Addition mental strategies – number complements

Two numbers that add together are called complements.

12 and 8 are complements to 20 because 12 + 8 = 20

35 and 65 are complements to 100 because 35 + 65 = 100

1 **Loop the complements in each set:**

a Complements to 20. There are three to find. The first one has been done for you.

7	4	14
10	1	6
10	12	8

b Complements to 50. There are eight to find:

26	12	30	20
24	38	15	35
17	45	5	40
33	18	32	10

2 **Complete these complement webs. Start with the centre number and subtract. Write your answers in the ovals:**

a

40
24   30
−10
−26   −20
45 — −5 — **50** — −25 — 25
−35   −15
−30
15   35
20

b

50
40   70
−50
−60   −30
85 — −15 — **100** — −90 — 10
−25   −75
−20
75   25
80
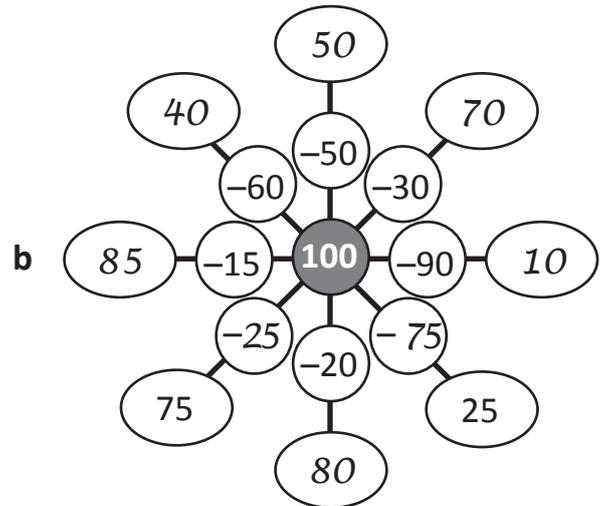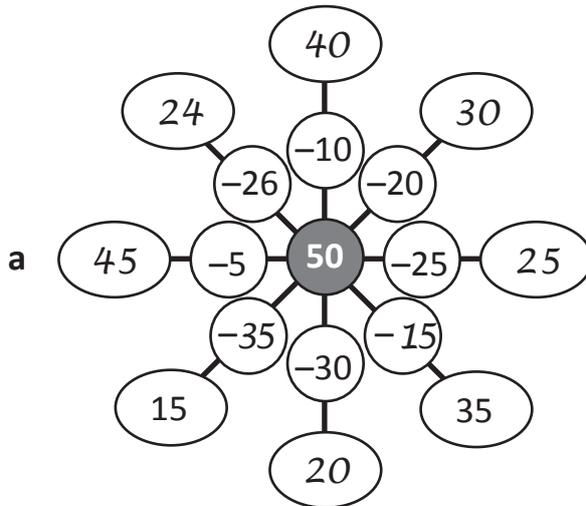
3 **Show how knowing the complements to 20, 50 and 100 makes adding easier. You may want to loop the complements first. The first one has been done for you.**

a (80 + 20) + (15 + 5) = *100 + 20 = 120*

b (18 + 2) + (30 + 20) + (10 + 10) = *20 + 50 + 20 = 90*

c (25 + 25) + 40 + (30 + 20) + 10 = *50 + 40 + 50 + 10 = 150*

d (15 + 35) + (20 + 30) + 10 + 12 = *50 + 50 + 10 + 12 = 122*

Addition mental strategies – number complements

4 Complete the complements to 50:

a | 12 | + 38 = 50   b | 33 | + 17 = 50

c 25 + | 25 | = 50   d 32 + | 18 | = 50

e | 4 | + 46 = 50   f | 22 | + 28 = 50

g 14 + | 36 | = 50   h 7 + | 43 | = 50

5 Complete the complements to 100:

a | 46 | + 54 = 100   b | 78 | + 22 = 100

c | 54 | + 46 = 100   d 33 + | 67 | = 100

e 62 + | 38 | = 100   f 25 + | 75 | = 100

g | 55 | + 45 = 100   h | 52 | + 48 = 100

6 Complete the addition crosses where the numbers add to 100 vertically and horizontally. The rules are, they must be symmetrical and only contain multiples of 5.

a

```
        25
        25
45  5  100  5  45
        25
        25
```

b

```
        15
        35
25  15  100  10  50
        25
        25
```
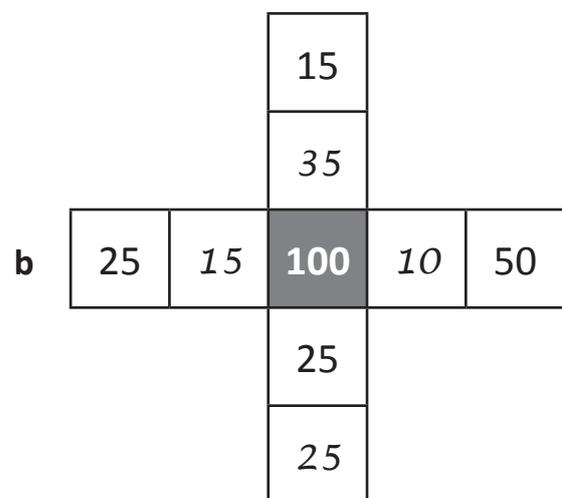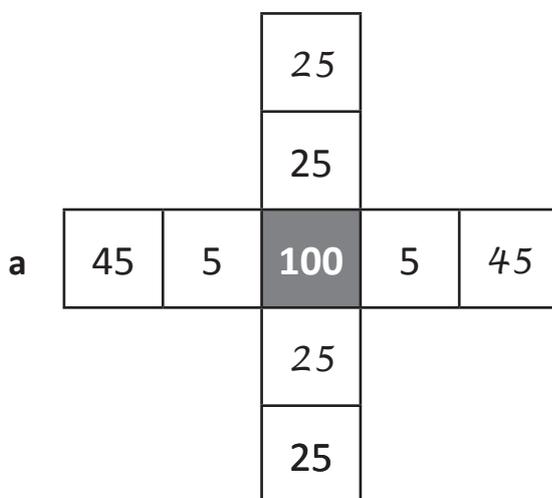
Addition mental strategies – doubles and near doubles

Doubles facts are the same number added together.

3 + 3 = 6 is the same as saying double 3 is 6.

Near doubles is when you use the doubles fact and then adjust either by adding or subtracting.

See: 6 + 7

Think: double 6 + 1

1 Circle all the doubles facts. The first two are circled for you. Next, shade all the doubles facts +1, then the double facts −1:

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

a double 1 = 2

double 2 = 4

double 3 = 6

double 4 = 8

double 5 = 10

double 6 = 12

double 7 = 14

double 8 = 16

double 9 = 18

b double 1 + 1 = 3

double 2 + 1 = 5

double 3 + 1 = 7

double 4 + 1 = 9

double 5 + 1 = 11

double 6 + 1 = 13

double 7 + 1 = 15

double 8 + 1 = 17

double 9 + 1 = 19

c double 1 − 1 = 1

double 2 − 1 = 3

double 3 − 1 = 5

double 4 − 1 = 7

double 5 − 1 = 9

double 6 − 1 = 11

double 7 − 1 = 13

double 8 − 1 = 15

double 9 − 1 = 17

Addition mental strategies – doubles and near doubles

2 **Complete each near double diagram. Start with the double in the centre and work clockwise. You will need to think in doubles and then adjust.**
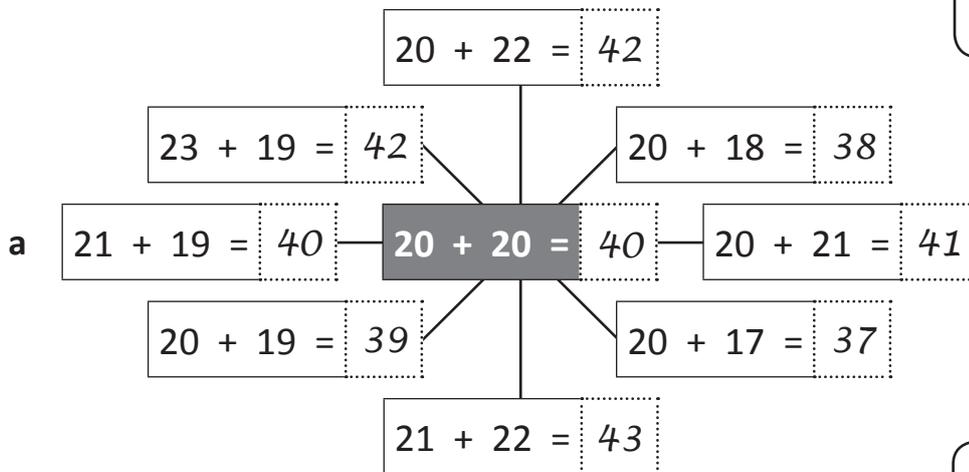
> Start by looking at the first number.
> For 21 + 18, think double 20 add 1 and then subtract 2 so the answer is 39.

a

20 + 22 = 42

23 + 19 = 42   20 + 18 = 38

21 + 19 = 40 — **20 + 20** = 40 — 20 + 21 = 41

20 + 19 = 39   20 + 17 = 37

21 + 22 = 43
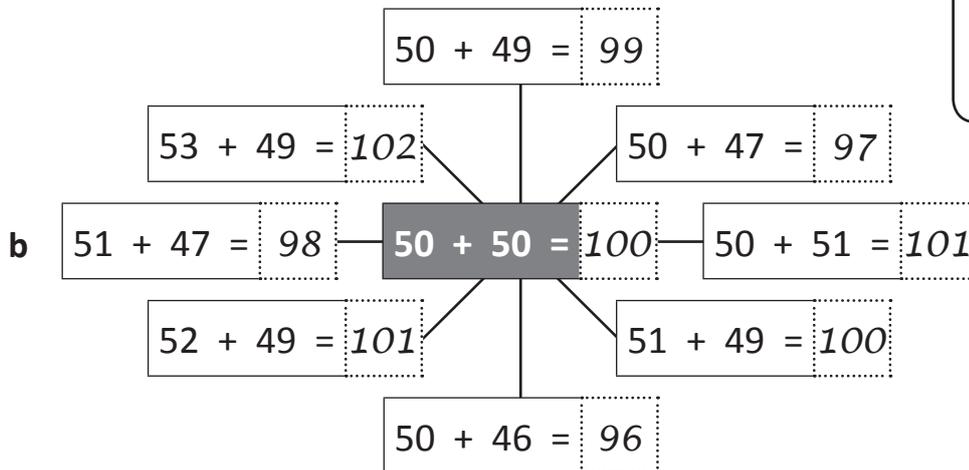
> Start by looking at the first number.
> For 51 + 48, think double 50 add 1 and then subtract 2 so the answer is 99.

b

50 + 49 = 99

53 + 49 = 102   50 + 47 = 97

51 + 47 = 98 — **50 + 50** = 100 — 50 + 51 = 101

52 + 49 = 101   51 + 49 = 100

50 + 46 = 96

CHECK

3 **Show how you would explain to someone how to add each of these using near doubles.**

a 30 + 32

Think double 30, add 2, so the answer is 62.

b 25 + 23

*Think double 25, subtract 2, so the answer is 48.*

c 100 + 97

Think double 100, subtract 3, so the answer is 197.

Addition and Subtraction

Addition mental strategies – bridge to ten

Bridge to ten is when we count on to the next 10 and then add what is left.

