

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:

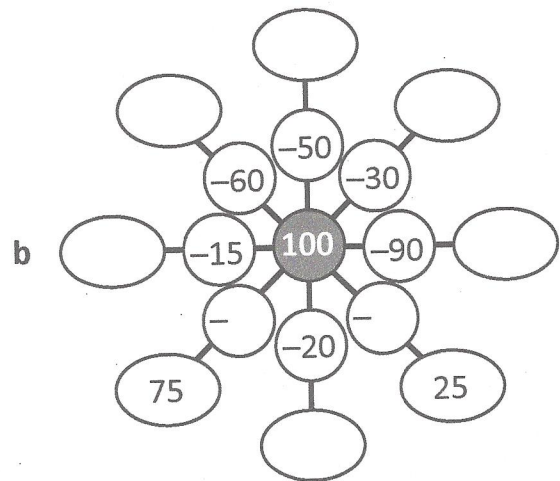
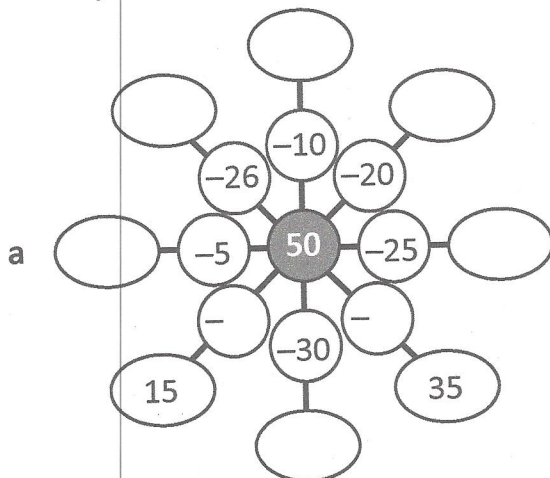
a Complements to 20. There are three to find. The first one has been done for you.

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:



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 $18 + 2 + 30 + 20 + 10 + 10 =$ _____

c $25 + 25 + 40 + 30 + 20 + 10 =$ _____

d $15 + 35 + 20 + 30 + 10 + 12 =$ _____

Addition mental strategies – number complements

4 Complete the complements to 50:

a + 38 = 50

b + 17 = 50

c 25 + = 50

d 32 + = 50

e + 46 = 50

f + 28 = 50

g 14 + = 50

h 7 + = 50

5 Complete the complements to 100:

a + 54 = 100

b + 22 = 100

c + 46 = 100

d 33 + = 100

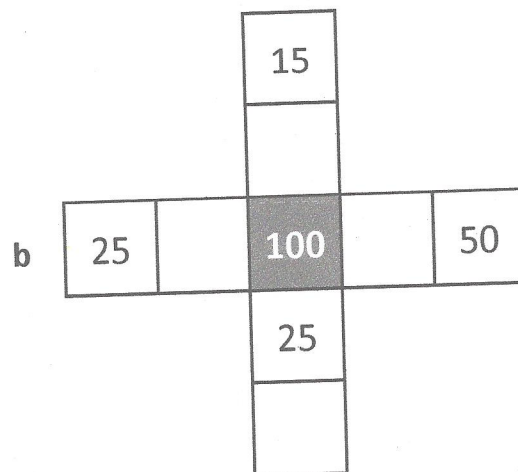
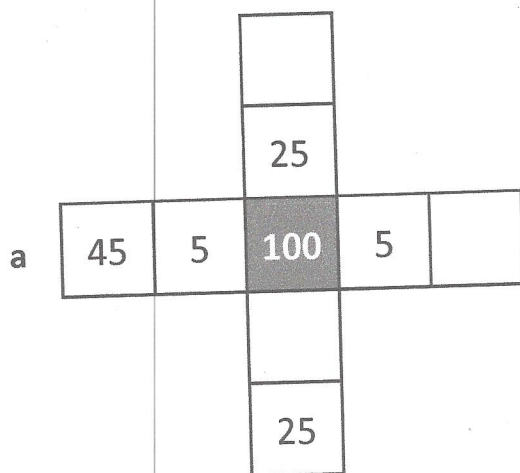
e 62 + = 100

f 25 + = 100

g + 45 = 100

h + 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.



