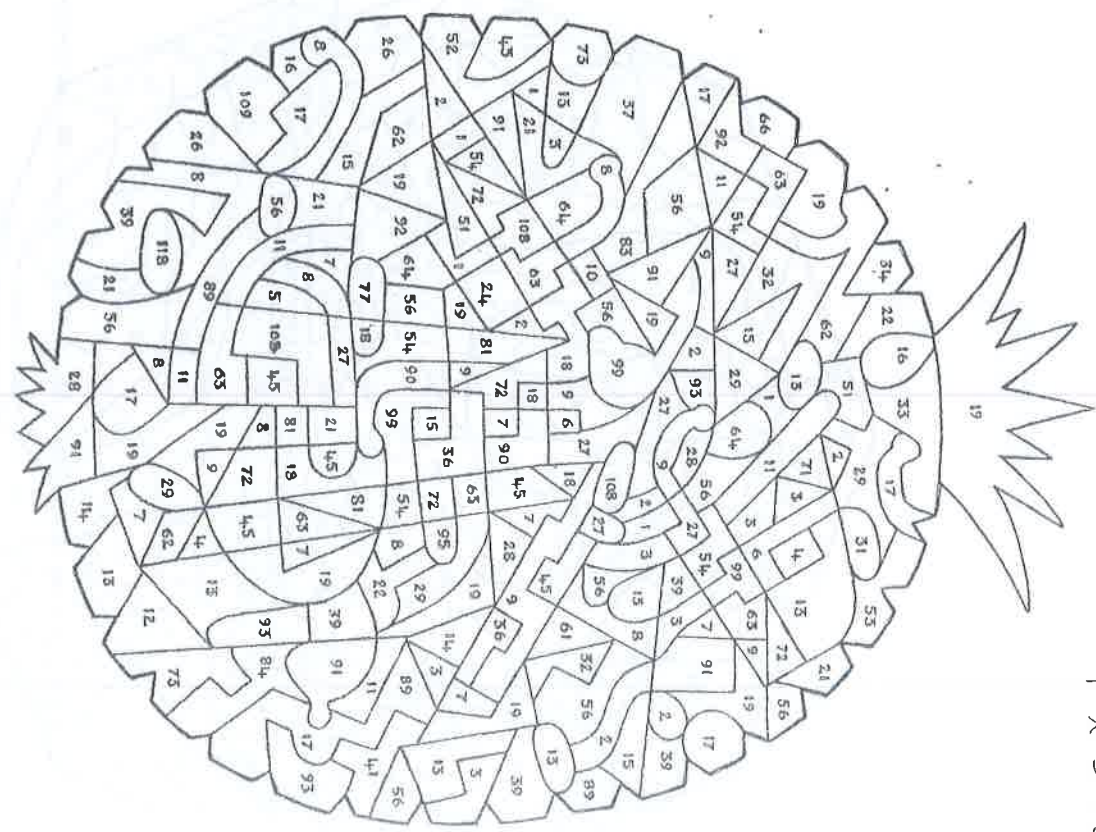
Make a pattern by colouring all the numbers which are multiples of 9.



Solve the puzzle picture opposite by colouring just those numbers which divide by 9.
What can you see?

Picture Puzzle

9 X table



Ten times table

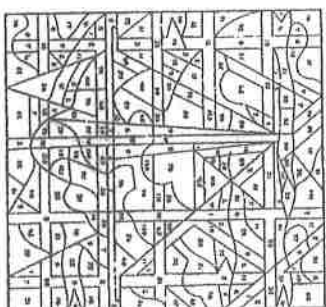
1 X 10 =
2 X 10 =
3 X 10 =
4 X 10 =
5 X 10 =
6 X 10 =
7 X 10 =
8 X 10 =
9 X 10 =
10 X 10 =
11 X 10 =
12 X 10 =

Multiples of 10

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Complete this table.

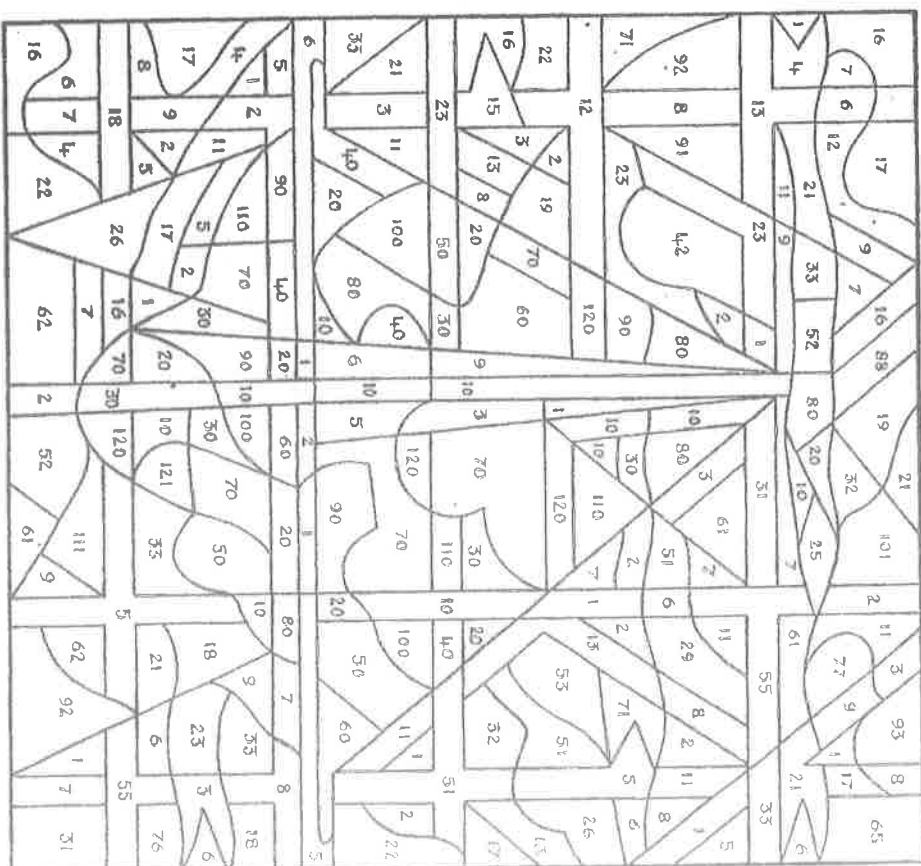
Make a pattern by colouring all the numbers which are multiples of 10.



Solve the puzzle picture opposite by colouring just those numbers which divide by 10.
What can you see?

Picture Puzzle

10 X Table



Eleven times table

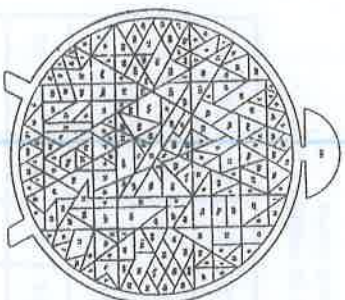
1	11	=
2	22	=
3	33	=
4	44	=
5	55	=
6	66	=
7	77	=
8	88	=
9	99	=
10	110	=
11	121	=
12	132	=

Complete this table.

Multiples of eleven

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

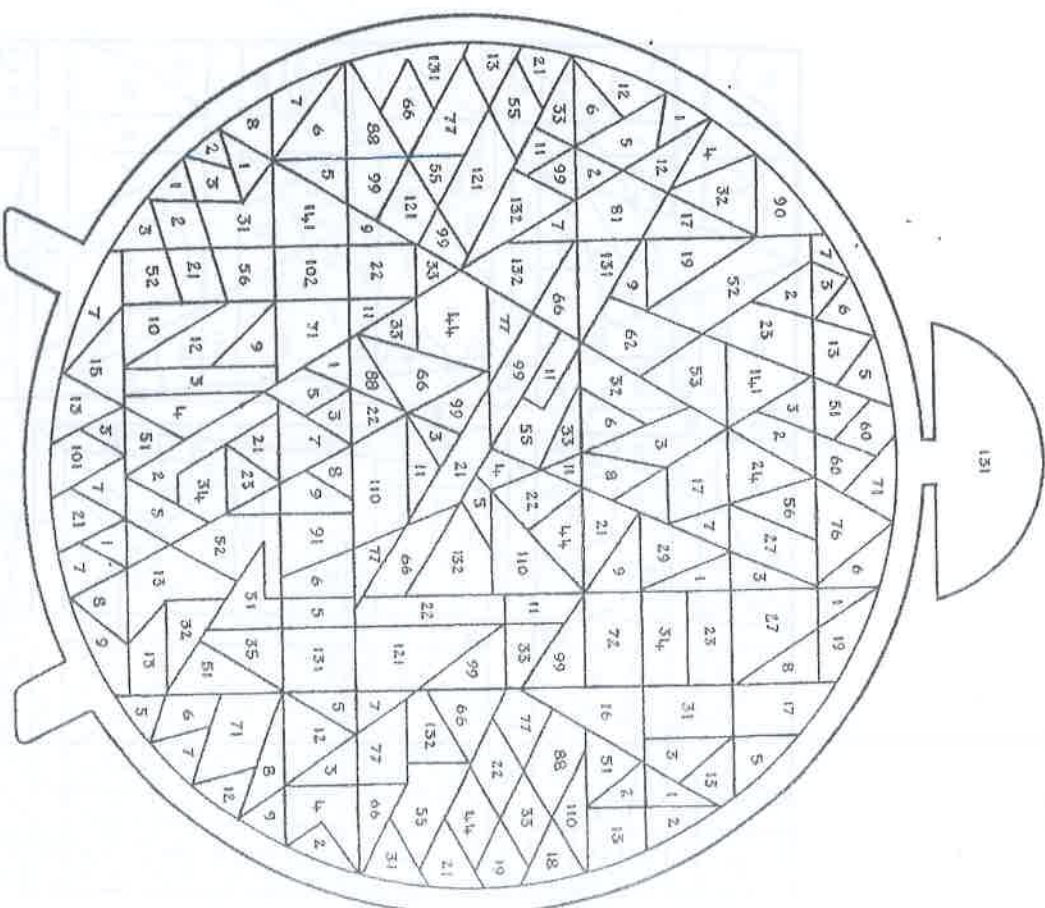
Make a pattern by colouring all the numbers which are multiples of 11.



Solve the puzzle picture opposite by colouring just those numbers which divide by 11.
What can you see?

Picture Puzzle

11 x table



Twelve times table

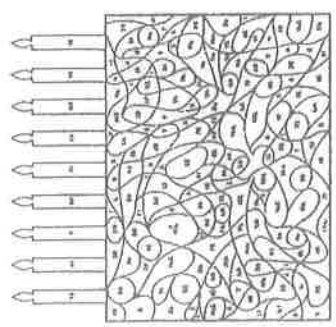
1	× 12	=
2	× 12	=
3	× 12	=
4	× 12	=
5	× 12	=
6	× 12	=
7	× 12	=
8	× 12	=
9	× 12	=
10	× 12	=
11	× 12	=
12	× 12	=

Complete this table.

Multiples of twelve

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

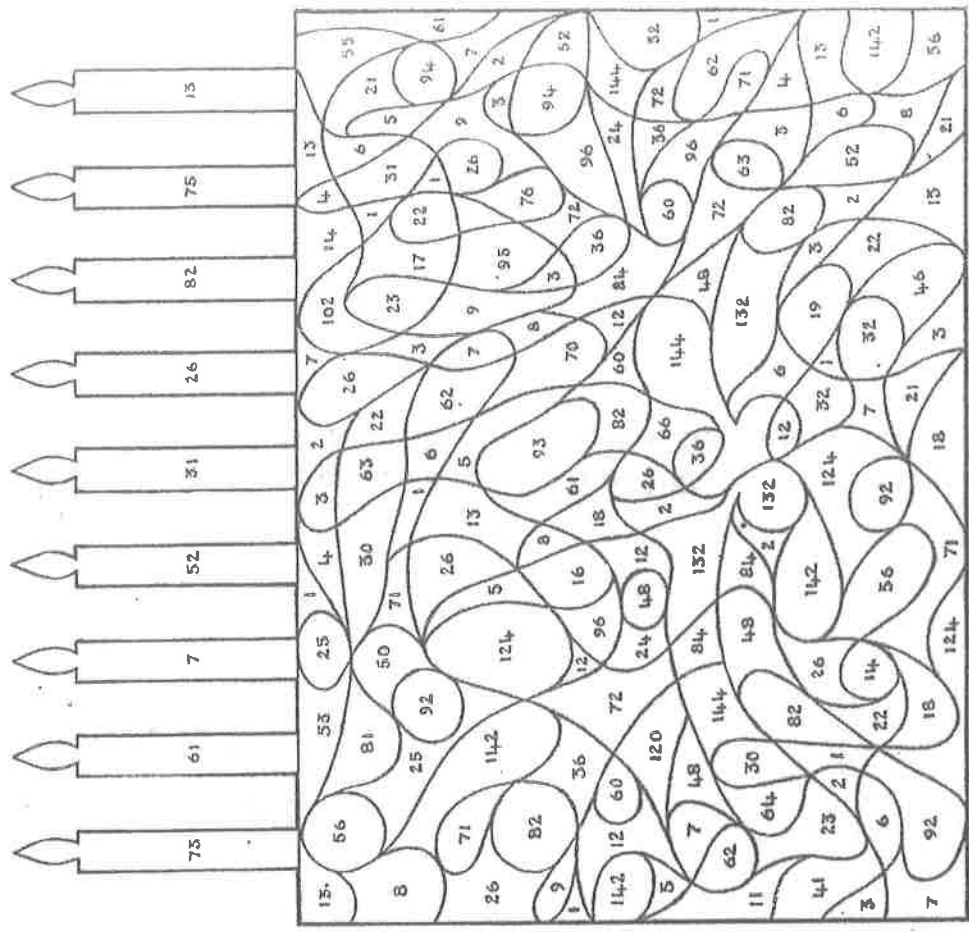
Make a pattern by colouring all the numbers which are multiples of 12.



Solve the puzzle picture opposite by colouring just those numbers which divide by 12.
What can you see?

Picture Puzzle

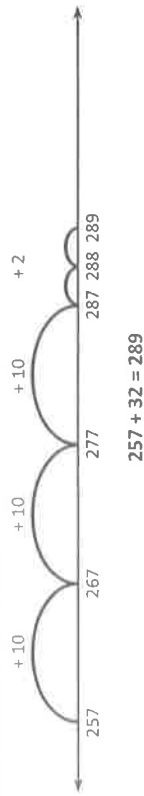
12 x table



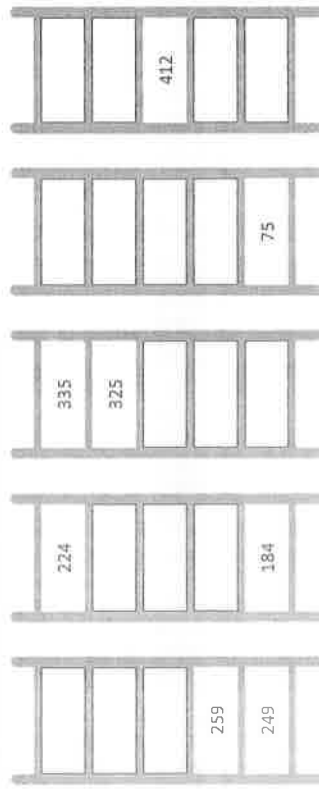
Addition mental strategies – jump strategy

When we add we can use the jump strategy to help us. Look at $257 + 32$:

- 1 First we jump up by the tens
- 2 Then we jump up by the units



1 Warm up with jumping by tens up and down these ladders:



2 Use the jump strategy to complete these additions:

a $575 + 52 = \square$



b $759 + 41 = \square$

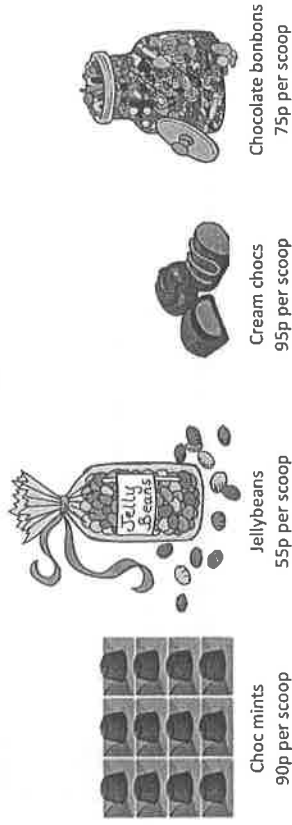


c $135 + 73 = \square$



Addition mental strategies – jump strategy

- 3 A group of friends each bought a bag of mixed sweets at a sweet shop. Practise using the jump strategy to solve each problem. Write your answer and any working out in the space below each problem:



- a How much did Liam spend if he bought a scoop of jellybeans and a scoop of choc mints?

- b How much did Ruby spend if she bought a scoop of cream chocs and a scoop of chocolate bonbons?

- c How much did Rea spend if she bought one scoop of each type?