122 + 12 = 134
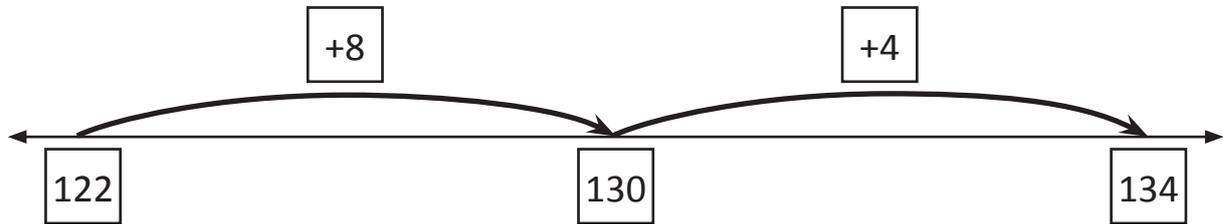
1 How many to the next ten? The first one has been done for you.

a 145 +5 150   b 243 +7 250

c 558 +2 560   d 167 +3 170

e 346 +4 350   f 179 +1 180

....
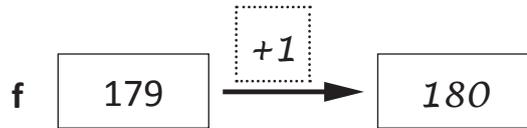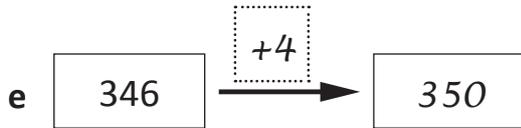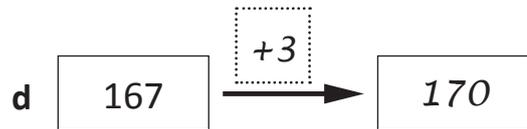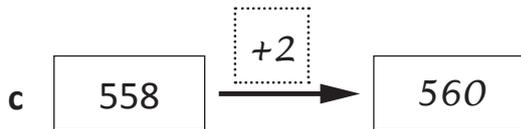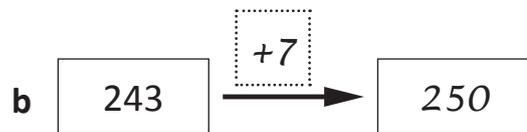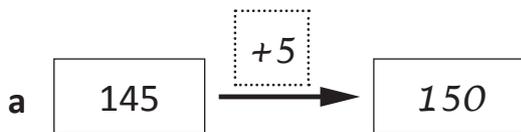
2 Use the number lines to bridge to ten:

a 253 + 15 = 268

+ 7   + 8

253   260   268

....

b 464 + 14 = 478

+ 6   + 8

464   470   478

....

c 671 + 17 = 688

+ 9   + 8

671   680   688
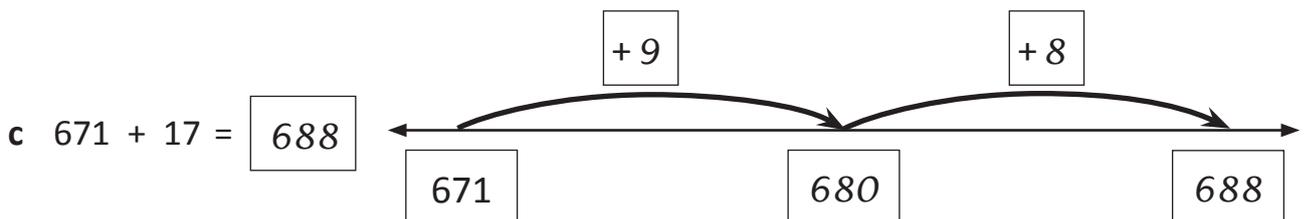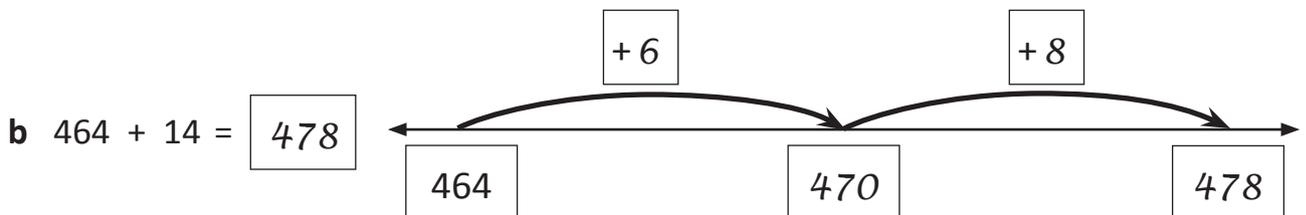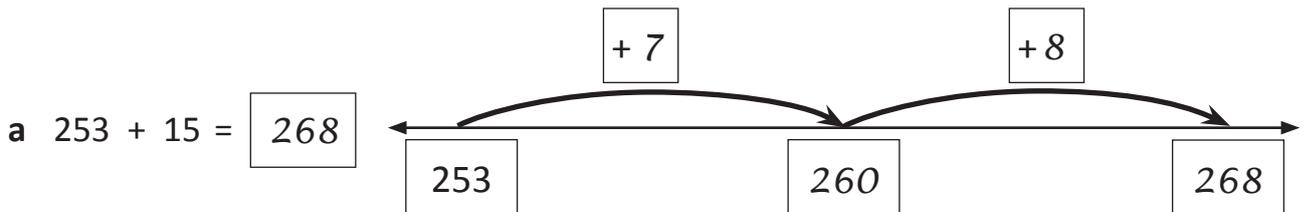
Addition mental strategies – bridge to ten

3 **Write a problem that matches the number line:**   *Answers will vary.*

a ☐ + ☐ = ☐

```
        +3              +9
   ┌──────────┐   ┌──────────────┐
───┴──────────┴───┴──────────────┴──→
 ☐              ☐                  ☐
```

b ☐ + ☐ = ☐

```
        +6              +8
   ┌──────────┐   ┌──────────────┐
───┴──────────┴───┴──────────────┴──→
 ☐              ☐                  ☐
```

c ☐ + ☐ = ☐

```
        +4              +7
   ┌──────────┐   ┌──────────────┐
───┴──────────┴───┴──────────────┴──→
 ☐              ☐                  ☐
```
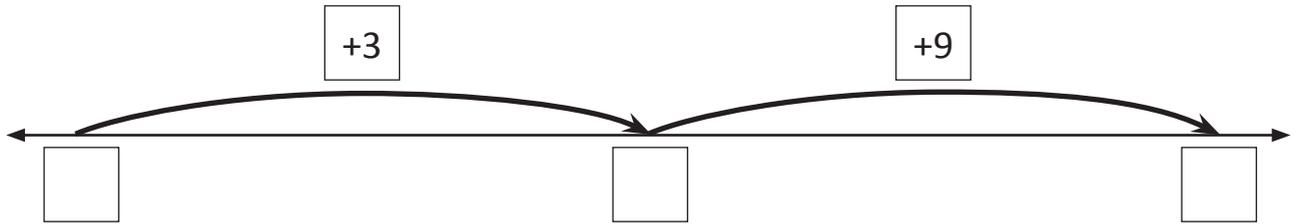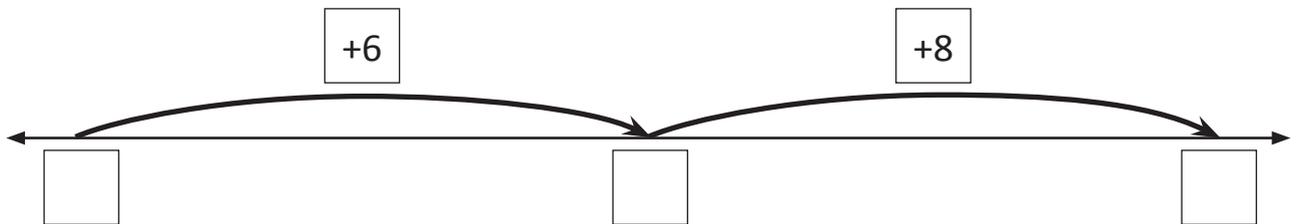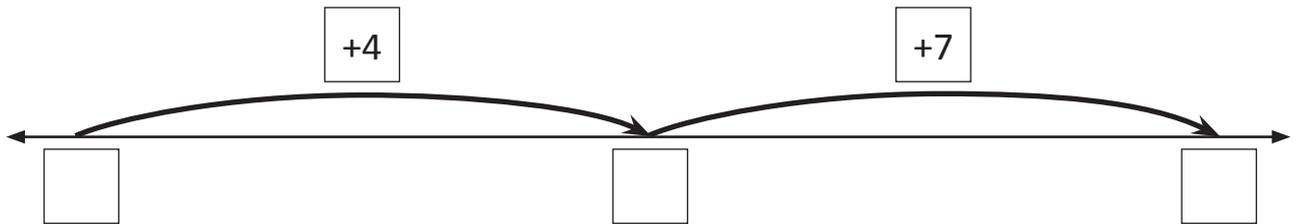
4 **Complete these addition grids by bridging to the next ten in your head:**

a

+	356	78	586	287	385	984
12	*368*	*90*	*598*	*299*	*397*	*996*

b

+	298	566	252	176	368	146
16	*314*	*582*	*268*	*192*	*384*	*162*

E SERIES   1 TOPIC

Addition and Subtraction

# Addition mental strategies – jump strategy

When we add, we can use the jump strategy to help us. Look at 57 + 22:

1 First we jump up by the tens.

2 Then we jump up by the units.

+10		+10		+2	

57   67   77 79

57 + 22 = 79
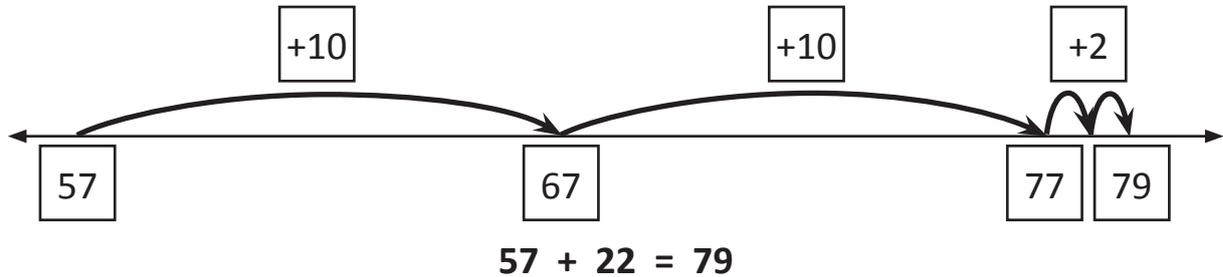
1 **Practise jumping in tens along the arrows:**