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 =

double 2 =

double 3 =

double 4 =

double 5 =

double 6 =

double 7 =

double 8 =

double 9 =

b double 1 + 1 =

double 2 + 1 =

double 3 + 1 =

double 4 + 1 =

double 5 + 1 =

double 6 + 1 =

double 7 + 1 =

double 8 + 1 =

double 9 + 1 =

c double 1 - 1 =

double 2 - 1 =

double 3 - 1 =

double 4 - 1 =

double 5 - 1 =

double 6 - 1 =

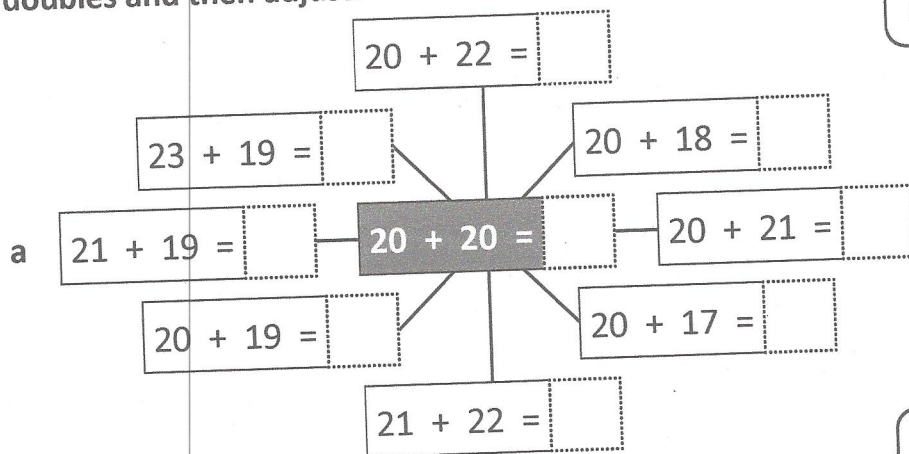
double 7 - 1 =

double 8 - 1 =

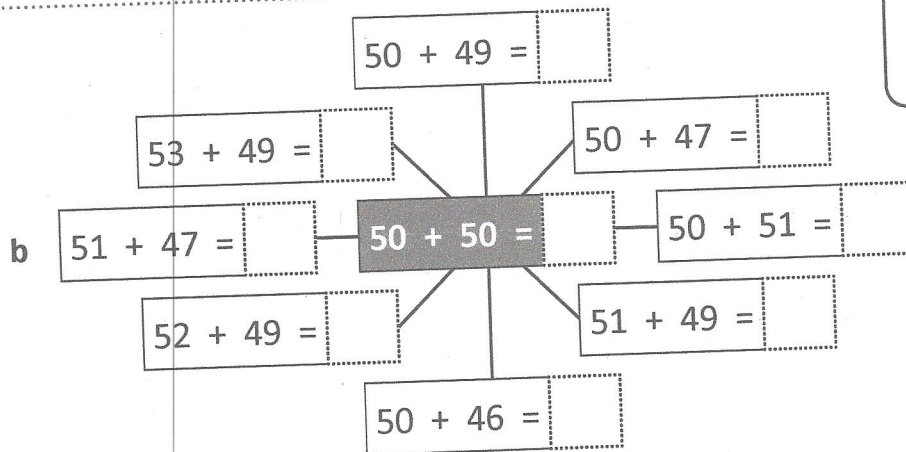
double 9 - 1 =

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.



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



CHECK

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

a $30 + 32$

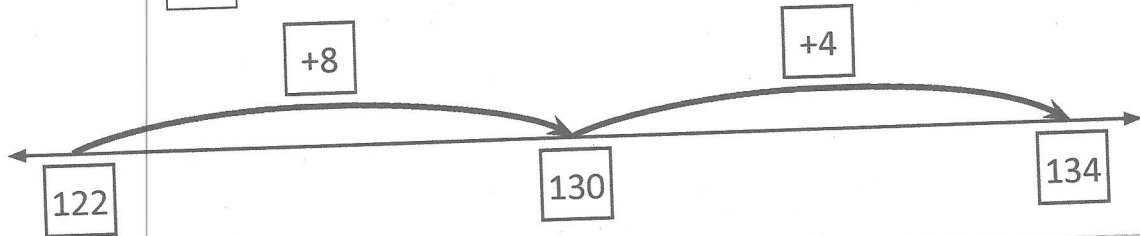
b $25 + 23$

c $100 + 97$

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 $145 \xrightarrow{+5} 150$

b $243 \xrightarrow{\square} \square$

c $558 \xrightarrow{\square} \square$

d $167 \xrightarrow{\square} \square$

e $346 \xrightarrow{\square} \square$

f $179 \xrightarrow{\square} \square$

2 Use the number lines to bridge to ten:

a $253 + 15 = \square$

A number line starting at 253. An arrow points to a box, and another arrow points to a second box. There are '+' signs above each jump.

b $464 + 14 = \square$

A number line starting at 464. An arrow points to a box, and another arrow points to a second box. There are '+' signs above each jump.

c $671 + 17 = \square$

A number line starting at 671. An arrow points to a box, and another arrow points to a second box. There are '+' signs above each jump.