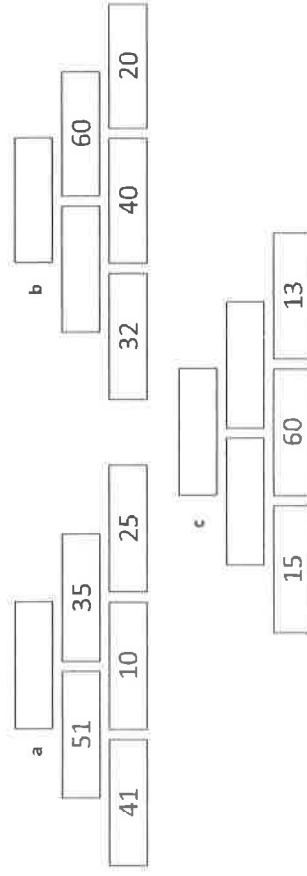
- d Rachel spent £1.85 on 2 scoops of sweets. Use guess, check and improve to work out which 2 scoops she could have bought.

Remember with addition, you can start with either number.



REMEMBER

- 4 Use the jump strategy to help you finish these addition walls. Can you see how they work?



Addition mental strategies – split strategy

138 can be split into 100, 30 and 8.

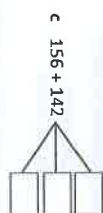
When adding large numbers in our heads it can be easier to split one of the numbers into parts and add each part separately.

$$214 + 138 \rightarrow 214 + 100 = 314 \rightarrow 314 + 30 = 344 \rightarrow 344 + 8 = 352$$

$$214 + 138 = 352$$

REMEMBER

1 Use the split strategy to add the numbers. The first one has been done for you.



$$623 + 20 = 643$$

$$643 + 8 = 651$$

$$623 + 28 = 651$$

$$38 + 26 =$$

$$156 + 142 =$$

2 These problems have been split and some have been solved already. Lucky, hey? You just have to work out what the second numbers were before they were split and answer any unsolved problems:

a $416 + 90 + 1 = 507$

was

$$416 + 91 =$$

b $230 + 30 + 3 =$

was

$$230 + 91 =$$

c $283 + 60 + 7 =$

was

$$283 + 283 =$$

d $532 + 60 + 1 =$

was

$$532 + 425 =$$

e $425 + 100 + 40 + 2 =$

was

$$425 + 129 =$$

f $129 + 200 + 40 + 6 =$

was

$$129 + 425 =$$

3 Work out the answers to these questions by using the split strategy. See if you can do the working in your head. If it helps, make notes as you go:

a $173 + 36 =$

b $446 + 51 =$

c $112 + 83 =$

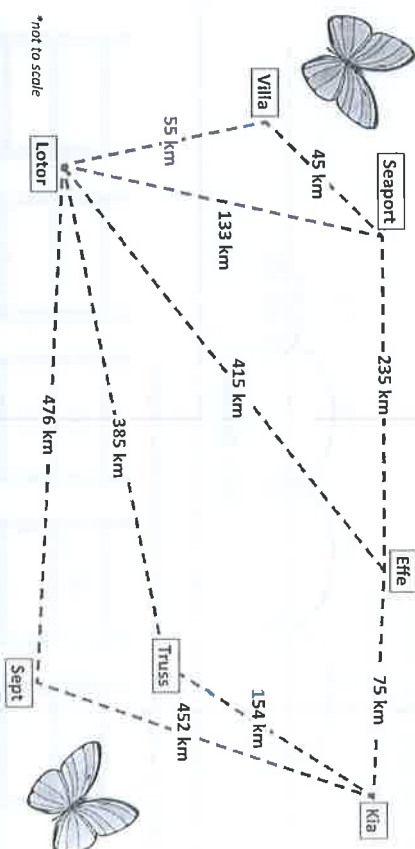
d $724 + 72 =$

e $475 + 122 =$

f $123 + 164 =$

Addition mental strategies – split strategy

4 Butterflies can fly great distances. Use the map and the split strategy to calculate the total distance flown by each butterfly in the table below:



Flight path	Distances to add	Total distance
The Field Crescent flies from Lotor to Villa and then to Seaport	55 + 45	
The Painted Lady flies from Sept to Lotor and then to Villa		
The Fawn flies from Seaport to Effe and then to Kia		
The Monarch flies from Sept to Kia and then to Effe		

We often use the split strategy when adding money. We split the amounts into pounds and pence, work out each part and then add the two answers together:

$$\begin{aligned} £28.50 + £16.80 &= (£28 + £16) + (£0.50 + £0.80) \\ &= £44 + £1.30 \\ &= £45.30 \end{aligned}$$

5 Match the price tags with the bills:

£18.25 + £12.75

Total: £31

£64.70 + £11.30

Total: £46

Total: £76

£11.85 + £34.15

Total: £130

£56.35 + £73.65

Addition mental strategies – compensation strategy

Sometimes we round one number in the problem to make it easier to do in our heads. Then we adjust our answer to compensate:

$405 + 69 = 474$
 $405 + 70 = 475$ I rounded up by 1
 $475 - 1 = 474$ so I subtract 1.

THINK

I added 1 extra to round to 70 so I have to take 1 off my answer.

1 Warm up by rounding these numbers to the closest ten:

- a 48 b 67 c 232 d 74
- e 89 f 456 g 955 h 786

2 Solve these problems using compensation:

- a $45 + 37 =$ b $66 + 18 =$
- $45 + 40 =$ $66 + =$
- $=$ $=$
- c $86 + 49 =$ d $124 + 57 =$
- $86 + =$ $124 + =$
- $=$ $=$

We can also round down to the closest ten. When we do this we add to compensate.

3 Round these numbers to the closest ten. Then compensate by adding:

- a $26 + 42 =$ b $35 + 63 =$
- $26 + 40 =$ $35 + =$
- $=$ $=$
- c $96 + 21 =$ d $145 + 34 =$
- $96 + =$ $145 + =$
- $=$ $=$

Addition mental strategies – compensation strategy

4 Connect the statements with their answer:

- When we round down we compensate by subtracting
- When we round up we compensate by adding

5 Solve these addition problems using compensation. Decide if you need to round up or down and compensate accordingly. Make as many notes as you need to:

- a $425 + 67$ b $673 + 98$ c $275 + 91$
- d $784 + 32$ e $316 + 73$ f $115 + 79$

6 A website tracked the number of visitors over 5 days:

Monday	Tuesday	Wednesday	Thursday	Friday
124	199	213	158	236



Use the compensation method to answer the following questions. Try to do the sum in your head, then show how you did it in the space below:

- a How many people looked at the website on Monday and Tuesday?
- b How many people looked at the website on Thursday and Friday?
- c On which 2 days did the total reach 449 visitors?

Checkerboard race

apply



This is a game for 2 players. You will need a counter each, a die and some paper to keep score.



Each of you will choose a starting square on the top row. The object of this game is to get to the finish line first with the largest total.



Roll a die. If you throw:

- a 1 or 2, you can only move one square across the row in either direction;
- a 3 or 4 means you can move one square diagonally;
- a 5 or 6 means you move one downwards.

Add the two numbers using a strategy of your choice. Record your total as you go. Who will arrive at the finish with the largest score? Good luck!

Choose the best addition mental strategy.



81	76	93	42	89	50	66	74
62	28	54	37	63	45	95	39
87	70	69	83	75	57	12	49
63	93	52	44	86	67	37	58
38	47	83	17	95	72	49	56
90	73	68	39	54	23	85	43
41	36	51	91	78	66	17	32
63	81	27	11	44	46	50	74
FINISH							

Can you find the route that would give you the largest possible score?



Crack the city code

apply



Work out the answers to these sums in your head. Each answer matches a letter in the list on the right. Write the letters next to your answers, then unjumble the letters to find the name of a city.



Try competing with a friend to be the fastest to do all of the sums and work out the names of the three cities.

- a $701 + 126 =$ Letter
- $501 + 81 =$ Letter
- $810 + 117 =$ Letter
- $304 + 205 =$ Letter
- $810 + 17 =$ Letter
- $230 + 626 =$ Letter

The city is

- b $293 + 216 =$ Letter
- $811 + 111 =$ Letter
- $650 + 130 =$ Letter
- $610 + 57 =$ Letter
- $380 + 32 =$ Letter

The city is

- c $816 + 40 =$ Letter
- $913 + 62 =$ Letter
- $751 + 105 =$ Letter
- $830 + 79 =$ Letter
- $882 + 93 =$ Letter
- $471 + 111 =$ Letter

The city is

Code

- A = 922
B = 754
C = 141
D = 582
E = 927
F = 735
G = 222
H = 358
I = 780
J = 889
K = 481
L = 909
M = 398
N = 856
O = 975
P = 667
Q = 555
R = 412
S = 509
T = 538
U = 656
V = 1110
W = 1150
X = 716
Y = 827
Z = 1907

Subtraction mental strategies – split strategy

Remember that
215 is 200 + 10 + 5

When subtracting large numbers in our heads it can be easier to split the number to be subtracted into parts and work with each part separately.

$$468 - 215 \rightarrow 468 - 200 = 268 \rightarrow 268 - 10 = 258 \rightarrow 258 - 5 = 253$$

$$468 - 215 = 253$$

REMEMBER

1 Practise splitting these numbers into hundreds, tens and units. The first one is done for you.

a $356 = 300 + 50 + 6$

b $289 =$

c $867 =$

d $923 =$

e $442 =$

f $294 =$

2 Use the split strategy to subtract:

a $468 - 316$



b $574 - 155$



c $457 - 323$



$$\begin{array}{r} 468 - 300 = \\ - 10 = \\ - 6 = \\ 468 - 316 = \end{array}$$

$574 - 155 =$

$457 - 323 =$

3 Work out the answers to these questions then cross out the letter above each answer in the puzzle. The letters that remain will form the answer to the riddle.

a $484 - 74 =$

b $400 - 80 =$

c $406 - 106 =$

d $410 - 40 =$

e $403 - 13 =$

f $455 - 60 =$

g $497 - 92 =$

h $505 - 25 =$

i $520 - 25 =$

j $795 - 150 =$

k $410 - 100 =$

S	Y	H	O	U	E	R	X	E	L	A
300	195	410	305	150	320	505	370	595	405	200
K	Z	R	I	D	R	J	U	M	V	A
390	495	220	395	210	385	480	500	205	645	310

Riddle: What is the most rhythmic part of your body?

0 0 0 0 0 0 0 0 0 0 0 0

Subtraction mental strategies – split strategy

4 These problems have been completed. Are they correct? If not, circle where it all began to go wrong:

a $375 - 164$

b $429 - 143$

c $179 - 158$

$375 - 100 = 275$
 $275 - 60 = 215$
 $215 - 4 = 211$
 $375 - 164 = 211$

$429 - 100 = 323$
 $323 - 4 = 319$
 $319 - 3 = 316$
 $429 - 143 = 316$

$179 - 100 = 79$
 $79 - 50 = 39$
 $39 - 8 = 31$
 $179 - 158 = 31$

5 The following problems require you to add and subtract. Use the split strategy to help you solve them:

Four different families went on a holiday over Easter. Work out the distance that each car has travelled on the missing days:

Day 1	125 km	225 km		130 km
Day 2	375 km		525 km	
Day 3		110 km	125 km	270 km
Total distance	735 km	836 km	950 km	695 km

Make as many notes as you need to help you:

6 Assuming that each family started their holiday from the same place, work out where each family was at the end of Day 2. Connect the place with the family by drawing a line:

Family	Place
Robertsons	Damp 'n Crazy Water Park – 726 km
Pankhursts	The Big Baboon – 825 km
Caites	Insect Museum – 425 km
	The Giant Toothbrush – 500 km

Subtraction mental strategies – compensation strategy

Sometimes we round one number in the problem to make it easier to do in our heads. Then we adjust our answer to compensate:

$$486 - 59 = \boxed{427}$$

$486 - 60 + 1$ I rounded up by 1, which means I subtracted

$$426 + 1 = 427 \text{ 1 extra so we need to add 1 back.}$$



THINK

- 1 Round these numbers to the closest ten. Then compensate by subtracting or adding to get back to the first number. The first one is done for you.

a $93 = 90 + 3$ b $48 =$ c $52 =$ d $76 =$

e $57 =$ f $37 =$ g $27 =$ h $68 =$

- 2 Solve these subtraction problems using compensation. Show all your working out:

a $585 - 78 =$ b $894 - 71 =$ c $163 - 149 =$

$$585 - 80 + 2 = 894 - 70 - 1 = 163 - 150 + 1 =$$

- 3 Solve these problems using compensation. Decide if you need to round up or down and compensate accordingly:

a $555 - 63$ b $775 - 98$ c $644 - 139$

d $594 - 329$

e $432 - 204$



REMEMBER

Subtraction mental strategies – compensation strategy

- 4 Wally the work experience boy has solved these. He is happy because he solved them all correctly. Can you use his working out to establish what the original questions were?

a $454 - \boxed{} = \boxed{427}$ b $\boxed{} - \boxed{} = \boxed{}$

$454 - 30 = 424 + 3 = 427$ $568 - 310 = 258 + 2 = 260$

c $\boxed{} - \boxed{} = \boxed{}$ d $\boxed{} - \boxed{} = \boxed{}$

$994 - 80 = 914 + 2 = 916$ $678 - 450 = 228 - 2 = 226$

e $\boxed{} - \boxed{} = \boxed{}$ f $\boxed{} - \boxed{} = \boxed{}$

$684 - 60 = 624 + 1 = 625$ $348 - 130 = 218 + 2 = 220$

- 5 Use the compensation method to count backwards and complete these number patterns.



THINK

-17	-21	-98	-33
600	124	395	800
583	103	199	
549			

- 6 These subtraction problems have been partially solved using compensation. Colour match the steps that were used and complete the missing parts. The first one has been done for you:

$£4.50 - £2.75$	$£5.70 - £3.00 = £2.70$	$£2.45 + = $
$£10.00 - £6.25$	$£4.50 - £3.00 = £1.50$	$£4.25 + = $
$£5.70 - £3.05$	$£17.25 - £13.00 = £4.25$	$£1.50 + = $
$£17.25 - £12.90$	$£9.45 - £7.00 = £2.45$	$£4.00 - = $
$£9.45 - £6.85$	$£10.00 - £6.00 = £4.00$	$£2.70 - = $

Snakes but no ladders

apply

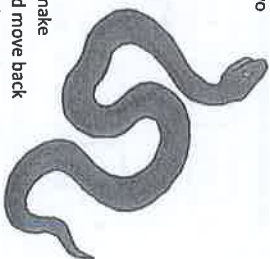


You can play with 1 to 4 players and you will need two dice and a love of snakes!



Start at 200. Throw the dice and add the numbers. The answer is the number of spaces you can move.

Follow the numbers. If you land on a square with a snake you must work out the answer to the subtraction and move back to that square! The winner is the first to finish ... alive!



263		261	260		258	257	256	
Finish								
248		250	251	252		254		
247		246	245		243	242	241	240
	233	234	235		237		239	
231	230		228	227		225	224	
	217	218			221	222	223	
215	214		212	211	210		208	
Start	201	202	203		205	206	207	

Written methods – addition

How do we add using a written strategy?

First we estimate: $235 + 500 = 735$. Our answer will be around 735.

We start with the units: $5 + 9$ is 14 units. We rename this as 1 ten and 4 units.

We put the 4 in the units column and carry the 1 to the tens column.

3 tens plus 8 tens plus the carried ten is 12 tens.

We rename this as 1 hundred and 2 tens.

We put the 2 in the tens column and carry the 1 to the hundreds column.

We add the hundreds. We put 7 in the hundreds column.

Finally we check against our estimate – do they match?

	H	T	U
12	1	3	5
+	4	8	9
	7	2	4

1 Solve these addition problems. First estimate the answers.

a

e:	
	H T U
	5 4 1
	+ 3 1 3

b

e:	
	H T U
	1 7 3
	+ 5 9 2

c

e:	
	H T U
	3 8 4
	+ 2 1 3

d

e:	
	H T U
	2 6 8
	+ 4 9 3

e

e:	
	Th: H T U
	2 2 1 7
	+ 3 4 0 8

f

e:	
	Th: H T U
	4 5 1 6
	+ 1 3 4 3

g

e:	
	Th: H T U
	5 3 8 9
	+ 1 2 7 4

h

e:	
	Th: H T U
	3 2 8 1
	+ 1 4 2 8

2 Use these cards to make 5 different addition problems using 2 and 3 digit numbers. Show your working out:

2

3

4

5

6

7

8

9

=

+

Written methods – addition

We can also add each place value separately and then add these together:

$$2 + 5 = 7$$

$$60 + 40 = 100$$

$$500 + 100 = 600$$

$$7 + 100 + 600 = 707$$

H	T	U
5	6	2
+	1	4
	5	7
1	0	0
6	0	0
7	0	7

3 Solve these addition problems using a written strategy of your choice:

e:	H	T	U
	3	8	5
	+	4	2

e:	H	T	U
	4	1	2
	+	2	3

e:	H	T	U
	9	2	2
	+	6	9

e:	H	T	U
	1	8	8
	+	4	1

e:	H	T	U
	7	2	4
	+	2	9

e:	H	T	U
		3	6
		+	1

4 Can you work out what the missing numbers should be? Remember there may have been some regrouping!

a	H	T	U
	4		5
	+	2	
		8	5

b	H	T	U
	1	5	9
	+	2	4
		0	6

c	H	T	U
	5	6	7
	+		9
		9	9

Guess, check and improve will help me here.