a 12 > 22 > 32 > 42 > 52 > 62 > 72 >

b 53 > 63 > 73 > 83 > 93 > 103 > 113 >

c 123 > 133 > 143 > 153 > 163 > 173 > 183 >

2 **Use the jump strategy to add these:**

a 78 + 52 = 130

+10 +10 +10 +10 +10 +2

78   88   98   108   118   128 130

b 115 + 44 = 159

+10 +10 +10 +10 +4

115   125   135   145   155   159

c 185 + 63 = 248

+10 +10 +10 +10 +10 +10 +3

185   195   205   215   225   235   245 248
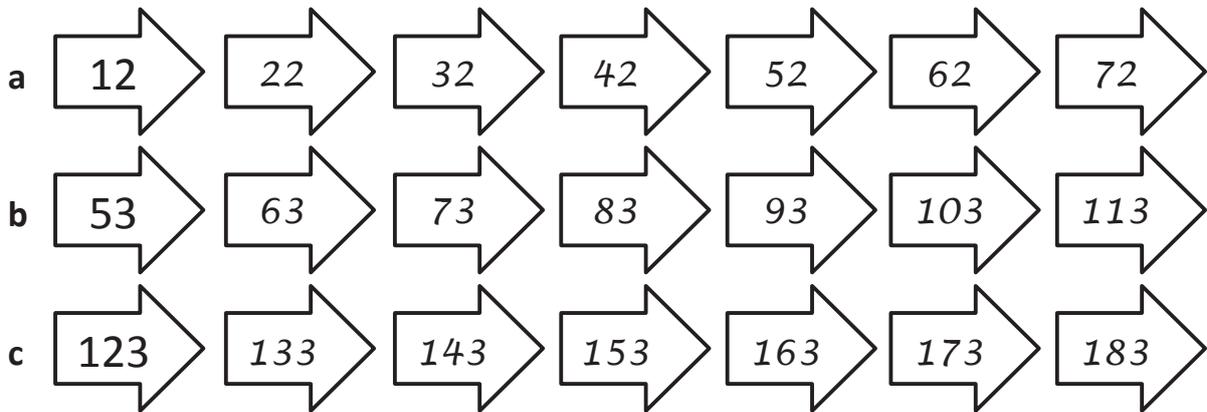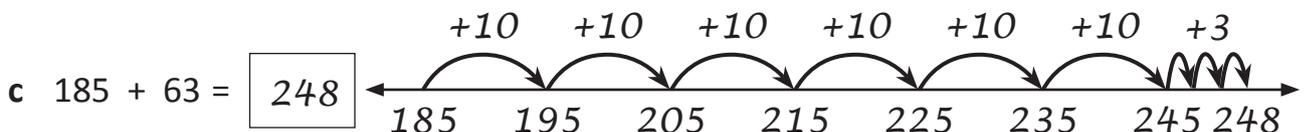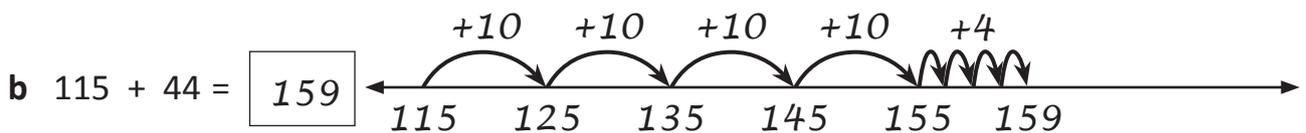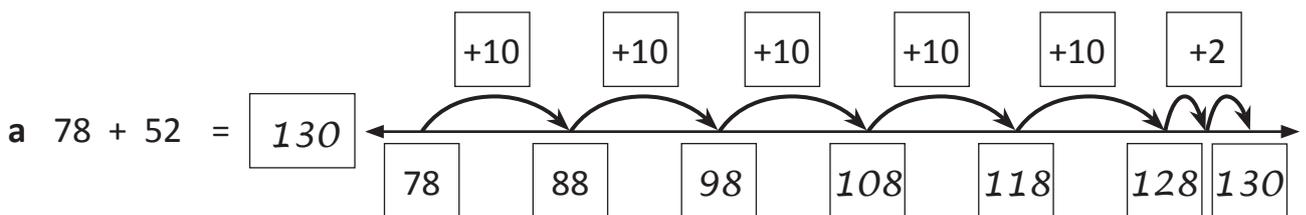
Addition mental strategies – jump strategy

3 Below are some number lines that only show the jumps. Complete the number line for the problem that matches and then write the complete problem.

| 187 + 54 | 179 + 62 | 78 + 53 |

a $\boxed{78}$ + $\boxed{53}$ = $\boxed{131}$

+10 +10 +10 +10 +10 +3

$\boxed{78}$ 88 98 108 118 128 $\boxed{131}$

b $\boxed{187}$ + $\boxed{54}$ = $\boxed{241}$

+10 +10 +10 +10 +10 +4

$\boxed{187}$ 197 207 217 227 237 $\boxed{241}$

c $\boxed{179}$ + $\boxed{62}$ = $\boxed{241}$

+10 +10 +10 +10 +10 +10 +2

$\boxed{179}$ 189 199 209 219 229 239 $\boxed{241}$
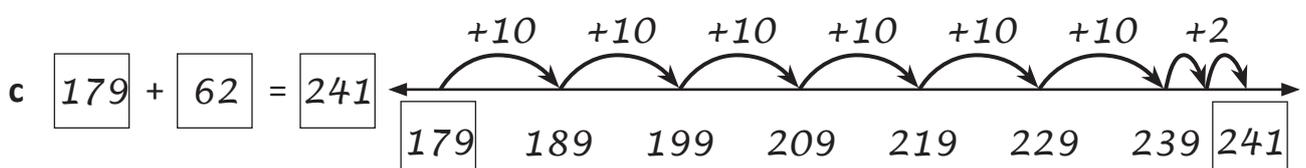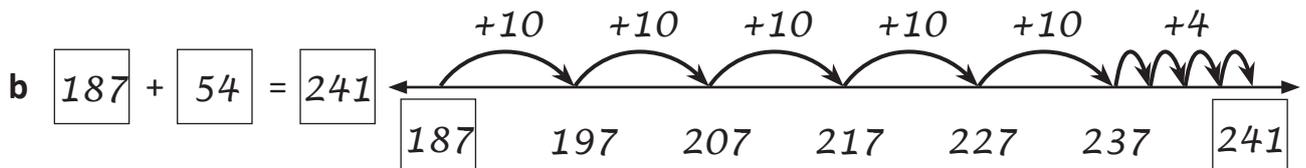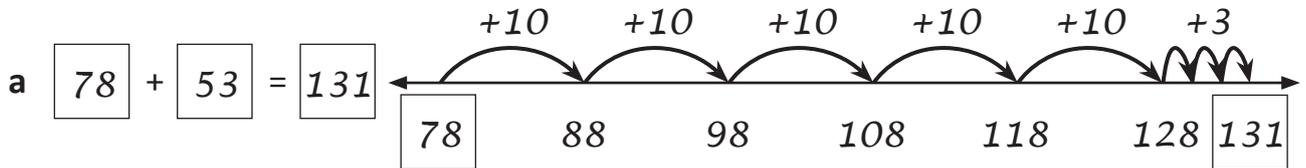
4 Use the jump strategy to add these:

Cupcake sales				
Day	Red velvet	Lemon drop	Coconut	Chocolate
Saturday	165	82	55	135
Sunday	43	98	65	36

a How many red velvet cupcakes were sold over the weekend?

$\boxed{165}$ + $\boxed{43}$ = $\boxed{208}$

+10 +10 +10 +10 +3

165 175 185 195 205 208
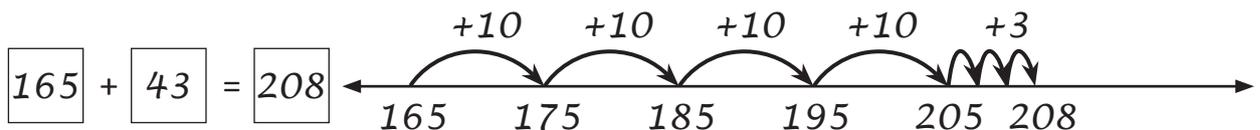
b How many lemon drop and coconut cupcakes were sold on Saturday?

$\boxed{82}$ + $\boxed{55}$ = $\boxed{137}$

+10 +10 +10 +10 +10 +5

82 92 102 112 122 132 137
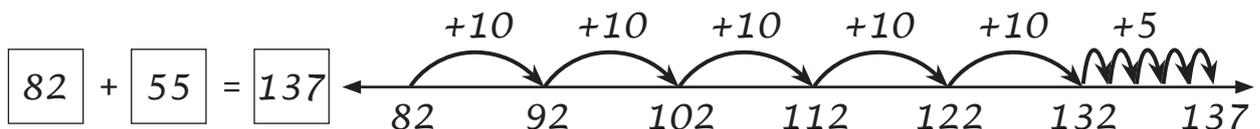
c How many chocolate cupcakes were sold over the weekend?

$\boxed{135}$ + $\boxed{36}$ = $\boxed{171}$

+10 +10 +10 +6

135 145 155 165 171

E SERIES 1 TOPIC

Addition and Subtraction
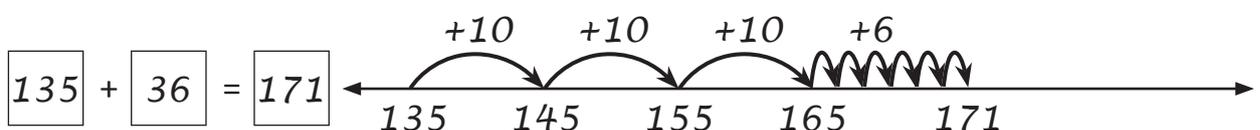
Addition mental strategies – split strategy version 1

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

$$112 + 46 \begin{cases} 40 \\ 6 \end{cases} \longrightarrow 112 + 40 = 152 \longrightarrow 152 + 6 = 158$$

1 Practise separating these numbers into tens and units. The first one has been done for you.

a $48 \begin{cases} 40 \\ 8 \end{cases}$　　**b** $63 \begin{cases} 60 \\ 3 \end{cases}$　　**c** $52 \begin{cases} 50 \\ 2 \end{cases}$　　**d** $27 \begin{cases} 20 \\ 7 \end{cases}$

2 Practise adding the tens to these numbers:

+	20	50	30	70	60
123	143	173	153	193	183
214	234	264	244	284	274

3 Use the split strategy with these problems. The first one has been done for you.

a $48 + 53 \begin{cases} 50 \\ 3 \end{cases} \longrightarrow \boxed{48 + 50 = 98} \longrightarrow \boxed{98 + 3 = 101}$

b $65 + 38 \begin{cases} 30 \\ 8 \end{cases} \longrightarrow \boxed{65 + 30 = 95} \longrightarrow \boxed{95 + 8 = 103}$

c $112 + 25 \begin{cases} 20 \\ 5 \end{cases} \longrightarrow \boxed{112 + 20 = 132} \longrightarrow \boxed{132 + 5 = 137}$

d $332 + 66 \begin{cases} 60 \\ 6 \end{cases} \longrightarrow \boxed{332 + 60 = 392} \longrightarrow \boxed{392 + 6 = 398}$

Addition mental strategies – split strategy version 2

Here is another way to use the split strategy.

$$42 + 32 = (4 \text{ tens} + 3 \text{ tens}) + (2 \text{ units} + 2 \text{ units})$$
$$= 7 \text{ tens} + 4 \text{ units}$$
$$= 74$$

1 **Use this way to add these:**

a 63 + 37 = (| 6 | + | 3 |) + (| 3 | + | 7 |)
   tens   tens   units   units

= | 9 | + | 10 |
   tens   units

= | 100 |

b 88 + 23 = (| 8 | + | 2 |) + (| 8 | + | 3 |)
   tens   tens   units   units

= | 10 | + | 11 |
   tens   units

= | 111 |

> Ten units are 1 ten.
> So if I have 3 tens + 10 units,
> I really have 4 tens or 40.