Addition mental strategies – bridge to ten

3 Write a problem that matches the number line:

a $\square + \square = \square$

A number line with three boxes. The first box is on the left, the second is in the middle, and the third is on the right. An arrow points from the first box to the second box, labeled with a box containing '+3'. A second arrow points from the second box to the third box, labeled with a box containing '+9'.

b $\square + \square = \square$

A number line with three boxes. The first box is on the left, the second is in the middle, and the third is on the right. An arrow points from the first box to the second box, labeled with a box containing '+6'. A second arrow points from the second box to the third box, labeled with a box containing '+8'.

c $\square + \square = \square$

A number line with three boxes. The first box is on the left, the second is in the middle, and the third is on the right. An arrow points from the first box to the second box, labeled with a box containing '+4'. A second arrow points from the second box to the third box, labeled with a box containing '+7'.

4 Complete these addition grids by bridging to the next ten in your head:

a

+	356	78	586	287	385	984
12						

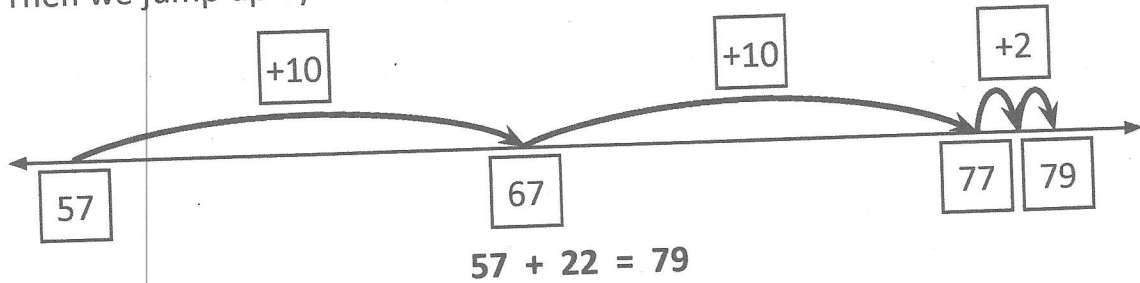
b

+	298	566	252	176	368	146
16						

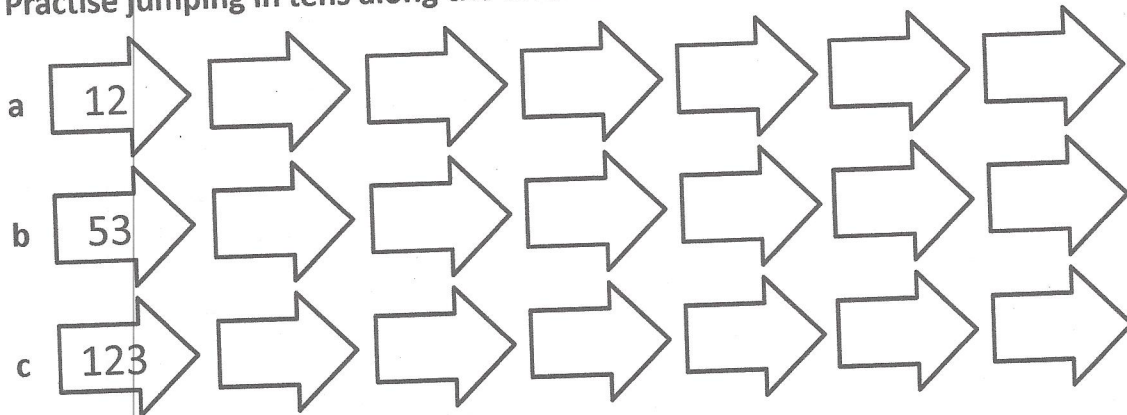
Addition mental strategies – jump strategy

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

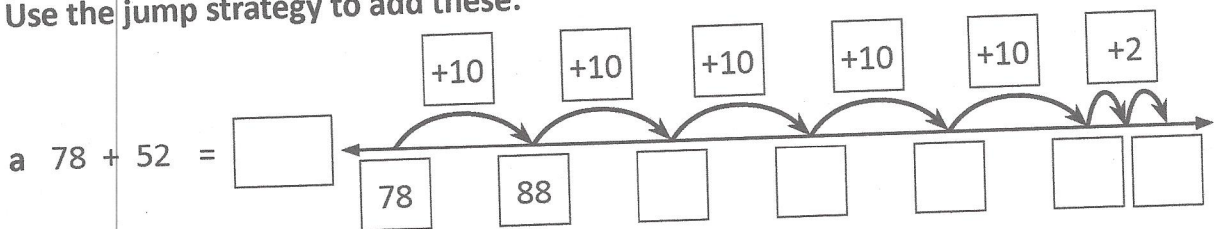
- 1 First we jump up by the tens.
- 2 Then we jump up by the ones.