DISCOVER

Written methods – subtraction

First we estimate: $1000 - 300 = 700$

We start with the units. We can't take 8 away from 4 so we must rename one of the tens as units. We now have 14 units.

14 subtract 8 is 6 so we put the 6 in the units column.

8 tens subtract 7 tens is 1 ten so we put a 1 in the tens column.

We subtract the hundreds. 9 hundred subtract 2 hundred is 7 hundred.

Put a 7 in the hundreds column.

We check the answer against our estimate.

H	T	U
9	8	4
-	2	7
	7	1

1 Complete the subtraction problems:

e:	Th	H	T	U
	4	9	8	2
	-	1	5	3

e:	Th	H	T	U
	2	9	5	1
	-	8	7	8

e:	Th	H	T	U
	3	8	7	2
	-	5	8	6

When a problem asks us to find the difference, we subtract. We always start with the larger number.

2 Solve these to find the difference problems:

a	Th	H	T	U

b What is the distance from Normanville to Tidings?

Th	H	T	U

c	Th	H	T	U

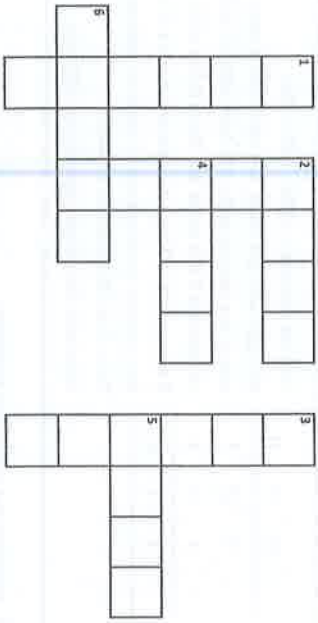
d How far from Normanville to Ace Bay?

Th	H	T	U

Showtown	4129 km	Tidings	1233 km
Normanville	3262 km	Ringer	7869 km
Roper	7419 km	Harpville	486 km
Ace Bay	1226 km	Eagle Bay	595 km

Written methods – subtraction

3 Use a calculator to add each group of numbers. Turn your calculator upside down to see a word on the screen. Use the key below to help you identify the letters. Write each word in the correct place in the crossword puzzle.



CLUES

Across

2. $3\ 025 + 1\ 589 =$ _____
4. $4\ 456 + 1\ 207 =$ _____
5. $2\ 776 + 2\ 861 =$ _____
6. $12\ 824 + 32\ 251 =$ _____

Down

1. $34\ 569 + 342\ 047 =$ _____
2. $20\ 786 + 36\ 548 =$ _____
3. $456\ 789 + 120\ 556 =$ _____

Key

0	1	3	4	5	6	7	8
O	I	E	H	S	G	L	B

4 The answer is 42. What could the missing numbers be? Come up with 5 possibilities:

1

H	T	U

2

H	T	U

3

H	T	U

4

H	T	U

5

H	T	U

6

H	T	U

Written methods – adding and subtracting decimals

When we add and subtract decimals we follow the same rules we use when working with whole numbers. We need to make sure we line up the place values and the decimal points:

	T	U	T
-	3	3	3
	1	7	2
	2	6	1

1 Estimate and solve these addition problems. Remember to put the decimal point into your answers:

a

T	U	T
5	4	1
+	3	1

e: _____

b

T	U	T
3	2	3
+	5	8

e: _____

c

T	U	T
4	8	4
+	4	1

e: _____

d

T	U	T
2	7	8
+	3	9

e: _____

e

T	U	T	H
5	2	1	7
+	3	5	9

e: _____

f

T	U	T	H
4	5	1	
+	1	4	0

e: _____

g

T	U	T	H
5	3	8	9
+	1	2	1

e: _____

h

T	U	T	H
3	2	4	1
+	1	9	3

e: _____

2 Estimate and solve these subtraction problems. Remember to put the decimal point into your answers:

a

T	U	T
8	4	3
-	3	2

e: _____

b

T	U	T
9	0	8
-	5	3

e: _____

c

T	U	T
7	6	3
-	2	0

e: _____

d

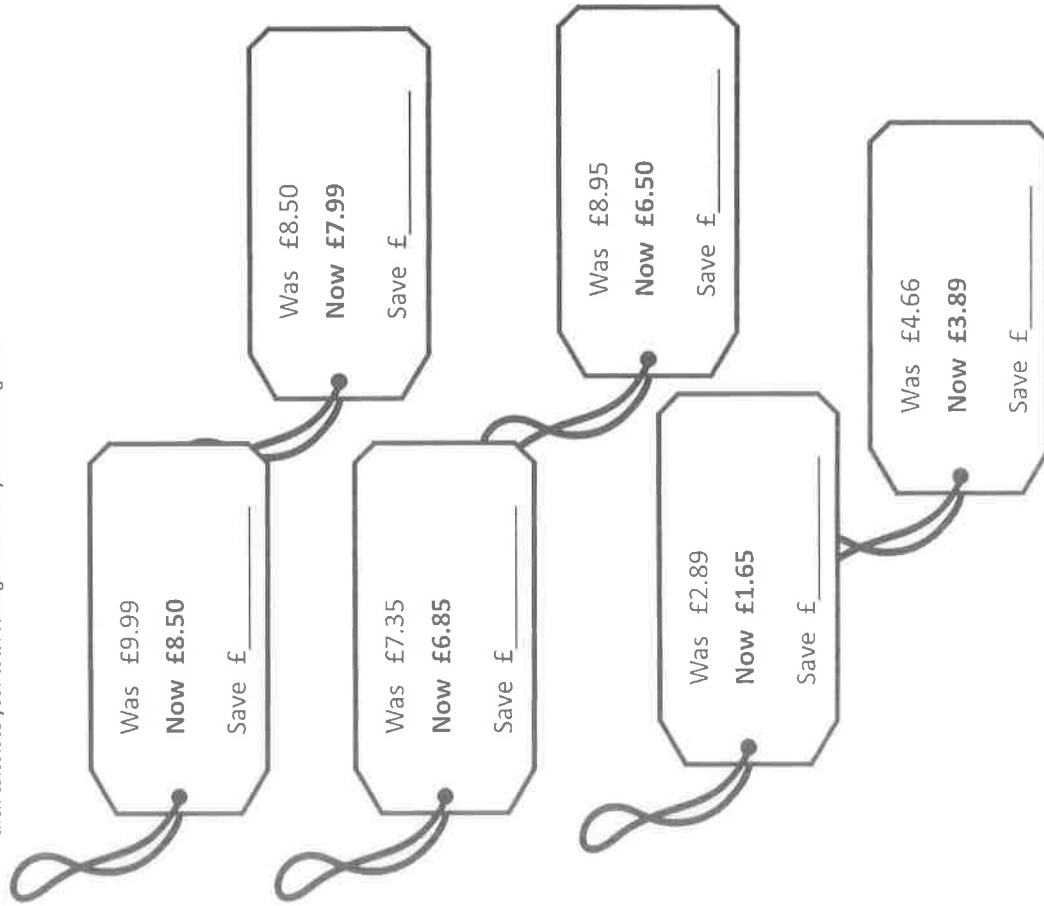
T	U	T
9	7	
-	3	2

e: _____

3 Bart finished his race in a time of 10.67 secs. Lisa finished in 11.24 secs. How much faster was Bart?

Written methods – adding and subtracting decimals

- 4 You bought the following. Find the difference between the discount price and regular price for each item, then calculate your total savings. Show all your working out:



Written methods – word problems

- 1 Solve the following word problems using addition or subtraction. Circle the process you use to calculate the answer:

a Joe scored 346 more points than Zac. Joe scored 589 points. How many points did Zac score?

+

–

Answer _____

c Maitland recorded 117 mm of rain. Balaklava recorded 58 mm more. How much rain did Balaklava record?

+

–

Answer _____

e Charlene had £132. After she paid for a ticket, she had £84. How much did the ticket cost?

+

–

Answer _____

g Jarred's bike cost £189. Molly's bike cost £263. What is the price difference between the two bikes?

+

–

Answer _____

i Write your own word problem and solve it.

+

–

Answer _____

b Jenny is 32 cm taller than Jaala. Jaala is 143 cm tall. How tall is Jenny?

+

–

Answer _____

d Wayne has £17. How much more money does he need to buy a t-shirt that costs £39?

+

–

Answer _____

f Sanjay spent £34 and had £92 left. How much did he have before the purchase?

+

–

Answer _____

h The rainfall in Two Wells was 73 mm. Gateshead recorded 36 mm less. How much rainfall did Gateshead record?

+

–

Answer _____

Mental multiplication strategies – doubling strategy

Doubling is a useful strategy to use when multiplying.

To multiply a number by four, double it twice.

$$15 \times 4 \text{ double once} = 30$$

$$\text{double twice} = 60$$

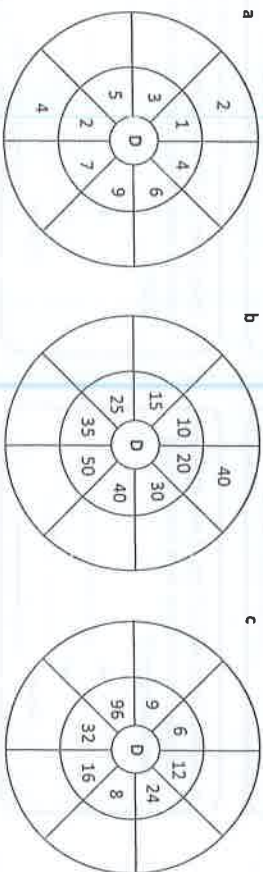
To multiply a number by eight, double it three times.

$$13 \times 8 \text{ double once} = 26$$

$$\text{double twice} = 52$$

$$\text{double three times} = 104$$

1 Warm up with some doubling practice:



2 Finish the doubling patterns:

a 4	8	16	64	96
b 3				
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:

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



To multiply by 4, double twice. To multiply by 8, double three times.

6 Use the doubling strategy to solve these:

	$\times 2$	$\times 4$	$\times 8$
a 12×8	24		96
b 14×8			112
c 25×8			84
d 21×8			
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 $18 \times 4 =$	b $16 \times 4 =$	c $26 \times 4 =$
d $24 \times 8 =$	e $15 \times 8 =$	f $22 \times 8 =$

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	Units
			4	5
		4	5	0
	4	5	0	0
4	5	0	0	0

$\times 10$
 $\times 100$
 $\times 1\,000$

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

T	Th	H	T	U
			1	7

$\times 10$
 $\times 100$
 $\times 1\,000$

T	Th	H	T	U
			4	3

$\times 10$
 $\times 100$
 $\times 1\,000$

T	Th	H	T	U
			8	5

$\times 10$
 $\times 100$
 $\times 1\,000$

T	Th	H	T	U
			9	9

$\times 10$
 $\times 100$
 $\times 1\,000$

2. Try these:

$14 \times 10 =$

$14 \times 100 =$

$14 \times 1\,000 =$

$92 \times 10 =$

$92 \times 1\,000 =$

$11 \times 1\,000 =$

$11 \times 100 =$

$11 \times 10 =$

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 : $4 \times 2 = 8$ $4 \times 20 = 80$
 We can express this as $4 \times 2 \times 10 = 80$ How would you work out 4×200 ?

4. Use patterns to help you solve these:

5×2

5×20

5×200

2×9

2×90

2×900

$6 \times £4$

$6 \times £40$

$6 \times £400$

8×3

8×30

8×300

$3 \times £7$

$3 \times £70$

$3 \times £700$

2×8

20×8

200×8

3×9

30×9

300×9

5. Answer these problems:

- Jock runs 50 km per week. How far does he run over 10 weeks?
- 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?
- The sum of two numbers is 28. When you multiply them together, the answer is 160. What are the numbers?

If you're struggling with your tables, get onto Live Mathletics and practise!



6. Finish these counting patterns:

10 20 30

20 40 80

30 60 150

40 80 200

50 100 150

100 200 400

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

$(40 \times 4) + (6 \times 4)$

$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

b 74×5

$(\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

c 48×4

$(\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

d 37×7

$(\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

e 62×8

$(\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

f 91×5

$(\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) + (\underline{\hspace{2cm}} \times \underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
 $= \underline{\hspace{2cm}}$

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

a $48 \times 8 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

b $52 \times 7 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

c $9 \times 43 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

d $8 \times 29 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

e $86 \times 7 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

THINK



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

a 37×6

$(30 \times 6) + (7 \times 6)$

$180 + 13$

$= 193$

b 17×5

$(10 \times 5) + (7 \times 5)$

$70 + 35$

$= 105$

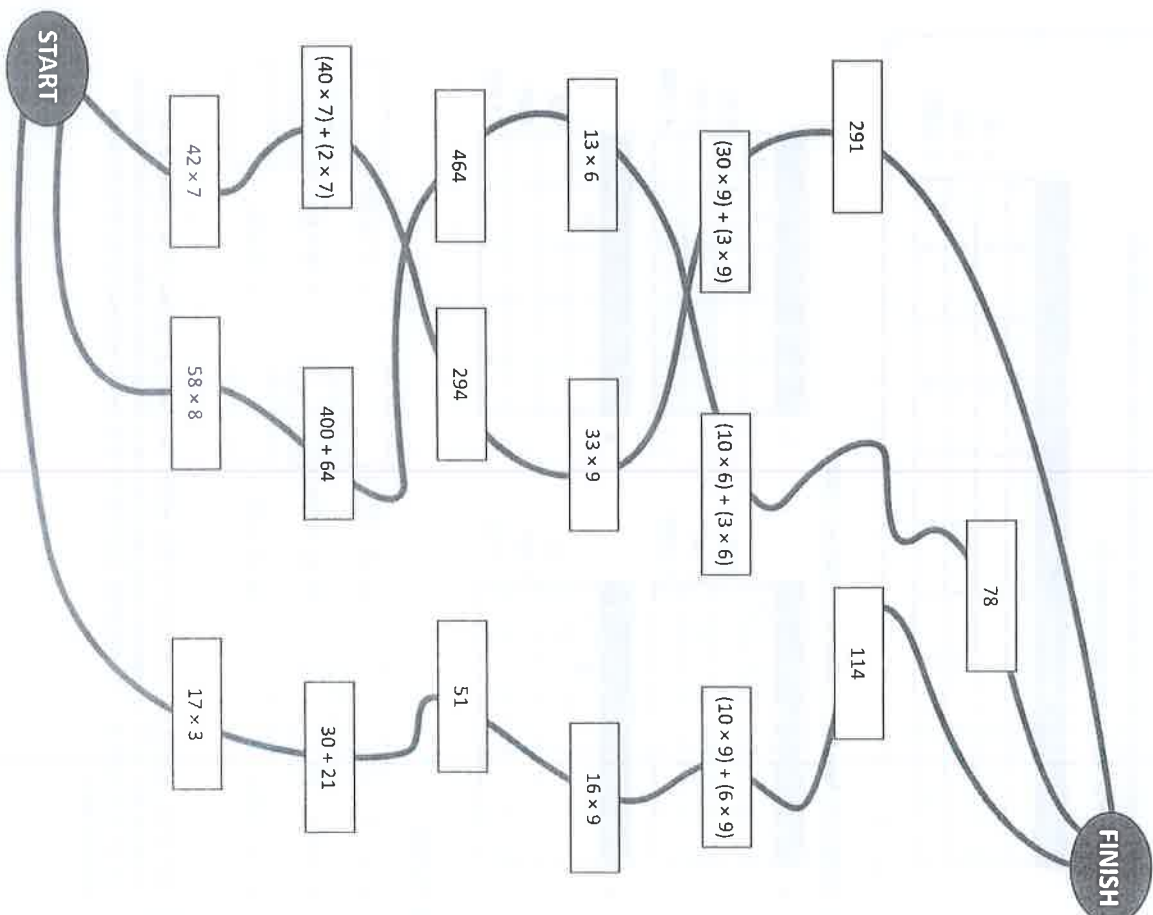
c 32×9

$(30 \times 9) + (2 \times 9)$

$27 + 18$

$= 45$

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 $4 \times 3 = 12$

$$4 \times 30 = 120$$

We have to take off 4 because we used one group of 4 too many: $120 - (1 \times 4) = 116$

$$4 \times 29 = 116$$

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

$$\begin{array}{r} 19 \times 3 = 20 \times 3 - 57 \\ 57 \end{array}$$

$$b \ 8 \times 29 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$c \ 18 \times 6 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

d $7 \times 39 =$ _____ $\times$ _____ = _____

$$e^{28 \times 5} = \frac{\quad}{\quad} \times \frac{\quad}{\quad} = \frac{\quad}{\quad}$$

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 $6 \times 6 = 36$

$$6 \times 60 = 360$$

We have to then add 2 more lots of 6: $360 + 12 = 372$

$$6 \times 62 = 372$$

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

$$41 \times 3 = 40 \times 3 + 3 = 123$$

$$b \ 81 \times 4 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} + \underline{\hspace{2cm}} =$$

$$c \quad 22 \times 9 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

$$d \ 32 \times 9 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$e \ 7 \times 62 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} + \underline{\hspace{2cm}} =$$

Would I use the compensation strategy with numbers such as 56 or 84? Why or why not?