c 56 + 15 = (| 5 | + | 1 |) + (| 6 | + | 5 |)
   tens   tens   units   units

= | 6 | + | 11 |
   tens   units

= | 71 |

REMEMBER

d 65 + 28 = (| 6 | + | 2 |) + (| 5 | + | 8 |)
   tens   tens   units   units

= | 8 | + | 13 |
   tens   units

= | 93 |

2 **Use either version of the split strategy to complete this table:**

+	23	78	63	55	36
45	68	123	108	100	81
39	62	117	102	94	75

E SERIES   1 TOPIC

Addition and Subtraction

Addition mental strategies – applying the split strategy

1 **Complete these addition wheels with the split strategy:**

a

267 243

55 31

238 26 (212 +) 46 258

52 68

264 280

b

162 206

34 78

142 14 (128 +) 61 189

31 27

159 155
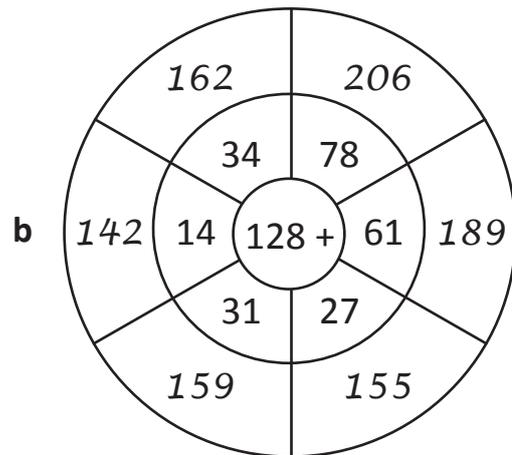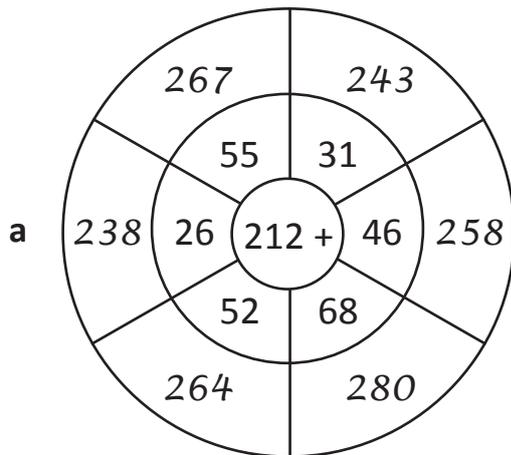
The split strategy is useful when adding three 2 digit numbers.

Try adding tens, then the units and recording it this way:

61 + 43 + 44 = 14 tens + 8 units = 140 + 8 = 148

2 **Record these place value amounts:**

a 8 tens = | 80 | **b** 17 tens = | 170 | **c** 15 tens = | 150 |

d 5 units = | 5 | **e** 12 tens = | 120 | **f** 16 units = | 16 |

---

3 At circus school, a competition was held to see who could stay on a unicycle the longest. The time was recorded in seconds. Using the split strategy, add up each person's time. The first one has been done for you.

	Names	Time in seconds	Working	Total in seconds
a	Lizzie	22, 14, 3	*3 tens + 9 units*	39
b	Dan	23, 4, 11	*3 tens + 8 units*	38
c	Lily	21, 6, 14	*3 tens + 11 units*	41
d	Jo	20, 8, 12	*3 tens + 10 units*	40
e	Julio	4, 22, 12	*3 tens + 8 units*	38

The winner is:

Lily

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:

$$23 + 19 \qquad = \boxed{42}$$

$$23 + 20 \,(-1) \qquad \textit{I rounded up by 1,}$$

$$43 \,(-1) \qquad = \; 42 \quad \textit{so I subtract 1.}$$

1 **Practise rounding:**

a $\boxed{148} \longrightarrow \boxed{150}$ **b** $\boxed{39} \longrightarrow \boxed{40}$ **c** $\boxed{47} \longrightarrow \boxed{50}$

d $\boxed{109} \longrightarrow \boxed{110}$ **e** $\boxed{96} \longrightarrow \boxed{100}$ **f** $\boxed{199} \longrightarrow \boxed{200}$

2 **Use the compensation method with these problems. Round the second number up to the closest ten. Compensate by subtracting.**

a $32 + 29 \qquad = \boxed{61}$

$32 + 30 \quad (-1)$

$\underline{\quad 62 \quad} \; (-1) = \boxed{61}$

b $55 + 38 \qquad = \boxed{93}$

$55 + 40 \quad (-2)$

$\underline{\quad 95 \quad} \; (-2) = \boxed{93}$

c $66 + 19 \qquad = \boxed{85}$

$66 + \underline{20} \;\, (-1)$

$\underline{\quad 86 \quad} \; (-1) = \boxed{85}$

d $22 + 39 \qquad = \boxed{61}$

$22 + \underline{40} \;\, (-1)$

$\underline{\quad 62 \quad} \; (-1) = \boxed{61}$

Addition and Subtraction

Addition mental strategies – compensation strategy

3 Now let's try the compensation method with rounding the second number down. Round these numbers down to the closest ten. Compensate by adding.

a 75 + 22 = $\boxed{97}$

75 + 20 (+2)

_95_ (+2) = $\boxed{97}$

b 45 + 41 = $\boxed{86}$

45 + 40 (+1)

_85_ (+1) = $\boxed{86}$

> When we round down we compensate by adding.
>
> When we round up we compensate by subtracting.

c 26 + 32 = $\boxed{58}$

26 + _30_ (+2)

_56_ (+2) = $\boxed{58}$

d 66 + 53 = $\boxed{119}$

66 + _50_ (+3)

_116_ (+3) = $\boxed{119}$

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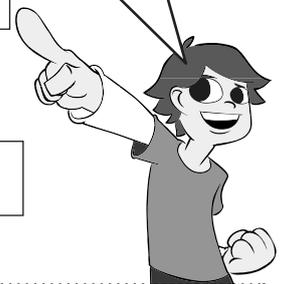
4 Use the compensation method to solve this riddle.

What vehicle is spelled the same forwards as it is backwards?

Match the letter to the answer in the grid at the bottom.

a 125 + 48 = $\boxed{A}$

b 115 + 41 = $\boxed{R}$

c 55 + 51 = $\boxed{C}$

d 715 + 28 = $\boxed{E}$

R	A	C	E	C	A	R
156	173	106	743	106	173	156

Addition and Subtraction

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E SERIES 1 TOPIC 13

Category match

Getting ready ➤ This is a game for two players. Each player will need to copy and cut out the cards on page 15 as well as the game board below.

C
copy

What to do ➤ Each player cuts out a set of the cards. Join both sets and shuffle well. Place face down into one pile in the centre. Each player turns over four of the digit cards and places each digit on their game board. Digit cards can't be moved once they have been placed.

Players then use a mental strategy to work out the answer and score points according to which category the answer fits into. Some answers may fit into more than one category.

Ends in even number	1 point
Ends in odd number	2 points
Less than 50	5 points
Greater than 150	10 points
Multiple of 5	10 points
Between 120 and 140	5 points

		+			=

E **SERIES** 1 **TOPIC**

Addition and Subtraction

9	8	7	6	5
4	3	2	1	9
9	8	7	6	5
4	3	2	1	9
4	3	2	1	9
4	3	2	1	9

Addition and Subtraction

Subtraction mental strategies – addition and subtraction

Knowing one addition fact means you also know two related subtraction facts.
Because 7 + 3 = 10 you know that 10 − 7 = 3 and 10 − 3 = 7

1 Make a group of facts for each pair of numbers. The first one has been done for you.

a

15	35

15 + 35 = 50

50 − 15 = 35

50 − 35 = 15

b

45	55

45 + 55 = 100

100 − 45 = 55

100 − 55 = 45

c

73	27

73 + 27 = 100

100 − 73 = 27

100 − 27 = 73

d

105	15

105 + 15 = 120

120 − 105 = 15

120 − 15 = 105

e

120	10

120 + 10 = 130

130 − 120 = 10

130 − 10 = 120

f

135	10

135 + 10 = 145

145 − 135 = 10

145 − 10 = 135

2 Complete each number trail:

a 150 → + 10 → 160 → − 15 → 145 → + 50 → 195 → + 30 → (225)

b 200 → − 50 → 150 → + 25 → 175 → − 30 → 145 → + 55 → (200)

c 99 → + 11 → 110 → + 50 → 160 → + 50 → 210 → − 20 → (190)

d 76 → + 24 → 100 → + 35 → 135 → + 15 → 150 → − 25 → (125)

E SERIES 2 TOPIC

Addition and Subtraction
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Subtraction mental strategies – subtraction strategy review

Look for patterns: $6 - 2 = 4$ so $60 - 20 = 40$ and $600 - 200 = 400$

$72 - 9 = 63$ so $62 - 9 = 53$ and $52 - 9 = 43$

Count on: When numbers are close together, you can count on to find the difference.

$$+4$$

20 21 22 23 24 25 26 27 (28) 29 30 31 (32) 33 34 35 36 37 38 39 40
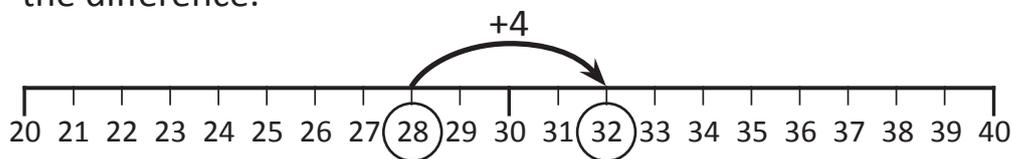
Complements: $35 + 65 = 100$ so $100 - 35 = 65$

$12 + 8 = 20$ so $20 - 8 = 12$

Near doubles: See: $15 - 7$ Think: $(14 - 7) + 1$

1 **This hundred grid makes it easier to see subtraction patterns. Use it to complete the sets.**

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

Set 1

$17 - 9 = 8$

$27 - 9 = 18$

$37 - 9 = 28$

$47 - 9 = 38$

$57 - 9 = 48$

$67 - 9 = 58$

Set 2

$21 - 6 = 15$

$31 - 6 = 25$

$41 - 6 = 35$

$51 - 6 = 45$

$61 - 6 = 55$

$71 - 6 = 65$

2 **Extend these subtractions according to the patterns:**

a	$9 - 6 = 3$	$90 - 60 = 30$	$900 - 600 = 300$
b	$14 - 8 = 6$	$140 - 80 = 60$	$1\ 400 - 800 = 600$
c	$24 - 14 = 10$	$240 - 140 = 100$	$2\ 400 - 1\ 400 = 1\ 000$
d	$69 - 32 = 37$	$690 - 320 = 370$	$6\ 900 - 3\ 200 = 3\ 700$

Subtraction mental strategies – subtraction strategy review

3 **Use counting on to complete these:**

a 32 − 29 = $\boxed{3}$ **b** 33 − 28 = $\boxed{5}$ **c** 34 − 27 = $\boxed{7}$

d 71 − 68 = $\boxed{3}$ **e** 82 − 76 = $\boxed{6}$ **f** 73 − 69 = $\boxed{4}$

g 83 − 77 = $\boxed{6}$ **h** 112 − 109 = $\boxed{3}$ **i** 201 − 196 = $\boxed{5}$