1 Practise jumping in tens along the arrows:



2 Use the jump strategy to add these:



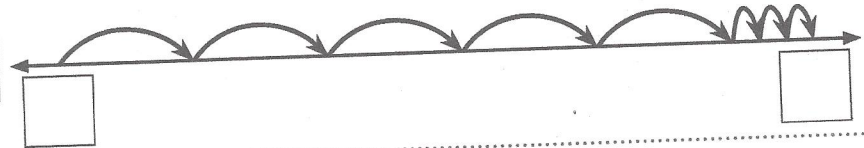
Addition mental strategies – jump strategy

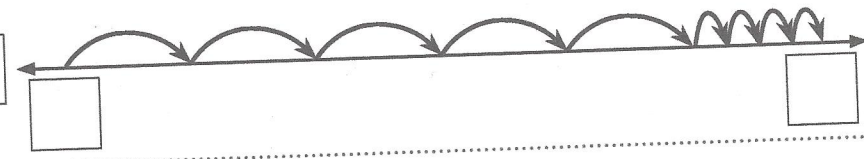
3 Below are some number lines that only show the jumps. Complete the number line for the problem that matches and then write the complete problem.

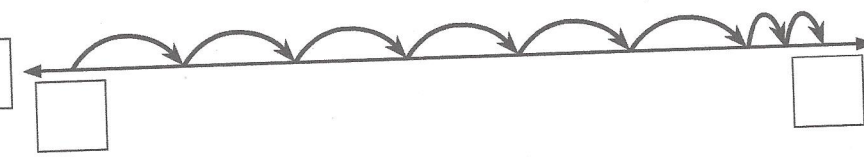
$$187 + 54$$

$$179 + 62$$

$$78 + 53$$

a $\square + \square = \square$ 

b $\square + \square = \square$ 

c $\square + \square = \square$ 

4 Use the jump strategy to add these:

Shirt sales				
Day	Red	Green	Striped	Plaid
Saturday	165	82	55	135
Sunday	43	98	65	36

a How many red shirts were sold over the weekend?

$$\square + \square = \square$$


b How many green and striped shirts were sold on Saturday?

$$\square + \square = \square$$


c How many plaid shirts were sold over the weekend?

$$\square + \square = \square$$


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.

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

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

a $48 \begin{cases} 40 \\ 8 \end{cases}$

b $63 \begin{cases} \square \\ \square \end{cases}$

c $52 \begin{cases} \square \\ \square \end{cases}$

d $27 \begin{cases} \square \\ \square \end{cases}$

- 2 Practise adding the tens to these numbers:

+	20	50	30	70	60
123					
214					

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

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

b $65 + 38 \begin{cases} \square \\ \square \end{cases} \rightarrow \square \rightarrow \square$

c $112 + 25 \begin{cases} \square \\ \square \end{cases} \rightarrow \square \rightarrow \square$

d $332 + 66 \begin{cases} \square \\ \square \end{cases} \rightarrow \square \rightarrow \square$

Addition mental strategies – split strategy version 2

Here is another way to use the split strategy.

$$42 + 32 = (4 \text{ tens} + 3 \text{ tens}) + (2 \text{ ones} + 2 \text{ ones})$$

$$= 7 \text{ tens} + 4 \text{ ones}$$

$$= 74$$

1 Use this way to add these:

a $63 + 37 = (\square + \square) + (\square + \square)$
 tens tens ones ones
 $= \square + \square$
 tens ones
 $= \square$

b $88 + 23 = (\square + \square) + (\square + \square)$
 tens tens ones ones
 $= \square + \square$
 tens ones
 $= \square$

c $56 + 15 = (\square + \square) + (\square + \square)$
 tens tens ones ones
 $= \square + \square$
 tens ones
 $= \square$

d $65 + 28 = (\square + \square) + (\square + \square)$
 tens tens ones ones
 $= \square + \square$
 tens ones
 $= \square$