THINK

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	Units	Multiplier	Answer
	1		
	9		
	2		
	1		
	8		
	1		
	9		
	8		
	2		
	1		

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

$$\text{factor} \times \text{factor} = \text{whole number}$$

How many factors does the number 12 have? $4 \times 3 = 12$, $6 \times 2 = 12$, $1 \times 12 = 12$
4, 3, 6, 2, 1 and 12 are all factors of 12.

- 1 List the factors of these numbers:**

[illegible][illegible]

- 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 sweets evenly.

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

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

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

_____ or _____ people can share 5 balls evenly.

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



A factor divides into a number evenly with no remainder.

THINK

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 ...

$$3 \times \text{factor} = \text{multiple}$$

- 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.

- 51

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	$3 \times 4 = 12$	$12 \times 2 = 24$	$24 \times 2 = 48$
b	$\square \times \square = \square$	$\square \times \square = \square$	$\square \times \square = \square$
c	$\square \times \square = \square$	$\square \times \square = \square$	$\square \times \square = \square$
d	$\square \times \square = \square$	$\square \times \square = \square$	$\square \times \square = \square$

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.

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

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

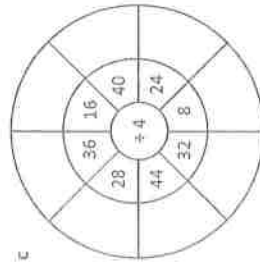
- a $56 \div 7 =$ $8 \times 7 = 56$ $56 \div 7 =$ $\square$
- b $121 \div 11 =$ $\square \times 11 = 121$ $121 \div 11 =$ $\square$
- c $72 \div 8 =$ $\square \times 8 = 72$ $72 \div 8 =$ $\square$
- d $49 \div 7 =$ $\square \times 7 = 49$ $49 \div 7 =$ $\square$
- e $36 \div 9 =$ $\square \times 9 = 36$ $36 \div 9 =$ $\square$
- f $64 \div 8 =$ $\square \times 8 = 64$ $64 \div 8 =$ $\square$
- g $108 \div 12 =$ $\square \times 12 = 108$ $108 \div 12 =$ $\square$

2 Now try these:

- a $81 \div 9 =$ $\square$ b $40 \div 5 =$ $\square$
- c $21 \div 3 =$ $\square$ d $54 \div 6 =$ $\square$
- e $42 \div 7 =$ $\square$ f $63 \div 9 =$ $\square$
- g $36 \div 4 =$ $\square$ h $45 \div 9 =$ $\square$
- i $39 \div 3 =$ $\square$ j $24 \div 6 =$ $\square$



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



Mental division strategies – use multiplication facts

Knowing our families of facts is also helpful.

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

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

- a $7 \times 8 = 56$ $8 \times 9 = 72$ $7 \times 9 = 63$
- $8 \times 7 = \square$ $9 \times 8 = \square$ $9 \times 7 = \square$
- $56 \div \square = 8$ $72 \div \square = 9$ $63 \div \square = 9$
- $\square \div 8 = 7$ $\square \div 9 = 8$ $\square \div 9 = 7$

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

- a $6 \times 7 = 42$ b $5 \times 9 = 45$ c $9 \times 6 = 54$
- d $17 \times 8 = 136$ e $12 \times 8 = 96$ f $11 \times 21 = 231$

6 Look at these two division facts: $20 \div 5 = 4$ and $20 \div 4 = 5$

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	Units	
4	5	0	0	0	$\div 10$
	4	5	0	0	$\div 100$
		4	5	0	$\div 1 000$
			4	5	

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

a

T	Th	H	T	U
4	5	0	0	0

$\div 10$

$\div 100$

$\div 1 000$

b

T	Th	H	T	U
4	3	0	0	0

$\div 10$

$\div 100$

$\div 1 000$

c

T	Th	H	T	U
8	5	0	0	0

$\div 10$

$\div 100$

$\div 1 000$

d

T	Th	H	T	U
8	8	0	0	0

$\div 10$

$\div 100$

$\div 1 000$

2 Draw lines to match the answers with the questions:

a What number is one thousand times smaller than 32 000? 9 500

b What number is one hundred times smaller than 32 000? 88

c What number is one hundred times smaller than 95 000? 950

d What number is ten times smaller than 95 000? 880

e What number is one hundred times smaller than 8 800? 320

f What number is ten times smaller than 8 800? 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.

$$126 \div 14$$

$$(half\ 126) \div (half\ 14)$$

$$63 \div 7 = 9$$

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

a

32	16	
56		
36	halve	
84		
96		

b

24		
48		
72	halve	
144		
192		

c

50		
500		
1 000	halve	
250		
100		

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

a $112 \div 14$ $\frac{56}{\div 7} = 8$

b $144 \div 16$ $\frac{\quad}{\div \quad} = \quad$

c $96 \div 12$ $\frac{\quad}{\div \quad} = \quad$

d $220 \div 4$ $\frac{\quad}{\div \quad} = \quad$

e $162 \div 18$ $\frac{\quad}{\div \quad} = \quad$

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

a $90 \div 18$ $\rightarrow$ $60 \div 6$ $= 5$

b $64 \div 16$ $\rightarrow$ $24 \div 8$ $= \quad$

c $120 \div 12$ $\rightarrow$ $35 \div 7$ $= \quad$

d $70 \div 14$ $\rightarrow$ $45 \div 9$ $= \quad$

e $144 \div 24$ $\rightarrow$ $72 \div 12$ $= \quad$

f $48 \div 16$ $\rightarrow$ $32 \div 8$ $= \quad$

Mental division strategies – halving strategy

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

$$144 \div 36 \rightarrow 72 \div 18 \rightarrow 36 \div 9 = 4$$

- 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	$216 \div 36 =$	$\div$	$=$	$\div$	$=$
b	$196 \div 28 =$	$\div$	$=$	$\div$	$=$
c	$224 \div 32 =$	$\div$	$=$	$\div$	$=$
d	$168 \div 24 =$	$\div$	$=$	$\div$	$=$
e	$144 \div 36 =$	$\div$	$=$	$\div$	$=$
f	$288 \div 72 =$	$\div$	$=$	$\div$	$=$

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

48	10	16	40
20	32	25	64
128	60	96	30
125	256	192	120
	250	80	50
	100		

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

You have an after school job at the local sweet shop, making up the mixed sweet bags. Today, you have to evenly share 288 sweets among 48 bags. How many sweets 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 $144 \div 9$

$$144 \div 9$$

$$\begin{array}{r} 90 \\ 54 \\ \hline \end{array} \div 9 = 16$$

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.

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

a	$112 \div 8$	$85 \div 5$	c	$78 \div 6$
	$\begin{array}{r} 80 \\ 32 \\ \hline \end{array} \div 8$	$\begin{array}{r} 50 \\ \hline \end{array} \div 5$		$\begin{array}{r} 18 \\ \hline \end{array} \div 6$
	$+ \quad =$	$+ \quad =$		$10 + \quad =$
d	$64 \div 4$	$91 \div 7$	e	$144 \div 8$
	$\begin{array}{r} 24 \\ \hline \end{array} \div 4$	$\begin{array}{r} 21 \\ \hline \end{array} \div 7$		$\begin{array}{r} 80 \\ 64 \\ \hline \end{array} \div 8$
	$+ \quad =$	$+ \quad =$		$+ \quad =$

- 2 Now try these:

a	$90 \div 6$	$\begin{array}{r} 60 \\ 30 \\ \hline \end{array} \div 6$	$=$
b	$105 \div 7$	$\begin{array}{r} 70 \\ 35 \\ \hline \end{array} \div 7$	$=$
c	$72 \div 4$	$\begin{array}{r} 40 \\ 32 \\ \hline \end{array} \div 4$	$=$
d	$144 \div 8$	$\begin{array}{r} 80 \\ 64 \\ \hline \end{array} \div 8$	$=$

Hmmm ... $91 \div 7$.
The unit digit helps me here. What multiple of 7 ends in 1? I know, 21. So that makes the other number 70!



DISCOVER

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 $76 \div 4$, you could locate 36 and 40.



$96 \div 4$	45	90
$75 \div 5$	25	21
$87 \div 3$	60	50
$98 \div 7$	80	70
$135 \div 9$	55	36
$78 \div 6$	30	60
$112 \div 8$	60	60
$51 \div 3$	27	32
$95 \div 5$	24	40
$84 \div 6$	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? <i>Yes, because it ends in an even number.</i>
3	A number is divisible by 3 if the sum of its digits is divisible by 3.	Is 7 281 divisible by 3? $7 + 2 + 8 + 1 = 18$ <i>Yes, because 18 is divisible by 3.</i>
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 units 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 units place.	Is 5 680 divisible by 10?

Written methods – contracted 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

$$\begin{array}{r} 13 \\ 3 \end{array} \begin{array}{r} 18 \\ 7 \end{array}$$

$$\times \begin{array}{r} 2 \\ 7 \end{array}$$

$$\begin{array}{r} 774 \end{array}$$

Harry

$$\begin{array}{r} 13 \\ 3 \end{array} \begin{array}{r} 18 \\ 7 \end{array}$$

$$\times \begin{array}{r} 2 \\ 7 \end{array}$$

$$\begin{array}{r} 774 \end{array}$$

$$\begin{array}{r} 119 \\ 7 \end{array}$$

$$\times \begin{array}{r} 773 \end{array}$$

$$\begin{array}{r} 1619 \\ 7 \end{array}$$

$$\times \begin{array}{r} 833 \end{array}$$

$$\begin{array}{r} 203 \\ 3 \end{array}$$

$$\times \begin{array}{r} 609 \end{array}$$

$$\begin{array}{r} 203 \\ 3 \end{array}$$

$$\times \begin{array}{r} 69 \end{array}$$

$$\begin{array}{r} 436 \\ 3 \end{array}$$

$$\times \begin{array}{r} 1208 \end{array}$$

$$\begin{array}{r} 436 \\ 3 \end{array}$$

$$\times \begin{array}{r} 1308 \end{array}$$

$$\begin{array}{r} 401 \\ 7 \end{array}$$

$$\times \begin{array}{r} 2807 \end{array}$$

$$\begin{array}{r} 401 \\ 7 \end{array}$$

$$\times \begin{array}{r} 287 \end{array}$$

Written methods – extended multiplication

	H	T	U
$\times$	2	3	4
	1	2	3
	9	0	0
	6	0	0
	7	0	2

Extended multiplication is another way of solving problems. In extended multiplication we multiply the units, 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	U
a a unit by a unit $\rightarrow 9 \times 7$						
b a ten by a unit $\rightarrow 43 \times 5$						
c a hundred by a unit $\rightarrow 126 \times 7$						
d a ten by a ten $\rightarrow 13 \times 72$						
e a ten by a hundred $\rightarrow 55 \times 120$						

2×2 would give me a unit only. But 8×6 would give me tens and units. I'll tick both columns.

- 2 Complete using extended multiplication. Estimate first:

e:

$$\begin{array}{r} 245 \\ \times 2 \end{array}$$

(2 × 5)
(2 × 40)
(2 × 200)

e:

$$\begin{array}{r} 452 \\ \times 7 \end{array}$$

(7 × 2)
(7 × 50)
(7 × 400)

e:

$$\begin{array}{r} 327 \\ \times 8 \end{array}$$

(8 × 7)
(8 × 20)
(8 × 300)

e:

$$\begin{array}{r} 279 \\ \times 2 \end{array}$$

(2 × 9)
(2 × 70)
(2 × 200)

e:

$$\begin{array}{r} 412 \\ \times 9 \end{array}$$

(9 × 2)
(9 × 10)
(9 × 400)

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 £68. How much did they spend altogether?

e:

- b Jack has a paper round and earns £4 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 Mathematics 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 playtime. 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	$\begin{array}{r} 245 \\ \times 32 \\ \hline \end{array}$	(2×5) (2×40) (2×200)	(3×9) (3×20) (3×300)
b	$\begin{array}{r} 329 \\ \times 45 \\ \hline \end{array}$	(2×5) (2×30) (2×200)	(40×9) (40×20) (40×300)
c	$\begin{array}{r} 238 \\ \times 52 \\ \hline \end{array}$	(50×8) (50×30) (50×200)	

Written methods – short division

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

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 units place.

$$936 \div 3 = 312$$

1 Divide these numbers:

a
$$\begin{array}{r} 4 \overline{) 84} \\ \hline \end{array}$$

b
$$\begin{array}{r} 5 \overline{) 55} \\ \hline \end{array}$$

c
$$\begin{array}{r} 3 \overline{) 93} \\ \hline \end{array}$$

d
$$\begin{array}{r} 9 \overline{) 990} \\ \hline \end{array}$$

e
$$\begin{array}{r} 4 \overline{) 484} \\ \hline \end{array}$$

f
$$\begin{array}{r} 6 \overline{) 666} \\ \hline \end{array}$$

g
$$\begin{array}{r} 3 \overline{) 999} \\ \hline \end{array}$$

h
$$\begin{array}{r} 2 \overline{) 462} \\ \hline \end{array}$$

i
$$\begin{array}{r} 3 \overline{) 693} \\ \hline \end{array}$$

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

$$\begin{array}{r} 3 \overline{) 936} \\ \hline \end{array}$$

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 units place.

$$936 \div 3 = 312$$

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
$$\begin{array}{r} 5 \overline{) 515} \\ \hline \end{array}$$

b
$$\begin{array}{r} 3 \overline{) 669} \\ \hline \end{array}$$

c
$$\begin{array}{r} 9 \overline{) 927} \\ \hline \end{array}$$

d
$$\begin{array}{r} 4 \overline{) 804} \\ \hline \end{array}$$

e
$$\begin{array}{r} 4 \overline{) 812} \\ \hline \end{array}$$

Written methods – short 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 $r\ 2$.

$527 \div 5 = 105\ r\ 2$.

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:

$$\begin{array}{r} 105 \\ 5 \overline{) 527} \\ \underline{5} \\ 27 \\ \underline{25} \\ 2 \end{array}$$

Written methods – short division with remainders

- 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.

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

a $\begin{array}{r} r \\ 9 \overline{) 75} \end{array}$ b $\begin{array}{r} r \\ 4 \overline{) 47} \end{array}$ c $\begin{array}{r} r \\ 6 \overline{) 38} \end{array}$

d $\begin{array}{r} r \\ 5 \overline{) 63} \end{array}$ e $\begin{array}{r} r \\ 4 \overline{) 49} \end{array}$ f $\begin{array}{r} r \\ 6 \overline{) 62} \end{array}$

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

a $\begin{array}{r} r \\ 5 \overline{) 557} \end{array}$ b $\begin{array}{r} r \\ 3 \overline{) 661} \end{array}$ c $\begin{array}{r} r \\ 4 \overline{) 481} \end{array}$

d $\begin{array}{r} r \\ 9 \overline{) 994} \end{array}$ e $\begin{array}{r} r \\ 4 \overline{) 845} \end{array}$ f $\begin{array}{r} r \\ 6 \overline{) 638} \end{array}$

- 3 Solve these problems:

- a Giovanni's Nan 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? □

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

- 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.

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

- a Share 12 pounds among 4 people.

- b Share 27 pounds between 2 people.

a $\begin{array}{r} r \\ 4 \overline{) 12} \end{array}$

b $\begin{array}{r} r \\ 2 \overline{) 27} \end{array}$

REMEMBER

27 divided by 2 is 13. Now we have one pound left. How many pence is half of one pound?



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

		
£1.95	£5.43	£8.50

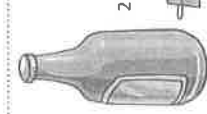
Best deal is _____

Best deal is _____

c

	
£22.90	£2.75

d

	
£1.40	£2.80

Best deal is _____

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		Extras	
1-day pass	£16	5-minute helicopter ride	£21
2-day pass	£24	10-minute helicopter ride	£35
Annual pass	£45	30-minute helicopter ride	£105
Individual rides	£6	Sunset cruise	£6
10-ride pass	£50	Lunch cruise	£11
Order online	£2 discount	Swim with the dolphins	£35

- 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



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

$A \times A = A$ A is ____
 $M \times M = M + M$ M is ____
 $T - M = A$ T is ____
 $T + T = H$ H is ____
 $H - M = L$ L is ____
 $3 \times L = U$ U is ____

Once I work out the first couple, the rest come easily!