4 **Complete these function tables using counting on:**

a

In	Rule	Out
120		2
123		5
126	− 118	8
124		6

b

In	Rule	Out
102		6
104		8
108	− 96	12
101		5

c

In	Rule	Out
87		9
81		3
85	− 78	7
83		5

5 **Complete this cross number puzzle. Using complements to 100 will help.**

¹2	0		²1	1		³9	5	
2		⁴7	2		⁵7	8		⁶8
	⁷3	6		⁸5	1		⁹3	9
¹⁰4	8		¹¹3	4		¹²2	5	

Across

1 100 − 80 = $\boxed{20}$ **8** 100 − 49 = $\boxed{51}$

2 100 − 89 = $\boxed{11}$ **9** 100 − 61 = $\boxed{39}$

3 100 − 5 = $\boxed{95}$ **10** 100 − 52 = $\boxed{48}$

4 100 − 28 = $\boxed{72}$ **11** 100 − 66 = $\boxed{34}$

5 100 − 22 = $\boxed{78}$ **12** 100 − 75 = $\boxed{25}$

7 100 − 64 = $\boxed{36}$

Down

1 100 − 78 = $\boxed{22}$ **7** 100 − 62 = $\boxed{38}$

2 100 − 88 = $\boxed{12}$ **8** 100 − 46 = $\boxed{54}$

3 100 − 2 = $\boxed{98}$ **9** 100 − 65 = $\boxed{35}$

4 100 − 24 = $\boxed{76}$

5 100 − 29 = $\boxed{71}$

6 100 − 11 = $\boxed{89}$

E SERIES **2** TOPIC

Addition and Subtraction

Subtraction mental strategies – subtraction strategy review

6 Use your knowledge of doubles and near doubles to complete these subtraction tables. The first one in each has been done for you.

a

See	Think
19 − 9 = **10**	(18 − 9) + 1
201 − 100 = **101**	(200 − 100) + 1
141 − 70 = **71**	(140 − 70) + 1
71 − 35 = **36**	(70 − 35) + 1

b

See	Think
15 − 8 = **7**	(16 − 8) − 1
31 − 16 = **15**	(32 − 16) − 1
99 − 50 = **49**	(100 − 50) − 1
87 − 44 = **43**	(88 − 44) − 1

c

See	Think
26 − 12 = **14**	(24 − 12) + 2
52 − 25 = **27**	(50 − 25) + 2
68 − 33 = **35**	(66 − 33) + 2
104 − 51 = **53**	(102 − 51) + 2

d

See	Think
24 − 13 = **11**	(26 − 13) − 2
48 − 25 = **23**	(50 − 25) − 2
70 − 36 = **34**	(72 − 36) − 2
78 − 40 = **38**	(80 − 40) − 2

7 Complete this near double web, which is based on the subtraction double in the centre. Start in the centre and work clockwise:

> Start by looking at the first number.
>
> For 99 − 51, think 100 − 50 subtract 2 = 48

CHECK

101 − 50 = **51**

99 − 49 = **50**   100 − 49 = **51**

99 − 51 = **48**   **100 − 50 =** 50   100 − 51 = **49**

98 − 50 = **48**   99 − 50 = **49**

97 − 50 = **47**
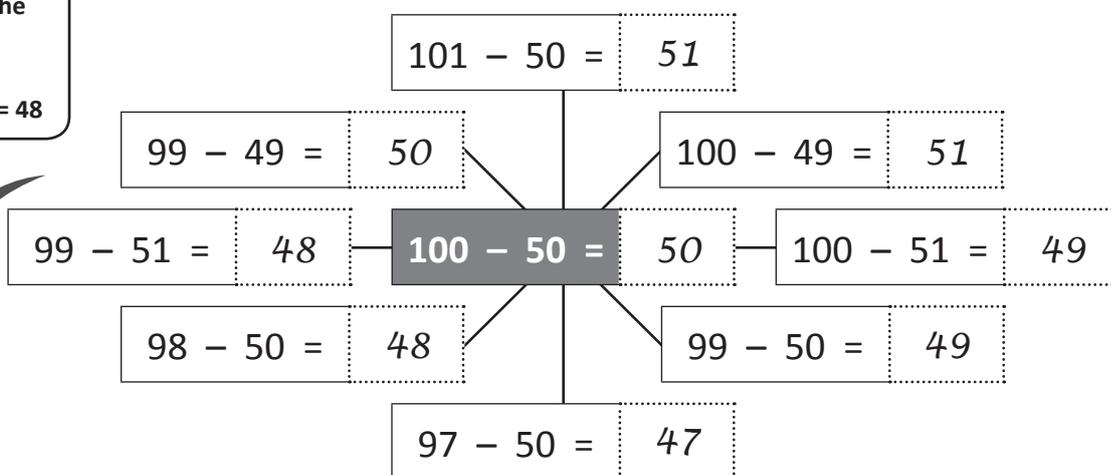
Subtraction mental strategies – jump strategy

When we subtract, we can use the jump strategy to help us. Look at 99 – 42:

1 First we jump back by the tens.

2 Then we jump back by the units.

Start

-2 -10 -10 -10 -10

57 59 69 79 89 99

99 – 42 = 57
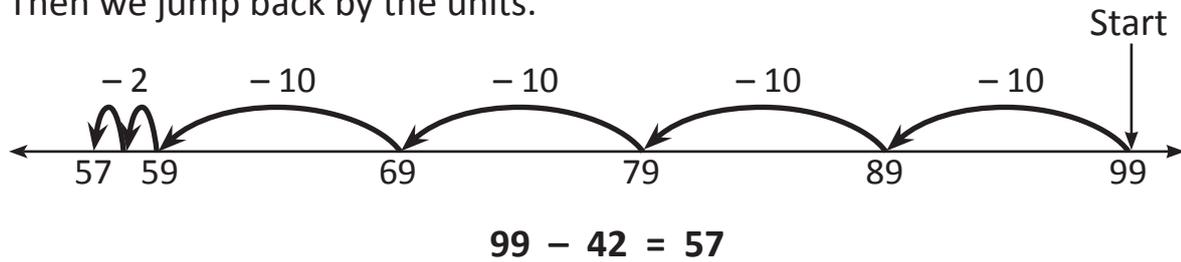
1 **Solve these using the jump strategy:**

a 125 – 42 = | 83 |

-2 -10 -10 -10 -10

83 85 95 105 115 125

b 168 – 36 = | 132 |

-6 -10 -10 -10

132 138 148 158 168

c 335 – 54 = | 281 |

-4 -10 -10 -10 -10 -10

281 285 295 305 315 325 335

d 245 – 45 = | 200 |

-5 -10 -10 -10 -10

200 205 215 225 235 245

Addition and Subtraction
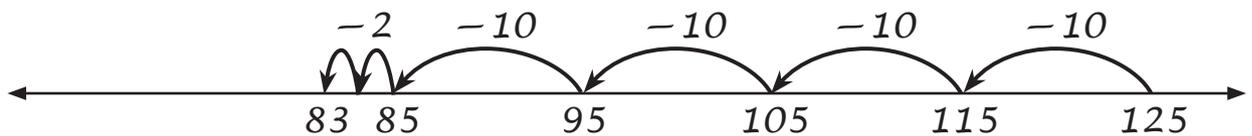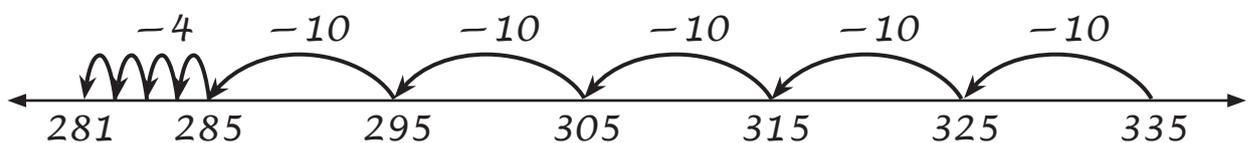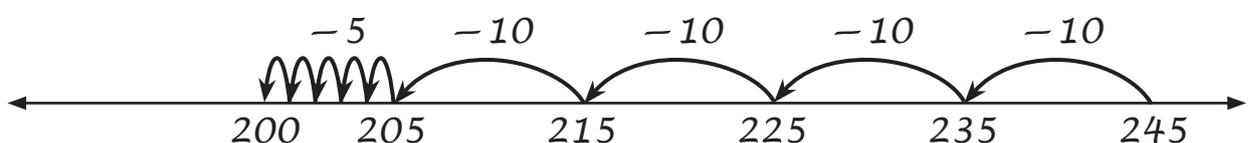
Subtraction mental strategies – jump strategy

2 It's stocktake time at Candilicious sweet shop. Use the jump strategy to work out how many of each type of sweet has been sold.

Sweets	Started with	Amount left	Sold
Cinnamon drops	254	45	*209*
Caramel melts	186	58	*128*
Milk bottles	145	65	*80*
Chocolate buds	165	34	*131*

a Cinnamon drops

$$\boxed{254} - \boxed{45} = \boxed{209}$$
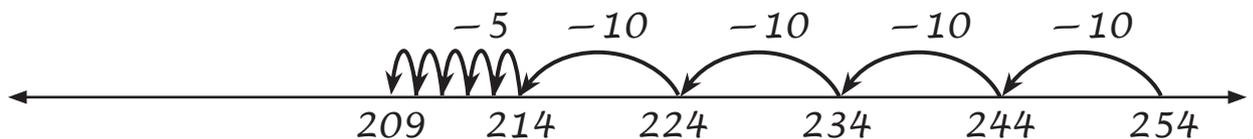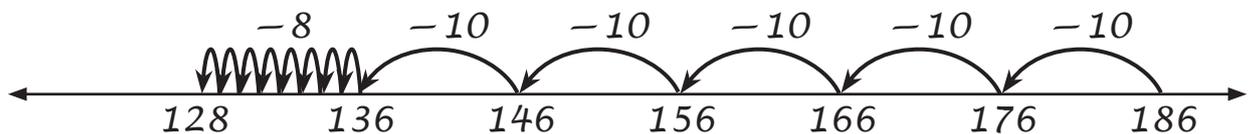
	−5	−10	−10	−10	−10
209	214	224	234	244	254

b Caramel melts

$$\boxed{186} - \boxed{58} = \boxed{128}$$

	−8	−10	−10	−10	−10	−10
128	136	146	156	166	176	186

c Milk bottles

$$\boxed{145} - \boxed{65} = \boxed{80}$$

	−5	−10	−10	−10	−10	−10	−10
80	85	95	105	115	125	135	145

d Chocolate buds

$$\boxed{165} - \boxed{34} = \boxed{131}$$

	−4	−10	−10	−10
131	135	145	155	165
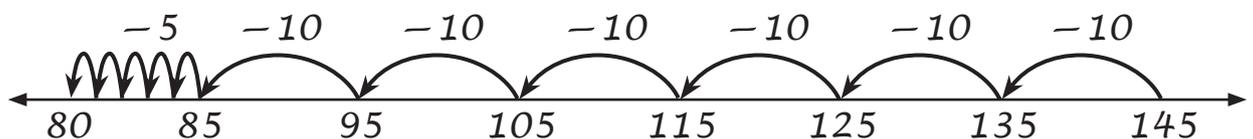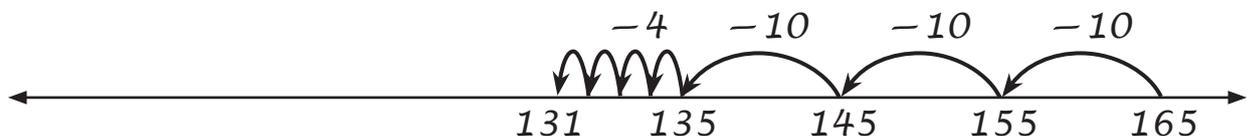
Subtraction mental strategies – split strategy

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.