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



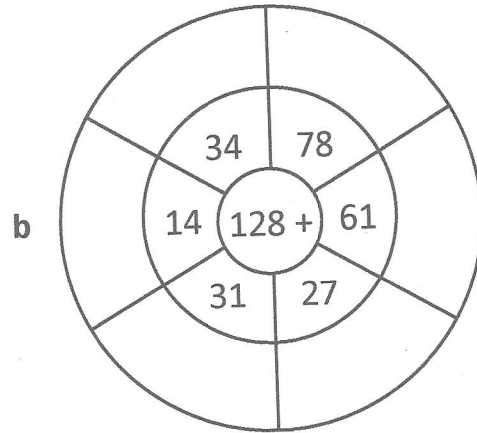
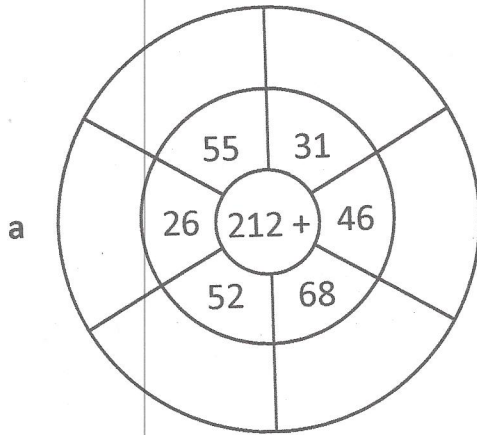
REMEMBER

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

+	23	78	63	55	36
45					
39					

Addition mental strategies – applying the split strategy

1 Complete these addition wheels with the split strategy:



The split strategy is useful when adding three 2 digit numbers.
Try adding tens, then the ones and recording it this way:

$$61 + 43 + 44 = 14 \text{ tens} + 8 \text{ ones} = 140 + 8 = 148$$

2 Record these place value amounts:

a 8 tens =

b 17 tens =

c 15 tens =

d 5 ones =

e 12 tens =

f 16 ones =

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	<i>3 tens + 9 ones</i>	39
b	Dan	23, 4, 11		
c	Lily	21, 6, 14		
d	Jo	20, 8, 12		
e	Julio	4, 22, 12		



The winner is:

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:

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

$$23 + 20 \text{ (} \ominus 1 \text{)} \quad \textit{I rounded up by 1,}$$

$$43 \text{ (} \ominus 1 \text{)} = 42 \quad \textit{so I subtract 1.}$$

1 Practise rounding:

a $\boxed{148} \rightarrow \boxed{}$

b $\boxed{39} \rightarrow \boxed{}$

c $\boxed{47} \rightarrow \boxed{}$

d $\boxed{109} \rightarrow \boxed{}$

e $\boxed{96} \rightarrow \boxed{}$

f $\boxed{199} \rightarrow \boxed{}$

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

a $32 + 29 = \boxed{}$

$$\begin{array}{r} 32 + 30 \\ \hline \end{array} \begin{array}{l} \text{ } \ominus 1 \\ \text{ } \ominus 1 \end{array} = \boxed{}$$

b $55 + 38 = \boxed{}$

$$\begin{array}{r} 55 + 40 \\ \hline \end{array} \begin{array}{l} \text{ } \ominus 2 \\ \text{ } \ominus 2 \end{array} = \boxed{}$$

c $66 + 19 = \boxed{}$

$$\begin{array}{r} 66 + \text{ } \\ \hline \end{array} \begin{array}{l} \text{ } \ominus 1 \\ \text{ } \ominus 1 \end{array} = \boxed{}$$

d $22 + 39 = \boxed{}$

$$\begin{array}{r} 22 + \text{ } \\ \hline \end{array} \begin{array}{l} \text{ } \ominus 1 \\ \text{ } \ominus 1 \end{array} = \boxed{}$$

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 $75 + 22 = \square$

$75 + 20 \bigcirc$
 $\underline{\hspace{2cm}} \bigcirc = \square$

b $45 + 41 = \square$

$45 + 40 \bigcirc$
 $\underline{\hspace{2cm}} \bigcirc = \square$

c $26 + 32 = \square$

$26 + \underline{\hspace{2cm}} \bigcirc$
 $\underline{\hspace{2cm}} \bigcirc = \square$

d $66 + 53 = \square$

$66 + \underline{\hspace{2cm}} \bigcirc$
 $\underline{\hspace{2cm}} \bigcirc = \square$

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



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 $125 + 48 = \square$ A

b $115 + 41 = \square$ R

c $55 + 51 = \square$ C

d $715 + 28 = \square$ E

156	173	106	743	106	173	156



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.



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

□	□	+	□	□	=
---	---	---	---	---	---



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