DISCOVER



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

$A \times A = A + A$ A is ____
 $A + A = T$ T is ____
 $T \times 2 = N$ N is ____
 $A \div N = E$ E is ____
 $2 \times E = L$ L is ____
 $E + T = U$ U is ____

If two letters are together, we read them as a tens digit and a units digit.



Multiplication and Division

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F 4

TOPIC

29

Smart buttons

apply



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.



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

$$22 + 2 + 2 = 26 \div 2 = 13$$

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?



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 the number 15 within the time span.

Bugs

investigate



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.



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

Multiplication and Division

30

F 4

TOPIC

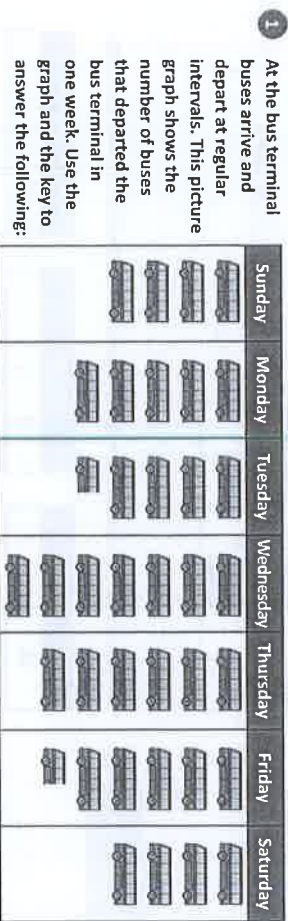
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Types of graphs 1 – picture graphs

Picture graphs are used to display large amounts of data. A symbol is chosen to represent a specific amount. Picture graphs have a title that tells us what data has been collected, category labels and a key to show the value of the symbol.

How many chocolate cupcakes were sold?
 $4 + 4 + 4 + 4 + 2 = 18$

Cupcakes Sold in a Day		Key:  = 4 cupcakes
Strawberry	   	
Chocolate	    	
Cherry	 	
Choc-chip	   	



- On which day did 55 buses depart?
- Which is the terminal's busiest day?
- How many buses depart on this day?
- How many buses leave on Tuesday?
- How many more buses depart on Friday than Saturday?

2 This graph shows the number of tickets bought at the local cinema.

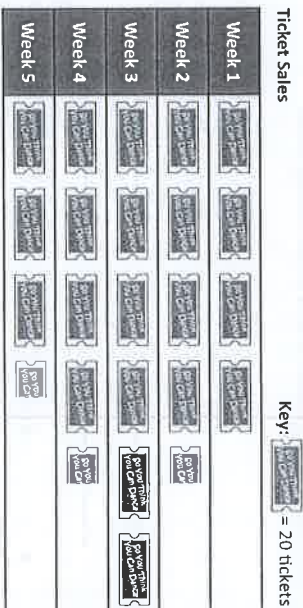
Movie Classification	Tickets Bought			
Comedy	    	    	    	    
Children	   	   	   	   
Horror	  	  	  	  
Action/Drama	  	  	  	  

Key:  = 100 tickets

- How many tickets were bought for Comedy and Children's movies?
- What was the total amount of tickets bought?

Types of graphs 1 – picture graphs

3 SF put on their own version of "So You Think You Can Dance". Use the graph and key to answer the following:



- How many tickets does each  represent?
- How many tickets were sold in Week 1?
- How many tickets were sold in Week 5?
- In which week were the most tickets sold?
- How many tickets were sold that week?
- During which two weeks were the same number of tickets sold?
- How many more tickets were sold in Week 3 than Week 1?
- How many tickets were sold during the entire sales period?

4 In a scandal that rocked the school, it was found that ticket sales data was exaggerated. The maximum attendees for any one week was actually 60.

- How many tickets does each symbol now represent?
- How many tickets were really sold during the entire sales period?

Types of graphs 1 – picture graphs

- 5 Pupils sold chocolates to raise money for charity. This picture graph shows their collection for the first week. Use this graph to answer the following:

Week 1 Chocolate Sale

Ethan	                
Claire	                
Pablo	                
Heba	                
Reece	                
Mia	                
Rania	                
Hassan	                

Key:  = 4 bars

- a Who sold 56 chocolate bars?

c Mia sold chocolate bars.

e How many bars were sold altogether?

b Who sold $\frac{1}{2}$ dozen bars?

d How many bars did Ethan sell?

f If each bar sold for £2, how much money did the group raise for charity?

6 Bars sold in Week 2 of the charity drive appear in the tally column of this table. Represent this information using symbols. The first pupil has been done for you:

Week 2 Chocolate Sale

Pupil	Tally	Picture Graph
Ethan	 	
Claire	 	
Pablo	 	
Heba	 	
Reece	 	
Mia	 	
Rania	 	
Hassan	 	

key: = 4 bars

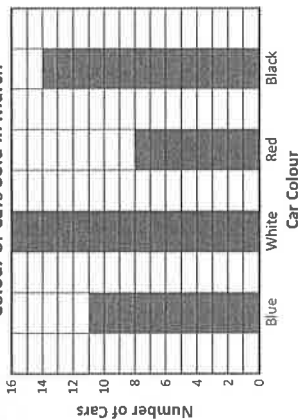
- During Week 2, how much money was raised altogether? Each chocolate bar is £2.
- A prize was given at the end of the 2 weeks to the pupil who raised the most money. Who won?

Types of graphs 1 – column graphs

We often use column graphs when we want to compare data. All column graphs have a title and each axis is labelled.

From this we can quickly see that 16 white cars were sold in March and that this was the most popular colour choice.

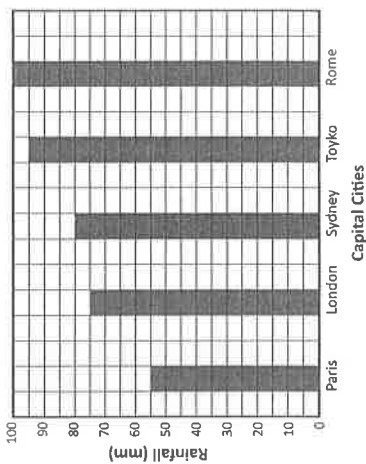
Colour of Cars Sold in March



Answer the questions about this column graph:

- Which city had the highest rainfall in October?
- What was this city's rainfall?
- Which cities had a rainfall between 70 mm and 90 mm?
- How many more millimetres of rain did Rome have than Paris?

Total Rainfall in October



- 2** Below are the November figures for the same cities. Add them to the graph (above). Think first how best to do this:

City	Distance (mm)
Paris	65 mm
London	40 mm
Sydney	95 mm
Tokyo	60 mm
Rome	30 mm

- Will you use the same colour columns?
- Will you need to change anything else on the graph?

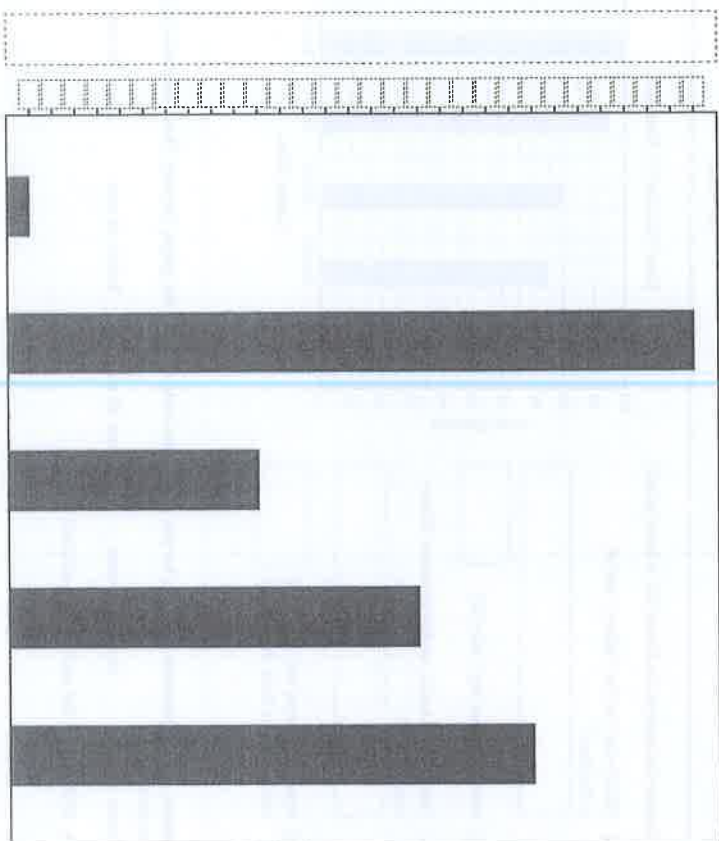
- 3** Write a problem using the new data for a partner to solve:

Types of graphs 1 – column graphs

- 4 The after school club kids are staging a mutiny. They are over watching the same DVDs and making popcorn every day and want to do something new and exciting on Wednesdays. This table shows the activities they'd prefer.
- a Help them present a case to the head teacher by completing the column graph:

Activity	Number of Pupils
No change	1
Swimming	30
Art	11
Football	18
Dancing	23

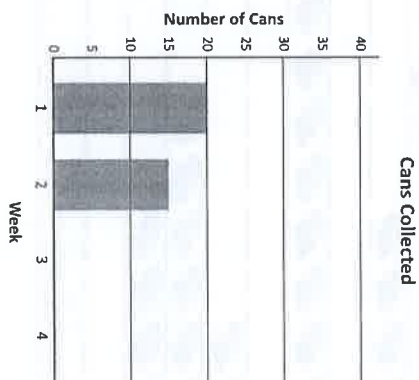
- ☐ Name your graph and both axes
- ☐ Label each column
- ☐ Select and label an appropriate scale



- b What are some key issues on the graph you'd point out? Work in a small team to come up with a solution. Pretend your teacher or another group is the head teacher and present your case.

Types of graphs 1 – column graphs

- 5 SD decide to run a recycling campaign and collect cans in and around the school. They recorded how many cans were collected each week and started constructing this column graph. In Week 3 they collected 40 cans and in Week 4 they collected 10 cans.



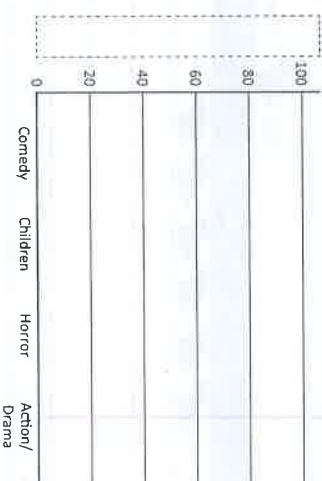
- a Add Week 3 and 4 data to the graph.
- b There was a soft drink special at the local store during one of the weeks. Which week do you think it was and why?
- c How many cans were collected in all?
- d If each can is worth 5p, how much money did SD make from the campaign?

- 6 The same information can be represented in different graphs.

- a Design a column graph to represent the data shown in this picture graph.

Type of Movie	Ticket Sales
Comedy	100
Children	80
Horror	60
Action/Drama	40

Key: = 20 tickets



- ☐ Name your graph
- ☐ Label both axes
- ☐ Select and label an appropriate scale
- ☐ Label each column



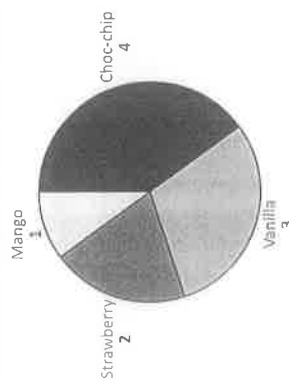
- b If you ran a cinema and wanted to plan your weekly movie schedule, which graph would you prefer? Which type of graph makes it easier to analyse and compare data?

Types of graphs 2 – pie charts

A pie chart shows data as parts of a whole. The circle represents the total amount while the segments are the parts. When we compare the parts to the whole, we're looking at proportion. This is often written as a fraction.

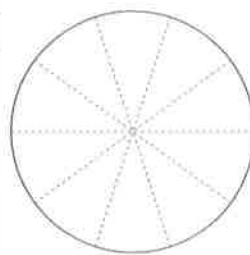
This pie chart shows the favourite ice cream flavours of 10 people.

Favourite ice cream flavours of 10 people



1. Colour and label this pie chart according to the information in the table:

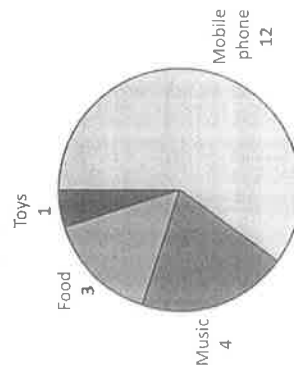
Favourite colours of 10 people



2. A group of pupils was surveyed to find out what they spend their pocket money on. This pie chart shows the results. Circle True or False next to each statement.

- a. More than half the pupils surveyed spent their money on a mobile phone.
True / False
- b. $\frac{4}{20}$ surveyed spent their money on food.
True / False
- c. 20 pupils were surveyed in total.
True / False

What do pupils spend their pocket money on?

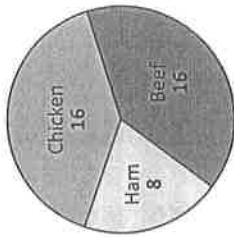


Types of graphs 2 – pie charts

3. 5F and 5H were planning a pizza party and conducted a survey of favourite toppings. This pie chart shows the results.



Pizza Topping Survey



- a. Complete the summary table if there are 40 pupils altogether.

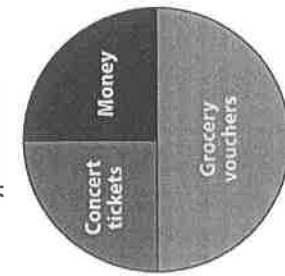
Category	Amount	Fraction
Chicken		
Ham		
Beef		
Total	40	$\frac{40}{40}$

- b. Their teacher said they could order 10 pizzas. How many of each flavour should they get?

Chicken Ham Beef

4. To boost ratings, Radio Non-Stop-Hits ran a promotion where they gave away prizes every hour. This pie chart shows the distribution of 60 prizes that they gave away.

Types of Prizes



- a. How many of each prize were given out?

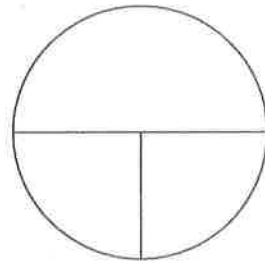
Concert tickets Grocery vouchers Money

- b. The radio station's accountant realised the pie chart was correctly divided but there'd been a miscalculation in the number of prizes given out. There'd actually been 25 money prizes given away. Calculate the actual amounts:

Concert tickets Grocery vouchers Money

5. The total amount that this graph is representing is 40. What could this be about? Give this pie chart a title and describe it by completing the table below:

Category	Amount	Fraction
Total		



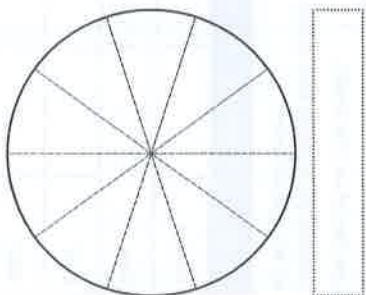
Types of graphs 2 – pie charts

6 Create your own pie chart.

- Ask 10 pupils to choose which of these gaming consoles they like best.
- Use the table below to collect your data.
- Show the results on a clearly labelled pie chart.

Gaming Console	Tally	Amount
Wii		
Xbox 360		
Playstation 3		
Nintendo Game Cube		

d What fraction of the group surveyed chose Wii?

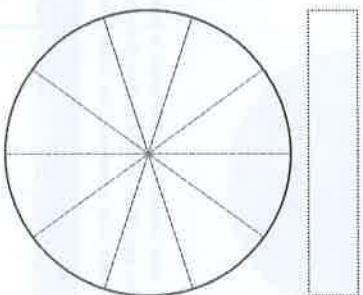


7 Survey 10 children on the topic of favourites. You can ask about favourite foods, TV shows, music or whatever you like.

- Write the topic at the top of the first column.
- Write 4 options to choose from underneath.
- Record your results in the frequency table below.
- Transfer the data from the frequency table to the pie chart.
- Label all sections correctly.

	Tally	Amount

f Write a statement about what your pie chart shows:



Types of graphs 2 – divided bar graphs

A divided bar graph is used to show how a total is divided. It's similar to a pie chart except it's a rectangle divided into parts that represent the information. This divided bar graph shows the favourite food of 10 children.



1 The Nicholls' family grocery budget is £200 per week. This table shows how the money is spent:

Fruit	Vegetables	Meat	Snacks	Drinks
£20	£40	£50	£40	£40

a Show the information in this table as a divided bar graph. Each space represents £20.



b What was $\frac{3}{10}$ of the budget spent on?