$$255 - 132 \begin{cases} 100 \\ 30 \\ 2 \end{cases} \rightarrow 255 - 100 = 155 \rightarrow 155 - 30 = 125 \rightarrow 125 - 2 = 123$$

255 – 132 = 123
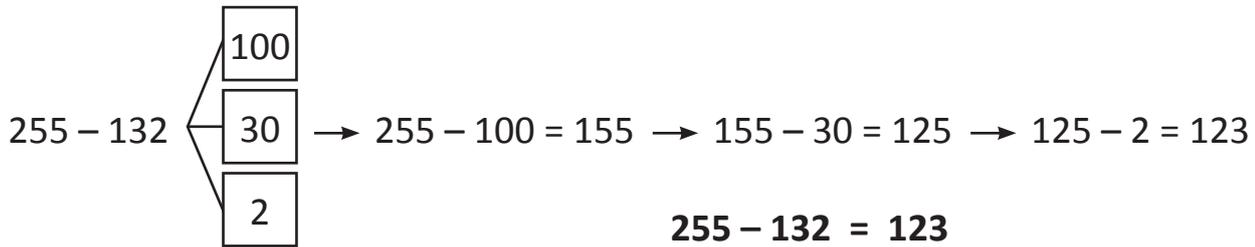
1 Practise splitting numbers into hundreds, tens and ones:

a 482 — 400, 80, 2

b 675 — 600, 70, 5

c 732 — 700, 30, 2

d 834 — 800, 30, 4
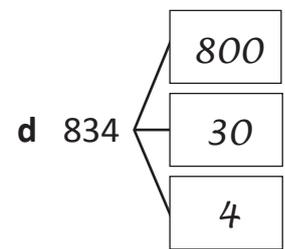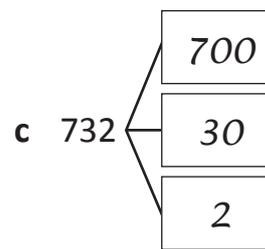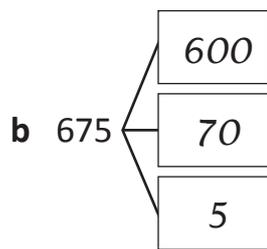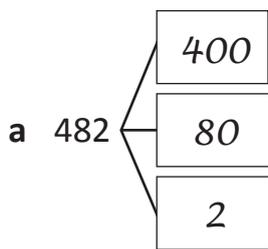
2 Complete these subtraction trails:
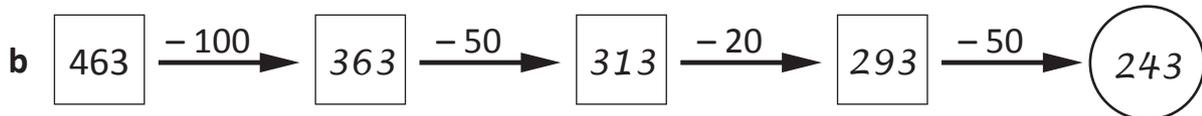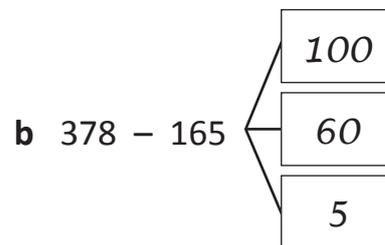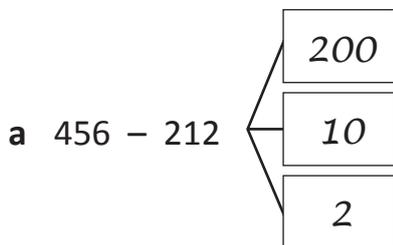
a 768 $\xrightarrow{-200}$ 568 $\xrightarrow{-20}$ 548 $\xrightarrow{-300}$ 248 $\xrightarrow{-10}$ (238)

b 463 $\xrightarrow{-100}$ 363 $\xrightarrow{-50}$ 313 $\xrightarrow{-20}$ 293 $\xrightarrow{-50}$ (243)

3 Use the split strategy with these problems:

a 456 – 212 — 200, 10, 2

b 378 – 165 — 100, 60, 5

456 – 200 = __256__		378 – 100 = __278__
__256__ – 10 = __246__		__278__ – 60 = __218__
__246__ – 2 = __244__		__218__ – 5 = __213__
So, 456 – 212 = __244__		So, 378 – 165 = __213__

E SERIES 2 TOPIC

Addition and Subtraction

Subtraction mental strategies – split strategy

4 **Try these subtractions with the split strategy:**

a 479 − 45 = ___434___

$$479 - 45 < \begin{array}{l} 40 \\ 5 \end{array}$$

479 − 40 = 439

439 − 5 = 434

So, 479 − 45 = ___434___

b 834 − 21 = ___813___

$$834 - 21 < \begin{array}{l} 20 \\ 1 \end{array}$$

834 − 20 = 814

814 − 1 = 813

So, 834 − 21 = ___813___

c 637 − 312 = ___325___

$$637 - 312 < \begin{array}{l} 300 \\ 10 \\ 2 \end{array}$$

637 − 300 = 337

337 − 10 = 327

327 − 2 = 325

So, 637 − 312 = ___325___

d 567 − 232 = ___335___

$$567 - 232 < \begin{array}{l} 200 \\ 30 \\ 2 \end{array}$$

567 − 200 = 367

367 − 30 = 337

337 − 2 = 335

So, 567 − 232 = ___335___

5 **Solve these pyramid puzzles using any strategy you like. The two bricks add to support the number on top. For example in puzzle a, 22 + 23 = 45.**
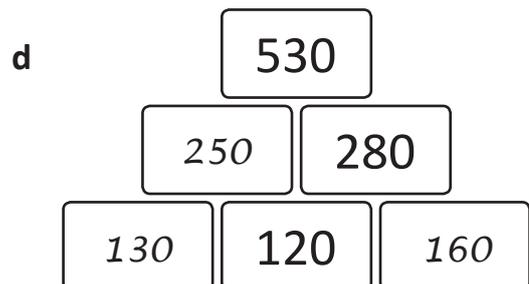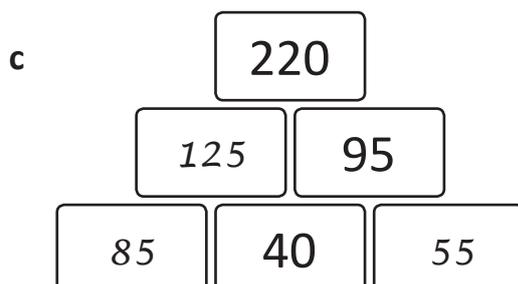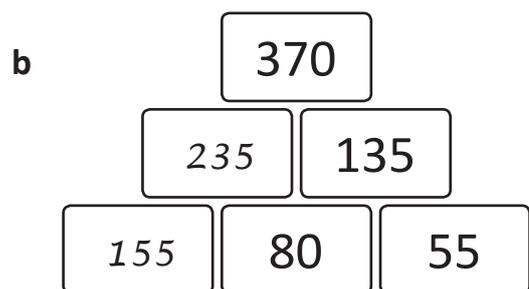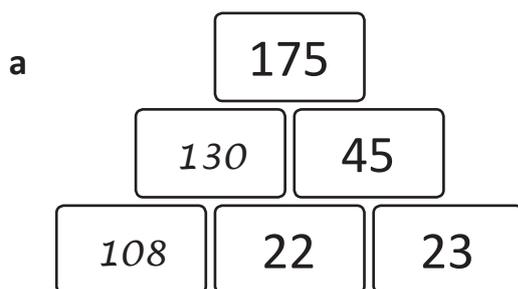
a

	175	
130		45
108	22	23

b

	370	
235		135
155	80	55

c

	220	
125		95
85	40	55

d

	530	
250		280
130	120	160

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:

125 − 49 = $\boxed{76}$

125 − 50 (+ 1)

75 (+ 1) = 76

I rounded up by 1, which means I subtracted 1 extra so we need to add 1 back.

I took off 1 extra so I have to add 1 back.

THINK

1 **Round these numbers to the closest ten. Then show how you rounded by subtracting or adding the difference. The first one has been done for you.**

a 78 = __80 − 2__   b 59 = __60 − 1__   c 62 = __60 + 2__

d 23 = __20 + 3__   e 87 = __90 − 3__   f 99 = __100 − 1__

g 103 = __100 + 3__   h 21 = __20 + 1__   i 88 = __90 − 2__

2 **Solve these subtraction problems using compensation. Show your working.**

a 136 − 29 = $\boxed{107}$

136 − 30 (+ 1)

__106__ (+1) = __107__

b 145 − 38 = $\boxed{107}$

145 − 40 (+ 2)

__105__ (+2) = __107__

c 156 − 39 = $\boxed{117}$

156 − __40__ (+1)

__116__ (+1) = __117__

d 184 − 48 = $\boxed{136}$

184 − __50__ (+2)

__134__ (+2) = __136__

Addition and Subtraction

Subtraction mental strategies – compensation strategy

2 Solve these subtraction problems using compensation. Show your working.

e $145 - 29$ = | 116 |

$145 - 30$ (+1)

$\underline{\quad 115 \quad}$ (+1) = $\underline{\quad 116 \quad}$

f $176 - 69$ = | 107 |

$\underline{176 - 70}$ (+1)

$\underline{\quad 106 \quad}$ (+1) = $\underline{\quad 107 \quad}$

g $365 - 42$ = | 323 |

$\underline{365 - 40}$ (−2)

$\underline{\quad 325 \quad}$ (−2) = $\underline{\quad 323 \quad}$

h $250 - 32$ = | 218 |

$\underline{250 - 30}$ (−2)

$\underline{\quad 220 \quad}$ (−2) = $\underline{\quad 218 \quad}$

....

3 Answer these subtraction problems to solve the riddle below:

What swirls, loops, and circles on your fingertips, yet never moves?

a $65 - 29 = F$ **b** $145 - 32 = U$ **c** $175 - 61 = E$

d $86 - 59 = O$ **e** $180 - 48 = I$ **f** $150 - 32 = N$

g $96 - 42 = R$ **h** $75 - 33 = G$ **i** $155 - 49 = Y$

j $166 - 55 = P$ **k** $185 - 19 = T$ **l** $370 - 28 = S$

y	*o*	*u*	*r*
106	27	113	54

f	*i*	*n*	*g*	*e*	*r*	*p*	*r*	*i*	*n*	*t*	*s*
36	132	118	42	114	54	111	54	132	118	166	342

Getting ready

This is a game for two players. You will need a copy of this page and 25 counters between you.

C copy

What to do

Player 1 covers a number on the grid with a counter and subtracts this number from 100. Player 2 then covers a number on the grid with a counter and subtracts this number from Player 1's answer. Play continues until a player is able to pick one of the remaining uncovered numbers to equal zero. If play continues without anyone reaching zero, the lowest difference wins.

Sample game:

Player 1 covers 20 with a counter and states the subtraction fact:
100 − 20 = 80

Player 2 covers 30 with a counter and states the next subtraction fact:
80 − 30 = 50

Player 1 then covers 50 and reaches zero first, so wins the round.

25	10	15	20	10
10	50	30	10	25
40	5	40	10	10
10	35	10	15	10
50	10	5	10	45

E SERIES 2 TOPIC

Addition and Subtraction

Subtraction grid puzzles

What to do → Complete these subtraction cross number puzzles:

a

125	–	75	=	*50*
–		–		–
53	–	*39*	=	14
=		=		=
72	–	36	=	*36*

b

350	–	228	=	*122*
–		–		–
165	–	*111*	=	54
=		=		=
185	–	117	=	68

Written methods – 3 digit addition with regrouping

e:	730	
	H	**T**	**U**

$$
\begin{array}{r}
\;{}^{1}5\;\;{}^{1}3\;\;4 \\
+\;1\;\;9\;\;7 \\
\hline
7\;\;3\;\;1 \\
\hline
\end{array}
$$

This is the written method for addition when regrouping.

First, estimate the answer to the nearest ten:
530 + 200 = 730

Add the units: 4 + 7 = 11 units.

Think of this as 1 ten and 1 unit.

Write the 1 in the units column and put the 1 in the tens column.

Add the tens: 3 + 9 + 1 = 13 tens.

Write 3 in the tens column and 1 in the hundreds column.

Add the hundreds: 5 + 1 + 1 = 7 hundreds.

Is our answer reasonable? Yes, because it's close to our estimate.

1 Practise estimating answers by rounding to the nearest ten. The first one has been done for you.

	Question	Estimate		Question	Estimate
a	682 + 179	*680 + 180 = 860*	**b**	271 + 119	*270 + 120 = 390*
c	359 + 222	*360 + 220 = 580*	**d**	378 + 119	*380 + 120 = 500*
e	587 + 398	*590 + 400 = 990*	**f**	412 + 98	*410 + 100 = 510*
g	189 + 108	*190 + 110 = 300*	**h**	911 + 207	*910 + 210 = 1 120*

2 Add these 3 digit numbers using the written method. First, estimate to the nearest ten.

e:	570			e:	840			e:	590	

a

	H	**T**	**U**
	3	${}^{1}5$	4
+	2	1	7
	5	7	1

b

	H	**T**	**U**
	6	${}^{1}2$	8
+	2	1	3
	8	4	1

c

	H	**T**	**U**
	3	${}^{1}6$	4
+	2	2	8
	5	9	2

Continued on page 29.

E **3**

SERIES TOPIC

Addition and Subtraction

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Written methods – 3 digit addition with regrouping

2 Add these 3 digit numbers using the written method:

e: 400

	H	T	U
d	¹2	¹6	3
+	1	3	9
	4	0	2

e: 800

	H	T	U
e	¹3	¹4	4
+	4	5	9
	8	0	3

e: 500

	Th	H	T	U
f		¹2	¹5	2
+		2	4	9
		5	0	1

e: 810

	Th	H	T	U
g		¹2	¹6	2
+		5	4	9
		8	1	1

e: 920

	Th	H	T	U
h		¹6	¹2	9
+		2	8	9
		9	1	8

e: 740

	Th	H	T	U
i		¹3	¹4	9
+		3	8	7
		7	3	6

....

3 Solve these word problems using the written method:

a At a muffin shop, 456 banana choc chip muffins were sold on Saturday and 458 caramel chunk muffins were sold on Sunday. How many muffins were sold that weekend?

	H	T	U
	¹4	¹5	6
+	4	5	8
	9	1	4

b A train left the station with 389 people on board and then another 678 people got on over the next three stops. How many passengers were on the train altogether?

	Th	H	T	U
		¹3	¹8	9
+		6	7	8
	1	0	6	7
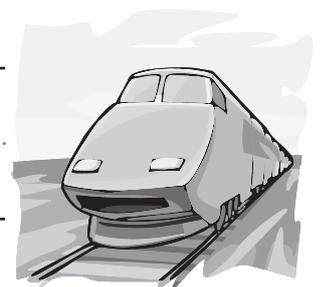
Written methods – 3 digit subtraction with regrouping

1 **Subtract these 3 digit numbers using the written method. Start by writing your estimate. Estimate to the nearest 10.**

e: 320

	H	T	U
a	6	⁴6̷	¹2
−	3	2	7
	3	2	5

e: 530

	H	T	U
b	7	⁵6̷	¹1
−	2	2	9
	5	3	2

e: 140

	H	T	U
c	5	⁸9̷	¹2
−	4	4	8
	1	4	4

> You can use a piece of scrap paper to estimate your answer to the nearest 10.

CHECK

e: 230

	H	T	U
d	5	⁷8̷	¹2
−	3	4	6
	2	3	6

e: 210

	H	T	U
e	6	⁴5̷	¹1
−	4	3	8
	2	1	3

e: 310

	H	T	U
f	9	⁵6̷	¹2
−	6	4	9
	3	1	3

e: 210

	H	T	U
g	8	⁷8̷	¹2
−	6	6	6
	2	1	6

e: 400

	H	T	U
h	7	³4̷	¹3
−	3	3	9
	4	0	4

E SERIES 3 TOPIC

Addition and Subtraction

Written methods – 3 digit subtraction with regrouping

2 This sign shows the distances of towns along a highway from where the sign is. Find the difference between these places.

Find the difference means to subtract.

CHECK
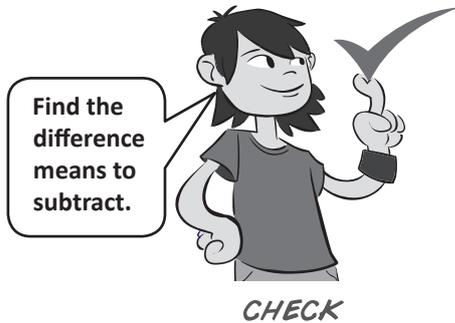
Showtown	971 km
Roper	893 km
Ringer	692 km
Eagle Bay	595 km
Normanville	567 km

a What is the distance between Ringer and Normanville?

	H	T	U	
	6	⁸9̷	¹2	
−	5	6	7	
	1	2	5	km

b What is the distance between Roper and Eagle Bay?

	H	T	U	
	⁷8̷	¹⁸9̷	¹3	
−	5	9	5	
	2	9	8	km

c What is the distance between Showtown and Ringer?

	H	T	U	
	⁸9̷	¹⁶7̷	¹1	
−	6	9	2	
	2	7	9	km

d What is the distance between Roper and Normanville?

	H	T	U	
	8	⁸9̷	¹3	
−	5	6	7	
	3	2	6	km

Written methods – 4 digit addition

1 **Add these 4 digit numbers:**

a

	Th	H	T	U
	3	3	5	3
+	1	0	2	1
	4	3	7	4

b

	Th	H	T	U
	2	5	4	6
+	5	4	3	1
	7	9	7	7

c

	Th	H	T	U
	4	5	2	4
+	2	1	6	4
	6	6	8	8

d

	Th	H	T	U
	3	6	3	1
+	1	3	5	7
	4	9	8	8

e

	Th	H	T	U
	1	2	5	2
+	5	3	3	3
	6	5	8	5

f

	Th	H	T	U
	2	4	3	2
+	5	3	4	6
	7	7	7	8

2 **Add these 4 digit numbers by regrouping:**

a

	Th	H	T	U
			1	
	6	6	3	8
+	1	2	3	6
	7	8	7	4

b

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

c

	Th	H	T	U
			1	
	3	4	2	9
+	1	1	3	9
	4	5	6	8

3 **Add these 4 digit numbers by regrouping:**

a

	Th	H	T	U
		1	1	
	2	4	6	6
+	2	1	8	7
	4	6	5	3

b

	Th	H	T	U
		1	1	
	3	1	8	7
+	3	0	5	9
	6	2	4	6

c

	Th	H	T	U
		1	1	
	3	2	9	6
+	2	1	5	8
	5	4	5	4

Written methods – addition and subtraction challenges

1 Write the numbers which are above each problem in the correct place:

a [4] [3] [9]

```
    3   6   2
+   4   3   7
─────────────
    7   9   9
```

b [8] [3] [3] [2]

```
    8   6   5
−   4   3   2
─────────────
    4   3   3
```

c [6] [5] [1]

```
    6   3   5
+   2   1   3
─────────────
    8   4   8
```

d [3] [6] [7]

```
    5   6   7
−   3   2   4
─────────────
    2   4   3
```

2 Solve these. The same symbol means the same number.

a
```
      ◆   3   ◆
+     ◆   ◆   4
──────────────────
  1   0   8   9
```
◆ = [5]

b
```
      6   2   9
+     ♥   1   ♥
──────────────────
  1   1   4   4
```
♥ = [5]

c
```
  ★   8   ★
−  3   ★   2
──────────────
  1   ★   2
```
★ = [4]

d
```
  ☺   4   1
−  2   3   ☺
──────────────
  3   0   6
```
☺ = [5]

Getting ready

This is a game for four players. Each player will need to copy and cut out the digit cards below. They will also need the addition frame on this page and a piece of scrap paper to write the answer on.

copy

0	1	2	3	4
5	6	7	8	9
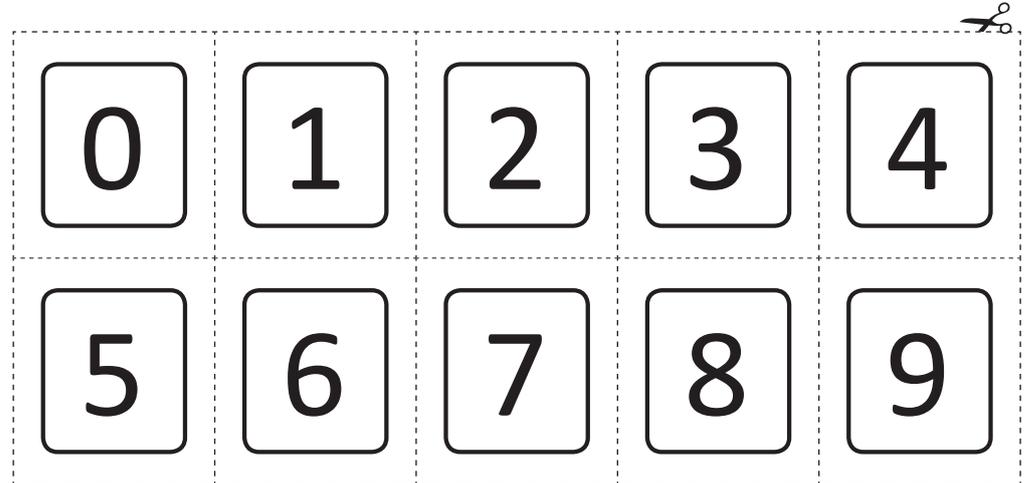
What to do

Choose one person to be the caller.

This person calls out the single digits above, randomly one at a time.

The other players place the digits in a box in the frame below, in any order. Players must think carefully about which square to place the digit, in order to create the largest total.

When all the players have filled in the frame, they complete the addition.

The biggest answer scores a point. Play the best out of 5.
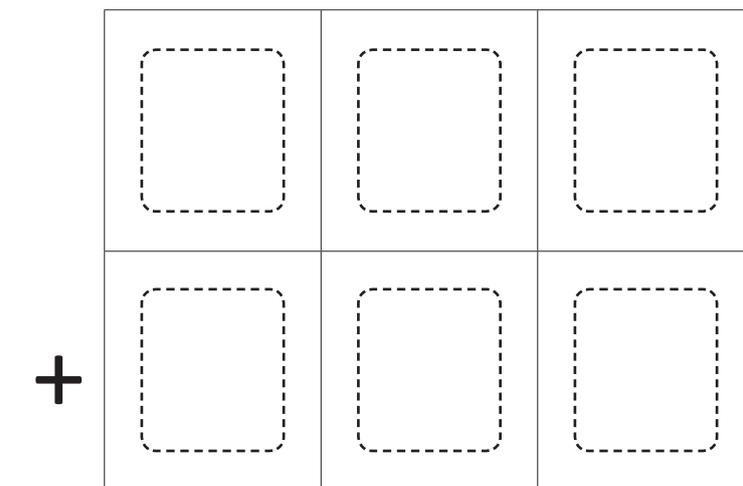
Addition and Subtraction

Claim the difference

Getting ready

This is a game for two players. Each player will need to copy and cut out the digit cards. To play you need to share the number grid on this page. Each player should have a piece of scrap paper to write the answer on and three counters in the same colour, but different to the other player.