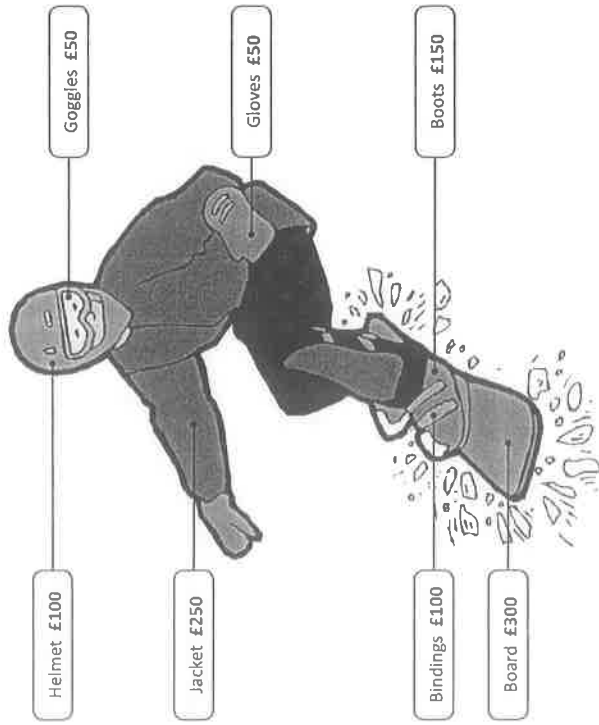
2 This divided bar graph shows how Paula spent £360 on her party. Answer the questions below about how much she spent on each category. You may use a calculator.

Entertainment	Food and drink	Decorations

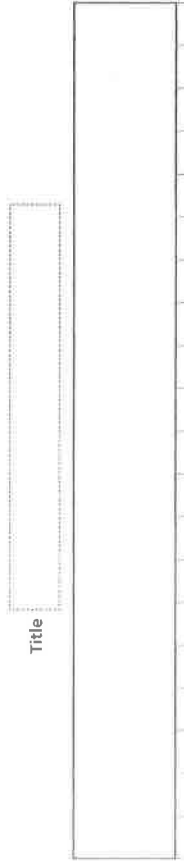
- What is each segment worth?
- $\frac{1}{3}$ was spent on decorations. How much is this?
- $\frac{2}{9}$ was spent on food and drink. How much is this?
- How much was spent on entertainment? Show your workings below:

Types of graphs 2 – divided bar graphs

- 3 You want to try snowboarding and you need to ask your parents for £1 000 to buy all the gear. Understandably, they want to know how their hard earned cash will be spent.



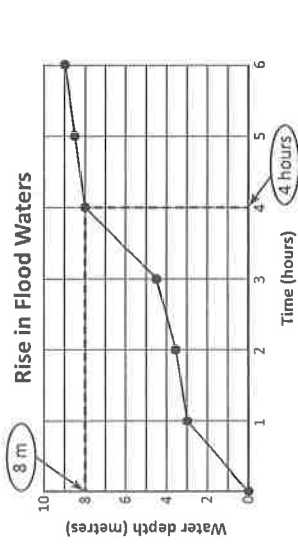
Complete a divided bar graph to show them. Colour in each category a different colour, label it clearly and include a title.



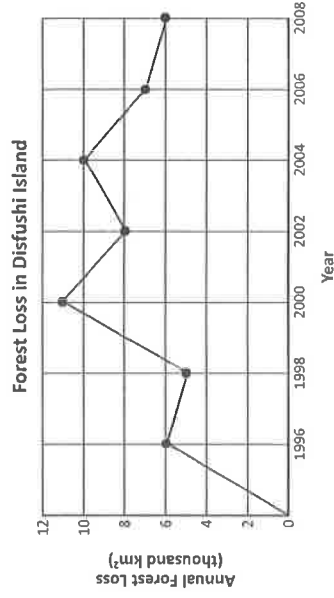
Types of graphs 3 – reading line graphs

Line graphs show how something changes over time in relation to something else. In this topic, we'll look at different examples of line graphs. Look at the line graph below. See how the more time passed, the higher the water got?

In which hour was the water 8 metres deep? Look below for how we read this information:



- 1 Look carefully at this line graph and answer the questions:



- How many square kilometres of forest was lost in 1996?
- How many square kilometres of forest was lost in 2000?
- In which year were 7 000 square kilometres of forest lost?
- How much more forest was lost in 2000 than in 2008?
- Use the graph to estimate the forest loss in 1999.
- Use the graph to estimate the forest loss in 2003.

Types of graphs 3 – reading line graphs

- 2 Polly and her friend Molly were practising reading a thermometer for homework. They boiled water in a kettle and then took turns measuring the temperature every minute as it cooled down. To make this more interesting, they made it a guessing game.

Look at the graph and answer the questions to see how they went:

- a Polly guessed that after 1 minute the temperature would be 46 °C. Was she right?

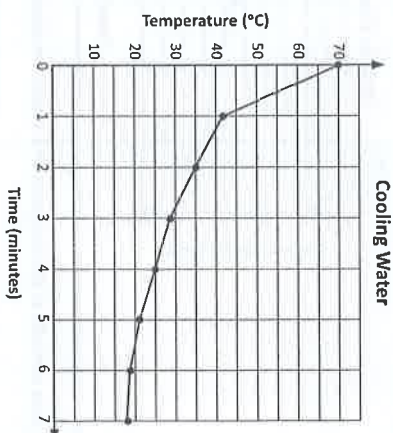
- b Molly guessed that after 2 minutes the temperature would be 34 °C. Was she right?

Look closely at the graph they made showing the temperature of the water in the kettle.

- c What is the value of each small division on the temperature axis?

- d By how much did the water cool down between 2 minutes and 4 minutes?

- e How long did the water take to cool to 19 °C?



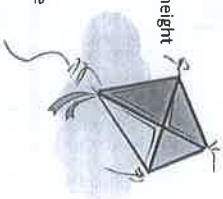
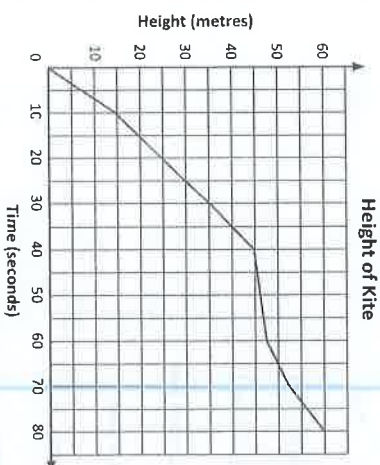
- 3 This graph shows a kite's height at different times. Answer the questions below:

- a What was the kite's height at 65 seconds?

- b How long did the kite take to rise from 25 metres to 40 metres?

- c Estimate the height of the kite at 1 minute.

- d If the kite continued to rise, how high do you think it would be after 90 seconds?



Types of graphs 3 – constructing line graphs

Let's see how to build a line graph from a data table. This data shows the rate of filling a fish tank with water.

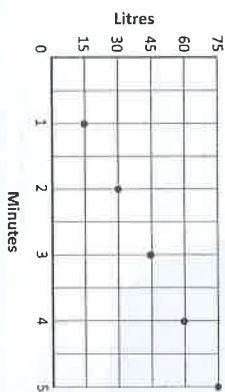
Minutes	1	2	3	4	5
Litres	15	30	45	60	75



Step 1

Carefully plot the data from the table.

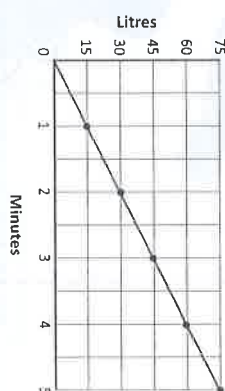
Rate of Filling a Fish Tank



Step 2

Join the points with straight lines.

Rate of Filling a Fish Tank

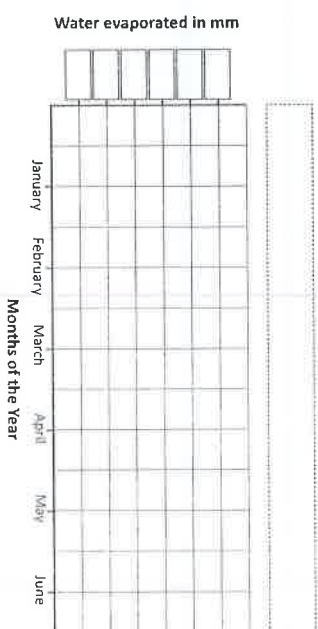


- 1 The average rate that water evaporates from an indoor swimming pool is 6 mm a month.

- a Complete this table to show how much water will evaporate over 6 months:

Millimetres	6					
Month	January	February	March	April	May	June

- b Label the vertical axis with an appropriate scale, then plot the points and join the points with a ruler. What else do you need to add to make this graph complete?



- c Write 2 questions about this graph and write the answers.

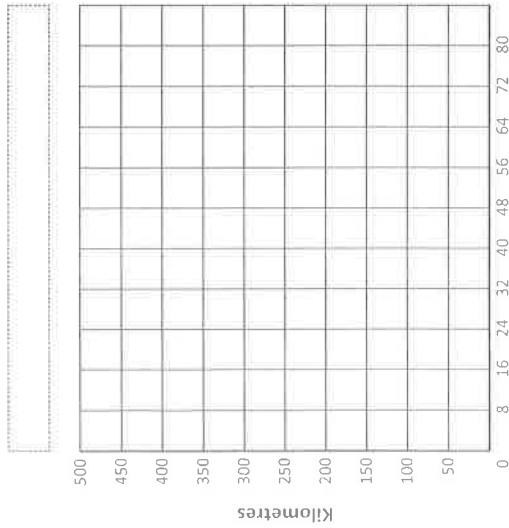
Types of graphs 3 – constructing line graphs

2. A car uses 8 litres of petrol for every 50 km travelled.

a Complete this table to show how much petrol is needed for a journey:

Litres	8	16	24	32	40	48	56	64	72	80
Kilometres	50									

b Complete this line graph:



c How far can the car go on 32 litres of petrol?

d How many litres of petrol are needed to travel 450 km?

e How far would a car travel on 12 litres of petrol?

f How far would you have travelled if you used 96 litres of petrol?

g If this car's fuel tank had a capacity of 40 litres, how many times would you need to fill it if you wanted to travel 500 km?

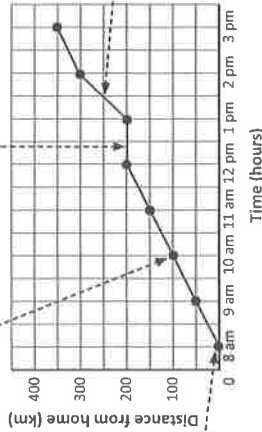
Types of graphs 3 – travel graphs

A travel graph is a type of line graph that shows the distance travelled and the time taken to travel that distance. We can tell a lot about a journey just by the shape of a line.

Between 8 am and 12 pm, it travels 200 km. This is 50 km per hour.

Here we see the car stops for one hour. We know this because it stays at 200 km from home between 12 pm and 1 pm. This tells us it's not moving.

Journey of a Car



Between 1 pm and 2 pm, the car travels at 100 km per hour.

This car leaves home at 8 am for a holiday.

1 This travel graph shows the journey of the Henderson family on a driving holiday.

a What time did they leave home?

b How long was their first rest stop?

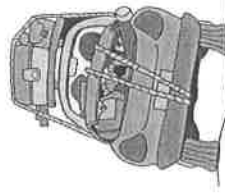
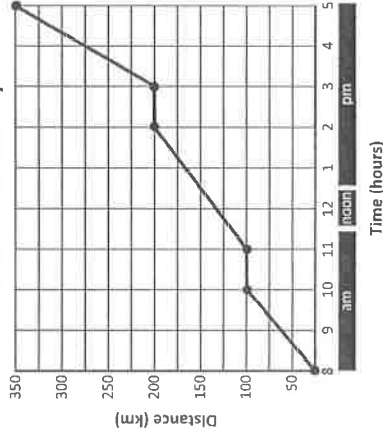
c How far had they travelled by 10 am?

d At what speed were they travelling between 3 pm and 5 pm?

e What could they have been doing at 2.30 pm?

f How long was the journey, excluding rest stops?

The Henderson Holiday



Collecting and analysing data – frequency tables

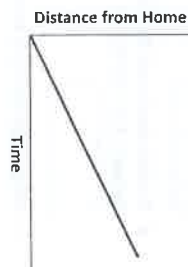
Raw data is often collected in a frequency table. Tally marks are a quick way to record numbers

- 1 Charlie sold drinks at the beach for an hour each day. He wrote down the drinks he sold each day:
- | | | | | | | |
|-----------|-------|----------|-------|-------|----------|----------|
| Monday | Coke | Lemonade | Water | Juice | | |
| Tuesday | Juice | Juice | Coke | Coke | | |
| Wednesday | Water | Juice | Juice | Coke | Lemonade | |
| Thursday | Water | Water | Water | Coke | Coke | Lemonade |



Sunday	Lemonade	Coke	Juice	Water	Coke

We travelled at the same speed, not stopping until we got there.



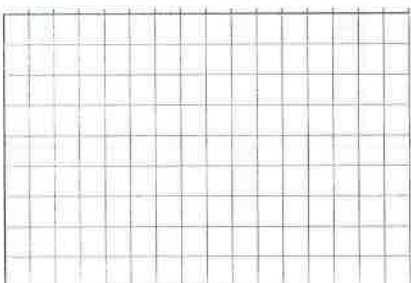
Raw data is often collected in a frequency table. Tally marks are a quick way to record numbers. When we're finished, we add the marks to find totals:

Car Types in Car Park	Tally	Frequency
4WD		20
Sedan		17
Station wagon		20
Hatchback		14

1 Charlie sold drinks at the beach for an hour each day. He wrote down the drinks he sold each day:

b Represent your data in a column graph:

Type of Drink	Tally	Frequency
Coke		13
Juice		
Water		
Lemonade		



- ☐ Name your graph and both axes
- ☐ Label each column
- ☐ Select and label an appropriate scale

Collecting and analysing data – mean

When we say we're finding the 'average', we're finding the mean. To do so, we add all the scores then divide by the number of scores:

$$\text{For example, the mean of 2, 3, 4, 5, 6} = \frac{2 + 3 + 4 + 5 + 6}{5} = 4$$

So if the numbers above represented eggs found by 5 children in an Easter egg hunt, it'd be fairest if each child received 4. Of course, in egg hunts, it's usually every person for themselves!

- 1 Find the mean in each set of data by adding the scores and then dividing by the number of scores:

a 13, 4, 7, 11, 5

$$= \frac{13 + 4 + 7 + 11 + 5}{5}$$

$$= 40 \div 5$$

$$=$$

b 9, 13, 5

c 3, 5, 9, 2, 6

- 2 Look at the following diving scores:

Marita 7.2	Ben 9.4	Ari 4.6	Mia 7.6
------------	---------	---------	---------

a Calculate the mean.

b Who was closest to the mean?



- 3 The table below shows the number of goals scored over a 5 week period by 3 football teams:

	6/3	13/3	20/3	27/3	3/4	Total	Mean
Fantastic Footballers	2	0	2	8		16	
Serious Socceros	3	2	4	1			3
Dangerous Dribblers	0	0	0	0	15		3

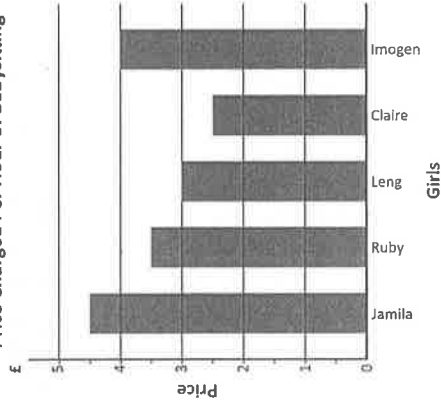


- a Complete the table by filling in the missing information.
- b Which team has scored the most goals?
- c Which team has the highest mean?
- d You're thinking of joining either the Serious Socceros or the Dangerous Dribblers. They both have a mean of 3 goals per game. Which team do you think would be more competitive and why?

Collecting and analysing data – mean

- 4 Emma has just moved into a new neighbourhood and wants to start babysitting. She asks the girls at school what they charge and records this information in a graph:

Price Charged Per Hour of Babysitting



- a If Emma wants to undercut all the others, what would you recommend she charge per hour?

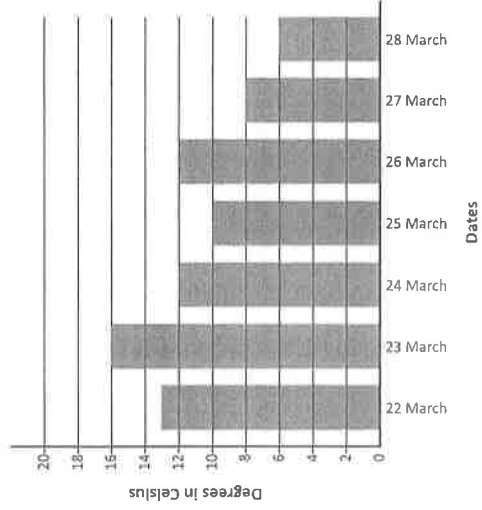
- b If Emma wants to position herself as an exclusive (expensive) babysitter, what would you recommend she charge per hour?