C copy

What to do

The aim of the game is to claim any 3 numbers on the grid below. Each player lays their digit cards upside down in front of them. They then turn over four of the cards to form two 2 digit numbers and find the difference.

If the answer is on the grid, they claim it by placing a counter on the number. If it's not, they can have a chance at rearranging the four cards they turned over, to create a number on the grid. If they can't do this, it's the next player's turn.

Digit cards ✂

0	1
2	3
4	5
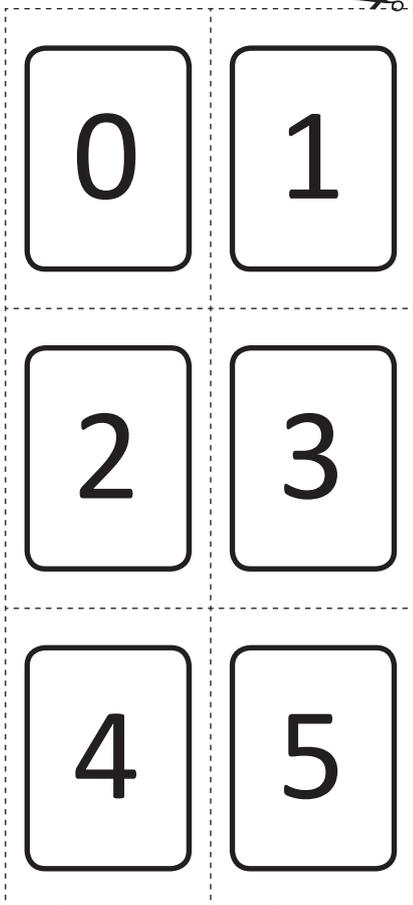
14	42	22	12
31	13	5	9
18	31	29	11
27	28	6	17

Money – coin combinations

It is important that you are able to recognise these notes and coins so that you are able to spend and save your money wisely.
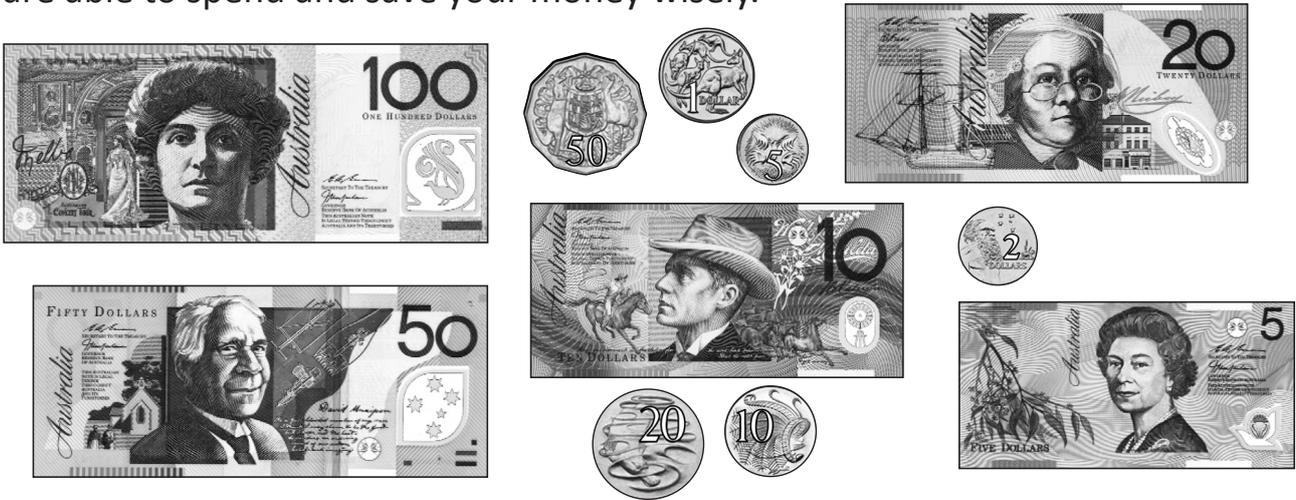
1 Calculate the total of each group of cash:

a

$18

b

$37

c

$7

d

$22

E 4
SERIES TOPIC

Addition and Subtraction

Money – coin combinations

2 **Make up each amount below using notes and coins in two different ways:**

a Show $20:   *Answers will vary.*

b Show $50:   *Answers will vary.*
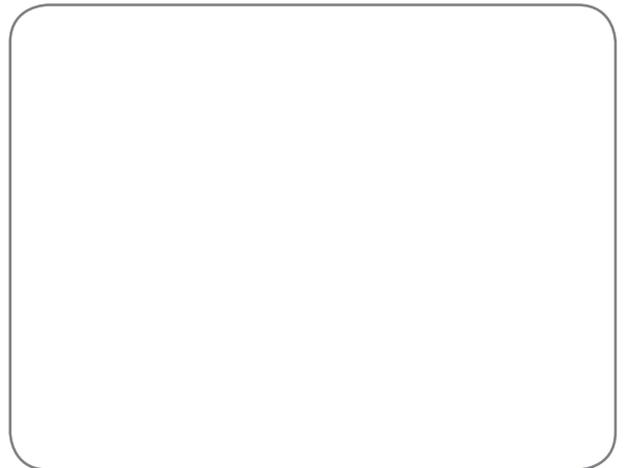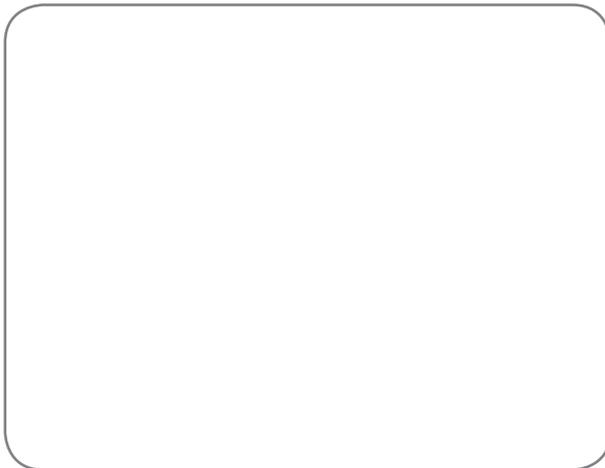
c Show $100:   *Answers will vary.*
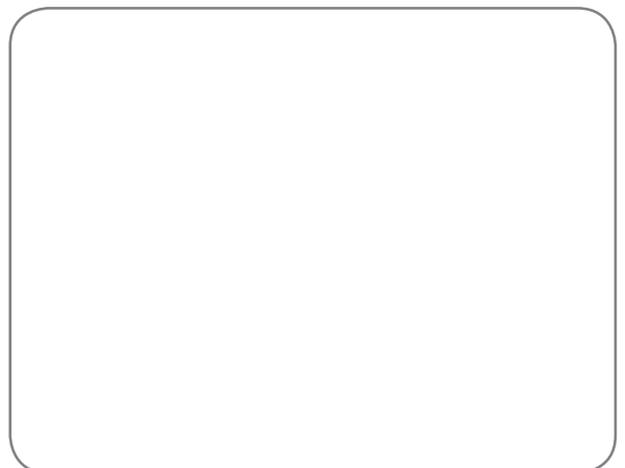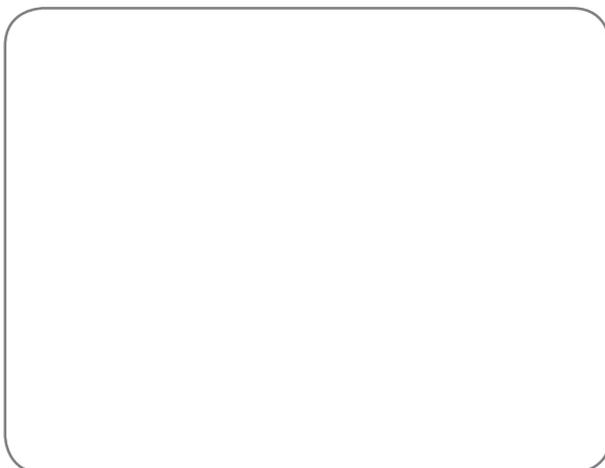
Money – finding change

When you buy something and you don't have the exact combination of notes and coins, you can pay with a larger amount and get the difference back. This is called change.

If I paid for these flowers with $20, my change would be $8.

$12

1 Find the change for each amount below. You could bridge to the next dollar and count on or use a written subtraction. Show all your workings:

a I had $100. I spent $68.

Workings will vary.

Change = $32

b I had $50. I spent $22.

Change = $28

c I had $20. I spent $16.50.

Change = $3.50

d I had $120. I spent $60.

Change = $60

e I had $100. I spent $75.

Change = $25

f I had $50. I spent $42.

Change = $8

E SERIES 4 TOPIC

Addition and Subtraction
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Money – using money

When you plan a party, you usually buy things such as food, drink and party favours. It's a good idea to set a budget before you go shopping so that you don't spend too much.

1 **Here is a price list of party items:**

Food	
Sausage rolls	$3.20
Pizza slices	$8.95
Burgers	$7.65

Drink	
Orange juice	$2.75
Lemonade	$3.10
Cola	$3.25

Party favours	
10 party hats	$3.80
10 balloons	$1.90
4 game prizes	$5.60

a Which two items of food and drink could I buy for less than $10? Show the change.

Sample answer:

Sausage rolls $3.20   *$10 − $6.45 = $3.55*
Cola   + $3.25
*   = $6.45*   Change = $3.55

b Maxine bought a type of party food. If her change was $2.35 and she paid with a $10 note, what did she buy?

Burgers

c Look at the price lists for the party items at the top of this page. Use a calculator to add up the total amount on Heidi's shopping list.

d Heidi's budget is $50. Suggest something to take off the total.

Answers will vary.

Heidi's shopping list:

2 packs of sausage rolls .. $6.40

4 packs of pizza slices $35.80

10 party hats $3.80

20 balloons.................... $3.80

Orange juice $2.75

Lemonade...................... $3.10

Total $55.65

Getting ready

This is a game for three players. You will need a die and each player needs a copy of page 41 to record the change.

You may wish to make extra copies of page 41 so you can play again.

What to do

The aim of the game is to end up with the most amount of money at the end of each round.

Roll the die to find what you are calculating change for. Record the number you rolled and the change in the table. Take turns. When you have filled in the table for each round, calculate the total amount of change. The most change scores 5 points. Play for three rounds to decide the overall winner.

Die number	Amount you have	Amount you spend
●	$20	It's your friend's birthday, you spend $5.25 on a card.
⚁	$15	You spend $7.50 on school supplies.
⚂	$5	You buy some lollies for $3.85.
⚃	$5	You spend $4.25 downloading songs from the internet.
⚄	$10	A trip to the movies costs $7.80.
⚅	$20	You are fined $17.80 for littering.

Addition and Subtraction

C
copy

Round 1	
Number rolled	**Change**
Total	

Round 2	
Number rolled	**Change**
Total	

Round 3	
Number rolled	**Change**
Total	