- c Emma decides to charge the mean price per hour. What does she charge?

- d Ruby decides to add a booking fee of 50p per hour. She reckons if online booking agencies can get away with it, so can she. How does this change the mean price charged by the group?

- 5 Here is a graph showing the temperature in London:

Temperature in London Over One Week in March



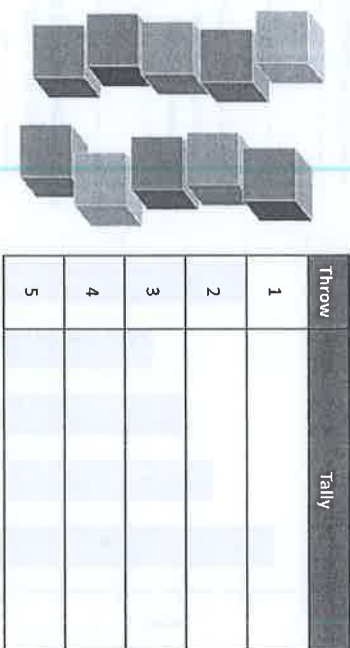
- a Calculate the mean temperature for the week:

- b If you were travelling to London for the week, what clothes would you pack?

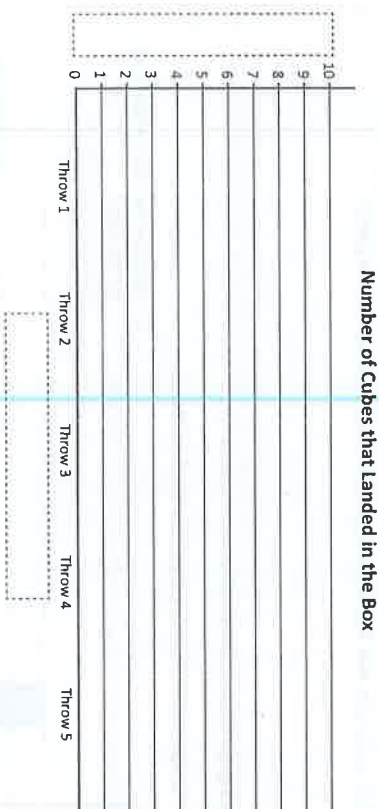
Collecting and analysing data – mean

- 6 You and a partner are going to record how many cubes land in a box. You will need 10 unifix cubes and an empty lunchbox.

- Place the lunchbox 1 metre in front of you.
- Sit on the floor.
- Take turns throwing all 10 cubes at the same time.
- Each record your results in the data table on the right.
- Repeat the process 5 times.



- 7 Create a column graph of your results. Label each axis.



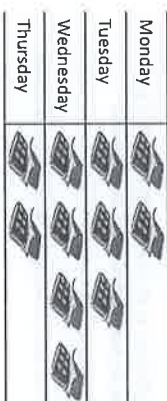
- What is your mean number of cubes that landed in the box?
- What was your partner's mean number of cubes that landed in the box?
- What was the mean of both sets of data together?
- Do you think the mean paints an accurate picture of the process?

Collecting and analysing data – collecting data

- 1 Study all the different types of graphs showing sales of chocolate bars. Match each graph to its main feature by completing the table below:

Picture Graph

Sales of Chocolate Bars



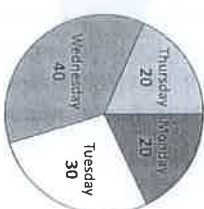
Divided Bar Graph

Sales of Chocolate Bars



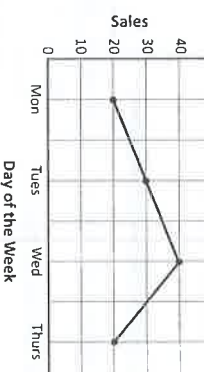
Pie Chart

Sales of Chocolate Bars



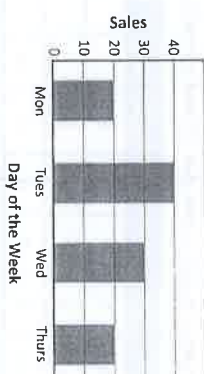
Line Graph

Sales of Chocolate Bars



Column Graph

Sales of Chocolate Bars



Main Feature

Clear to see how big each category is compared to the whole. Sometimes has a key and looks like a pie.

Name of Graph

Shows an exact amount in each category and allows you to compare categories.

Compares sizes of categories at a glance and takes up very little space.

Shows numerical data using pictures. Has a key.

Shows how data changes in relation to something – usually time.

Whodunnit?

solve



Many crimes are solved by analysing paperwork. Detectives spend countless hours sifting through data. It can be one tiny fact that breaks a case open.

 What to do

Read this next part very carefully. A bank was robbed during the month of May. Since it was the bank with all your savings, you have a vested interest in tracking down the offender.

An informant has told you that the crime was committed on the thief's birthday. They treated themselves to a shopping spree with your money! Apparently they crept in during a busy weekday and quietly cracked a safe.

The next three pages contain data about criminals in your area. Use the information to identify the thief and get your money back. You'll need to flick between graphs and clues to crack the case.

CLUE 1

		MAY						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
3		4	5	6	7	8	9	
10		11	12	13	14	15	16	
17		18	19	20	21	22	23	
24	25	26	27	28	29	30		
	31							

CLUE 2

Birthdays of Local Criminals

[illegible]

More clues on page 25.

24

Data Representation

24

23

Data Representation

24

23



Data Representation

solve

Birthdates by Gender

Males	Females
04.01.75	11.02.85
23.02.86	14.02.78
17.02.66	03.03.80
02.04.73	13.05.84
04.04.75	07.07.77
24.04.67	17.10.78
10.05.81	31.10.87
23.05.82	
18.07.81	
09.08.67	
18.08.63	
26.09.66	
13.10.72	
24.12.65	

Gender Breakdown of Local Criminals

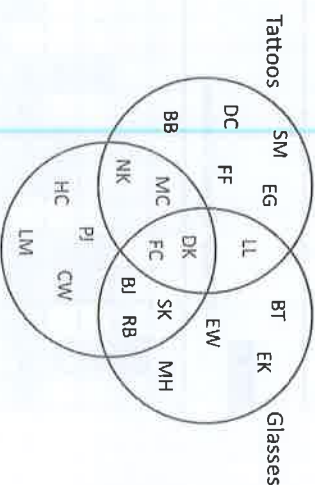


Known Crims

Sam McNab	Earl Wyatt
Master Criminal	Frammie Finger
Bobette Trimbole	Emma Getaway
Ned Kelly	Shifty Keys
Dan Kelly	Betty Baladava
Ellen Kelly	Ron Biggs
Pretty-boy Jones	Buster Jones
Harry Cracker	Luke Moran
Maria Hari	Dan Cuffme
Light-fingered Larry	Carla Williams
Fred Capone	

You should know who the criminal is by now! Use the following data to find out more about them.

Distinguishing Features



Facial Hair

More clues on page 26.

solve

Hair Colour

[illegible]

Height of Known Criminals

[illegible]

Whodunnit? Give a name and a detailed description to the police superintendent:

What to do next

Create a WANTED poster for the guilty party.



You work for the chocolate company Cocoa Delights. In less than an hour, you're presenting the annual report to the Board. They're keen to know yearly sales figures, best selling lines, the breakdown of monthly expenses and how each product sells compared to the others.

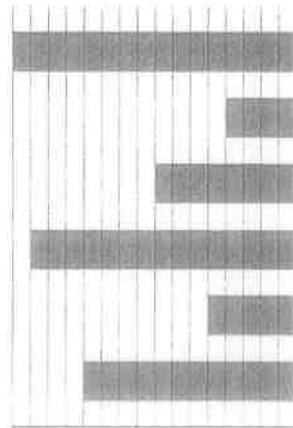
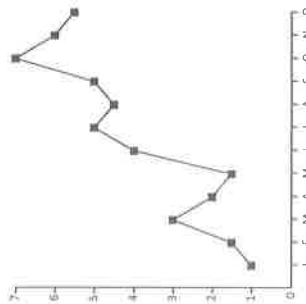
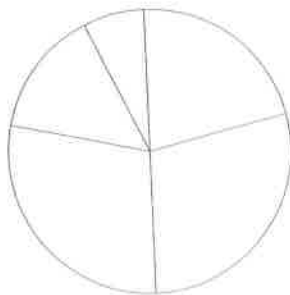


Your team has slaved to prepare the following data. However, someone didn't bother to add titles and labels to the graphs.

You don't have time to hunt for the culprit. You have to fix this yourself. Fast!

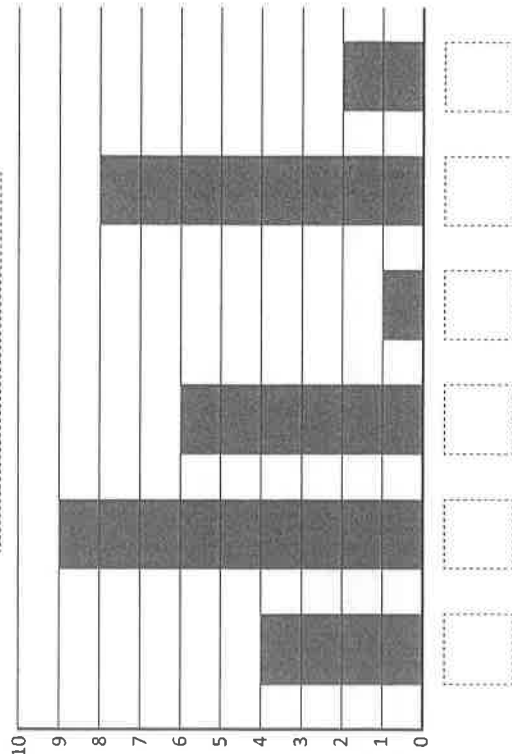


Look at the graphs below and come up with some believable information that would give each graph meaning and keep the Board happy. Think about which graph would best suit each set of data. They'll need titles, labels and numbers.



Follow the clues to correctly label each column with the appropriate symbol:

5N's Preferred Holiday Activities



Four times as many kids would rather go to the beach than go to an art gallery.



A holiday at Wet 'n' Wild is the most preferred option.



There are 3 times as many shoppers than there are art gallery attendees.



Five fewer people like camping than Wet 'n' Wild.



Half the number of people who like camping prefer to visit art galleries.



Poor Mr N will be hill walking alone it seems. He'll probably get over it.



Measuring time – time relationships

Connect these time facts:

1 minute	24 hours	1 year	10 years
1 hour	365 days	1 fortnight	100 years
1 day	60 seconds	1 decade	12 months
1 year	60 minutes	1 century	14 days

1 How many minutes are there in the following hours?

- a 2 hours = minutes b $\frac{1}{4}$ hour = minutes
- c $\frac{1}{2}$ hour = minutes d $\frac{3}{4}$ hour = minutes
- e 4 hours = minutes f 6 hours = minutes

2 How many seconds are there in the following times? You may use a calculator.

- a 2 minutes = seconds b 5 minutes = seconds
- c 1 hour = seconds d $\frac{1}{2}$ hour = seconds
- e $\frac{1}{2}$ minute = seconds f $\frac{1}{4}$ hour = seconds

I need to remember to change hours to minutes first. Then I can convert to seconds.



3 Use the information in the top box to work out these time facts:

- a 1 decade = months b 1 century = years
- c 2 fortnights = days d $\frac{1}{2}$ century = years
- e 1 week = hours f 2 years = days

4 What time unit would you use to measure each of the following?

- Time to hard boil an egg _____
- One millennium _____
- One leap year _____
- Length of a football match _____



Measuring time – reading analogue clocks

1 Draw a line from each clock to its matching time in words:



A quarter to 8

Half past 2



25 minutes to 5

25 minutes past 3



2 Draw the hands on these clocks:



a 20 past 6



b A quarter to 7



c 16 minutes past 4



d 25 to 9

3 Using 'to' and 'past', write the time displayed on each clock:



a _____



c _____



b _____



d _____

Measuring time – am and pm notation

We use am and pm with digital time.

am → The part of the day between 12 midnight and 12 noon.

pm → The part of the day between 12 noon and 12 midnight.

1 Express these times in digital form using am or pm:



morning

a :



afternoon

b :



evening

c :



morning

d :



morning

e :



evening

f :



afternoon

g :



morning

h :

2 Draw hands on these analogue clocks to match the digital times:



a 8:40 am



b 5:15 pm



c 10:30 am



d 12:20 pm

3 Put these times in order from earliest to latest. Express the times in digital form:



am

A quarter past 5

In the evening



pm

11:10 am

1 :

2 :

3 :

4 :

Measuring time – 24 hour time



Time can be measured using 12 hour time, using am/pm, or 24 hour time.

3:00 pm = 1500

REMEMBER

1 Complete the table with the correct analogue, digital and 24 hour times.

0835	1:00 pm	9:30 pm	1815
2:22 pm	1:18 am	2000	2104

2 Convert these 24 hour times to digital times:

a 0400 = 4:00 am

b 1500 =

c 1330 =

d 1605 =

e 0920 =

f 0825 =

3 Convert these digital times into 24 hour time:

a 9 am =

b 10 pm =

c 7:30 am =

d 2:15 pm =

e 5:35 am =

f 7:25 pm =

4 It is 1700 and your favourite TV show is due to start in half an hour. Show the starting time in digital form:

Measuring time – time relationship challenges

1 How long does it take to make a loaf of bread?

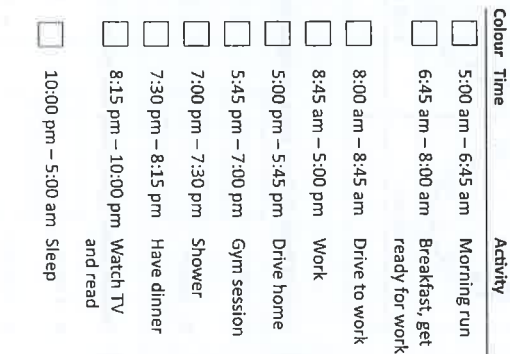
- 1** How long does it take to make a loaf of bread?
Read this recipe carefully and work out how long it will take to make the bread

Program	Start	Finish	Length
Science Show	0900	1000	1 hour
Behind the News			
Movie: Solaris			
4 pm News			
Smartline			
Movie: Chinatown			

[illegible]

- complete this cross number puzzle. You may use a calculator.

1. years in half a century
2. minutes in $\frac{1}{4}$ of an hour



-
-
-

1. years in half a century
2. minutes in $\frac{1}{4}$ of an hour
3. minutes in 1 hour + 20 minutes
4. hours in 1 day
5. days in April
7. hours in 2 days plus 1 hour
8. hours in half a day
9. minutes in $1\frac{1}{4}$ hours
10. minutes in $\frac{2}{3}$ of an hour
11. hours in 4 days and 2 hours
12. your age minus 4

5

Thirty days
have September,
November, June and
February,
everybody knows
that. Right? Right.
But the rest have
in leap years
Thirteen days
when February's
days are twenty-nine.

Camping trip

solve



Last weekend, Akhil and three of his friends went on a camping trip. Each person brought different snacks. Each person had different travel times. Each person had a preferred nickname.



Read the clues in order to determine each person's nickname, the amount of time that it took each to arrive, and the snacks each person brought.

- The four nicknames are: Bug, Hank, Tops and Haz (the four friends' names are written in the table).
- The four snacks are: chocolate, lollies, soft drink and chips.
- The four travel times are: 15 minutes, 10 minutes, 20 minutes and 5 minutes.

Clues

- Houman brought the lollies and had the longest drive. His drive was 20 minutes.
- Akhil, whose nickname is Bug, did not bring soft drink or chocolate.
- Sean arrived before the person who brought the lollies and after the one who brought the chocolate.
- Dan only needed to drive for five minutes. His was the shortest drive.
- The order of arrival is: the one who brought chocolate, the one whose nickname is Tops, Akhil, and the person whose nickname is Haz.

Name	Nickname	Time	Snack
Akhil			
Houman			
Sean			
Dan			

Time

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7

24 hour time dominoes

apply



This is a game for 2 players. You will need a copy of this page, a pencil and some paper.



Cut out the cards below and choose one player to be the caller. The other 2 players must write down six digital pm times but only o'clock and half past times. The caller must shuffle the cards well and read out the 24 hour times.

The first player to cross out all 6 times is the winner.

Swap roles and play again until everyone has had a turn at being the caller.

1500	1700	1300	1400
1430	2030	2100	1330
2000	1730	1830	2230
1900	2130	1630	1930
1600	2200	2330	2300

8

Time

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Calculating time – elapsed time

Elapsed time is the difference between 2 different times.
To work out the difference between 2 times, first you count the hours, then you count the minutes.

1:55 to 6:10



1:55 to 5:55 = 4 hours

5:55 to 6:10 = 15 minutes

The total elapsed time is 4 hours and 15 minutes.

1 How much time is there between:

a Three in the afternoon and eleven that evening?

b 6 am and 1 pm?

c One in the morning and ten in the same morning?

d Seven in the morning until 12:30 pm?

2 Work out the time elapsed.

a Linh arrived at a party at:



She left at:



She was at the party for:

hours minutes

b The bus left at:



It arrived at:



The bus trip took:

hours minutes

c The movie started at:



It finished at:



The movie went for:

hours minutes



THINK

Calculating time – elapsed time

3 Work out the elapsed time.

Start 9:15 am	Finish 	Start 7:30 am	Finish
Elapsed time: 		Elapsed time 	
Start 4:00 pm	Finish 	Start 2:00 am	Finish
Elapsed time 		Elapsed time 	

4 Work out the finish time.

Start 	Finish 	Start 	Finish
Elapsed time: 3 hours 10 minutes		Elapsed time: 2 hours 25 minutes	
Start 	Finish 	Start 	Finish
Elapsed time: 6 hours 15 minutes		Elapsed time: 4 hours 30 minutes	

5 Being able to count forward in intervals is an important skill.

Finish each time trail:

a Count on in 15 minutes	9:30		10:00		10:15				
b Count on in 10 minutes	7:42		7:52		8:22				
c Count on in 15 minutes	6:47		7:32		8:02				
d Count on in 10 minutes	2:53								

Calculating time – elapsed time

A time line can help us with more difficult elapsed time problems.

Question: A party started at 12:48 pm and went for 1 hour and 30 minutes. What time did it finish?

Steps:

1. First count on in hours in your head and write that answer in the first box on the time line.
2. Use the time line to count on in minutes.

Each small marker represents 2 minutes.
Each large marker represents 10 minutes.



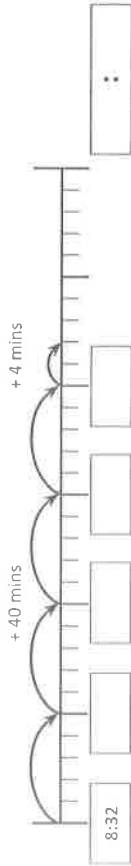
Answer: 2:18 pm



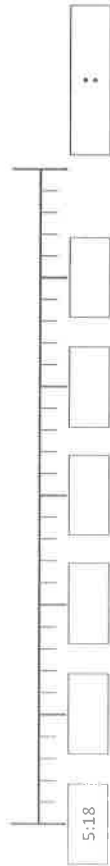
REMEMBER

6 Use the time line for each elapsed time problem:

- a Abdul played the clarinet from 7:32 pm for 1 hour and 44 minutes. What time did he finish?



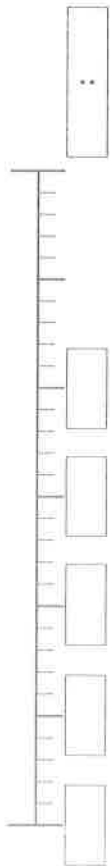
- b Ali took 3 hours and 52 minutes to wash 12 cars. If she started at 2:18 pm, what time did she finish?



- c Sarah drove to her friend Nick's house. She left her house at 4:36 pm and the drive took 2 hours and 18 minutes. What time did she arrive?



- d In order to buy and prepare all the food for the birthday party, Max worked solidly from 2:18 pm for 3 hours and 46 minutes. What time did he stop?



Calculating time – using a stopwatch



The time on this stopwatch is read as:
52 minutes, 38 seconds and 42 hundredths of a second

- 1 For these questions you will need a stopwatch.
Estimate and measure how long it takes to do the following activities down to hundredths of a second.
Write the time as accurately as possible.

Activity	Estimate	Time
Run 200 metres		
Recite the 6 times table		
Eat an apple		
Count to 150		
Write the alphabet 3 times		
Walk to the school office		
Write your name neatly 5 times		

- 2 What do these times mean on a stopwatch?

Stopwatch display	Minutes	Seconds	Hundredths of a second
3:51:22			
2:45:79			
1:58:87			
5:45:78			

- 3 Order these times from fastest to slowest:

1:38:42	1:36:65	1:56:89	1:56:99

Calculating time – elapsed time

A time line can help us with more difficult elapsed time problems.

Question: A party started at 12:48 pm and went for 1 hour and 30 minutes. What time did it finish?

Steps:

1. First count on in hours in your head and write that answer in the first box on the time line.
2. Use the time line to count on in minutes.

Each small marker represents 2 minutes.
Each large marker represents 10 minutes.



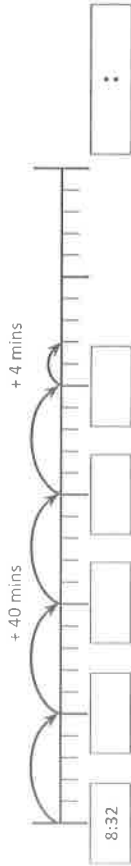
Answer: 2:18 pm



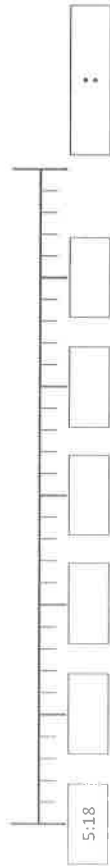
REMEMBER

6 Use the time line for each elapsed time problem:

- a Abdul played the clarinet from 7:32 pm for 1 hour and 44 minutes. What time did he finish?



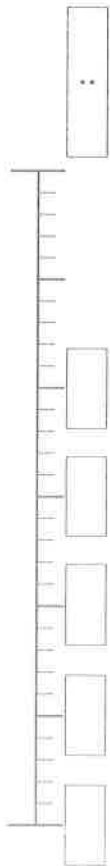
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Lucky numbers

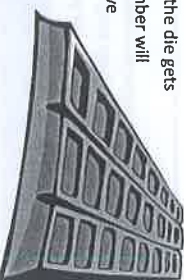
apply



For this game you will need: a group of 6 players, a die, a stopwatch, a block of chocolate, a knife and fork, a pair of rubber gloves and a hat. You will also need a copy of this sheet per group.



The aim of this game is to find out which roll of the die gets to the chocolate the fastest. Your first lucky number will be 1, then 2, and so on until all the numbers have been played.



Players sit in a circle. Put the chocolate, gloves, knife and fork and a hat in the centre of the circle. One player stands outside the group timing how long it takes to roll each number on the die with a stopwatch. Start anywhere in the circle, pass the die around until a player rolls the lucky number on the die. The player who rolls the lucky number puts on the hat and gloves and cuts off one piece of chocolate at a time to eat.

Meanwhile, the die is still passed around with players trying to roll the lucky number.

When the next person rolls the lucky number, the person who was in the centre cutting into the chocolate becomes the timer and the timer joins the circle.

After you have played with all 6 numbers (1–6), order the numbers in the table according to how quickly they came up.

This first row in this table shows how you need to record the times.

Number on die	Minutes	Seconds	Hundredths of a second	Ranking fastest to slowest
1	1	34	38	
2				
3				
4				
5				
6				



Compare your table with other groups. Did anyone have a similar ranking of "lucky" numbers?

Mayhem at Max Madness!!

solve



"It's mayhem!" moaned Sergeant Nixon as he fought his way backstage through the angry crowds. 100,000 fans had travelled from far and wide to see their idol Max Madness in concert, and they were growing increasingly restless as time ticked on with no Max in sight.

Little did the fans know that Max Madness might not appear at all — his golden electric maximum voltage guitar had been stolen and Max was storming around his dressing room, cursing and muttering, and refusing to go on stage until it was safely back in his possession.



"I've had it with me all day," he spat. "The only time it was out of my sight was when I was getting a massage between 5:00 and 6:00 pm!"

"We'll get it back, Sir," stated Sergeant Nixon firmly. "No one will get away with that on my watch. This show will go on."

He rounded up 3 likely suspects, all avid fans, who had been found lurking around backstage. All 3 were obsessed with Max. All 3 had caught the train to the stadium. And of course, all 3 swore black and blue that they were innocent.

Tina Sparkles, Max's self-appointed number 1 (and just a bit crazy) fan, protested, "Well it couldn't have been me! I was getting a spray tan and my nails done at 3 pm. That took 2 hours. It takes time to look good, you know. And Max and I might marry tonight so I must look my best ..."

Rod Raver, a wanna be rock star, stated desperately, "I was with my mates rehearsing. We started at 3:55 and jammed for 2½ hours. Once Max hears how good I am, he'll want me in his band."

Paparazzi Pete, who stalked Max regularly, claimed, "Nah, not me, mate. I was on Paris Hilton watch today. I spotted her at 4:15 and kept watch for an hour until it was time to come here."



One of these suspects arrived at the stadium in time to nick the guitar. Use the train timetable to see whose alibi just doesn't hold up.

Train Timetable	
Departs City	Arrives Rock and Roll Stadium
3:10 pm	3:40 pm
4:00 pm	4:30 pm
4:40 pm	5:10 pm
5:10 pm	5:40 pm
5:40 pm	6:10 pm
6:00 pm	6:30 pm

Answer: _____ Have you and Sergeant Nixon saved the day?

Timetables – reading timetables

Timetables are often used to schedule public transport and can be set up using either digital or 24 hour time.

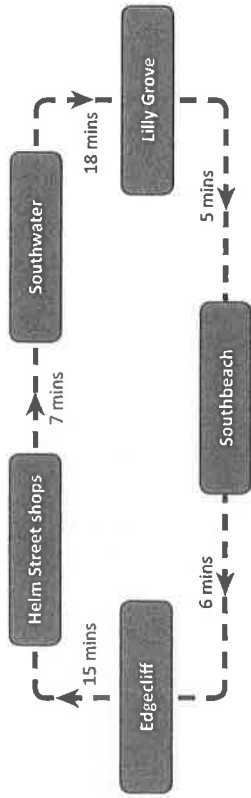
Burwood to Wynyard											
Burwood	1720	1727	1750	1917	2026	2132	2239	2343			
Croydon	---	---	1800	1927	2036	---	2249	---			
Ashfield	1735	1742	1805	1932	2041	2146	2254	2358			
Summer Hill	---	---	1812	1939	2048	2153	2301	---			
Lewisham	1748	1755	1818	1945	2054	2158	2307	0011			
Petersham	1753	1800	1823	1948	2057	2101	2310	0009			
Stanmore	---	---	1829	1954	2103	2007	2316	---			
Newtown	---	---	1836	2000	2110	---	2323	---			
Redfern	1811	1818	1841	2005	2114	2017	2327	0024			
Central	---	1821	1844	2008	2118	2020	2330	0027			
Town Hall	---	---	1848	2012	2122	2024	2334	0031			
Wynyard	1823	1830	1853	2017	2126	2028	2338	0036			

1 Use the timetable to answer the questions below:

- a What time does the 7:17 pm train from Burwood arrive at Petersham?
- b What time does the quarter to eight train from Lewisham arrive at Town Hall?
- c Can I catch the 5:35 pm from Ashfield if I want to get off at Stanmore?
- d Which stations does the last train from Burwood miss?
- e At what time does the 8:36 pm Croydon train leave Newtown?
- f Omar arrives at Redfern station at ten to six in the evening.
How long does he have to wait for the next train?

Timetables – reading timetables

2 This diagram shows the route of a shuttle bus and the length of time between stops.



- a If you leave Edgcliff at 7:55 am, what time can you expect to be at Lilly Grove?
- b What time did you get on the bus at Southbeach if it is 5:00 pm when you get off at Helm Street shops?

3 The timetable below is from a fitness club.

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8:30 am	Boxing	Yoga	Cardio	Cardio	Squash	Pilates	Pilates
9:30 am	Pilates	Squash	Yoga	Weights	Cardio	Squash	Weights
10:30 am	Cardio	Pilates	Pilates	Squash	Pilates	Cardio	Squash
4:30 pm	Yoga	Boxing	Squash	Pilates	Boxing	Weights	Cardio
5:30 pm	Squash	Squash	Weights	Boxing	Weights	Yoga	Yoga

Fill in the blank in each person's statement:

- a Paula says to her friend:
"I can meet you on Monday but we have to finish by _____ as it takes me 30 minutes to drive to my yoga class."
- b Linh says to her friend:
"I can meet you at _____ after my squash game on Sunday. My game takes 45 minutes and then the drive will take me 10 minutes maximum."
- c Michael says to his friend:
"I'll meet you for dinner after my boxing training that goes for 1½ hours on Thursday night. It will take me 10 minutes to shower and 20 minutes to drive there so I will meet you at _____."

Timetables – working out travel time

Quite often when we use public transport we need to be able to work out how we are going to use more than one mode of transport. We do this by working backwards. Look at this question based on the timetables below:

We can see that **Carlsford** is the connecting point between the train and the bus.
To get to **Fisherman's Wharf** by 1:30 pm, he needs to catch the 12:20 pm bus from **Carlsford**.
To catch the 12:20 pm bus at **Carlsford**, he needs to catch the 12:05 pm train from **Trinian Street** and change to the bus platform.

Ben is at **Trinian Street** and wants to meet his friend at **Fisherman's Wharf** at 1:30.

Train	Bus
Catch the 12:05 pm from Trinian Street . Change at Carlsford and wait 2 minutes.	Catch the 12:20 pm from Carlsford . Arrive at Fisherman's Wharf 1:12 pm.

Train				
Knights Cove	10:16 am	11:16 am	12:16 pm	1:16 pm
Fig Tree Park	10:21 am	11:21 am	12:21 pm	1:21 pm
Trinian Street	11:05 am	12:05 pm	1:05 pm	2:05 pm
Carlsford	11:15 am	12:18 pm	1:16 pm	2:17 pm

Bus				
Carlsford	11:20 am	12:20 pm	1:20 pm	2:20 pm
Nettville	11:50 am	12:50 pm	1:50 pm	2:50 pm
Fisherman's Wharf	12:12 pm	1:12 pm	2:12 pm	3:12 pm
Slamton	12:32 pm	2:32 pm	3:32 pm	4:32 pm

- 1 Give each person the travel details they need to arrive at their destination on time. Remember to work backwards and to find the connecting point.

- a Akhil is at **Trinian Street** and wants to go shopping at **Nettville**. He would like to get there at 3 pm.

Train	Bus

- b Masuka is at **Knights Cove** and needs to get to **Fisherman's Wharf** for his 12:30 pm shift at the fish and chips shop.

Train	Bus

- c Mish is at **Fig Tree Park** and wants to meet her friend at **Slamton** at 3:40 pm.

Train	Bus

What's on the box?

solve



Five friends like five different TV shows: a cartoon, a crime show, a reality show, football and a sitcom. They all screen on different channels (BBC 2, Channel 5, Sky 1, BBC 1 and Channel 4) and on different nights of the week. Your job is to match the friend with their favourite show.



Read the clues below and use the information to eliminate possibilities. Show your choices on the grid below. You may want to use the grid on the following page to help you arrange your thoughts.

1. Luke's favourite show airs on the weekend. He doesn't watch crime shows and thinks sitcoms are a waste of time.
2. The sitcom screens on Tuesday evening on Channel 4.
3. The cartoon is on BBC 1.
4. Hung's show is on the highest numbered BBC channel on the first day of the school week. He can't stand reality TV.
5. No one's favourite show is on Sunday or Friday.
6. Macey hates sports. Her favourite show is Hung's least favourite show and screens 2 days after Jamie's.
7. The crime show airs on BBC 2.
8. Britt's favourite show screens on Wednesdays on BBC 1.
9. Jamie's show screens on Channel 4, one day before Britt's favourite show.
10. The football screens on Saturday on Channel 5.

Name	Show	Night	Channel
Luke			
Macey			
Jamie			
Hung			
Britt			

What's on the box?

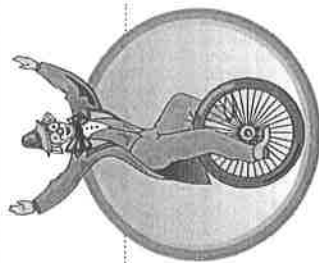
solve

Puzzle grid

	Luke	Macey	Jamie	Hung	Britt
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					
Sport					
Reality					
Crime					
Cartoon					
Sitcom					
BBC 2					
Channel 5					
Sky 1					
BBC 1					
Channel 4					



You have been given the task of writing the school holiday program for the Circus School Royale.



Use trial and error to work out which activities fit within the 8 session times exactly to create a daily program. Start by looking at how much time there is between breaks, then decide on the best way to order the activities.

The time between breaks must equal the combined time of the activities you choose.

Allow 5 minutes after breaks for everyone to get to the next session.

Start times for the sessions after breaks are written in.

The order of activities may vary.

Activity	Duration
Clown school	1 hour
Acrobatics	1 $\frac{1}{2}$ hours
Flying trapeze	40 minutes
Balloon animals	45 minutes
Fire juggling	35 minutes
Unicycling	55 minutes
Magic tricks	50 minutes
Face painting	25 minutes

Session	Time	Activity
1	9:00	
2		
3	11:30–12:10	Break
4	12:15	
	1:30–2:30	Lunch
5	2:35	
6		
7		
8	4:35–5:00	Break
	5:05	
	6:00	Home



