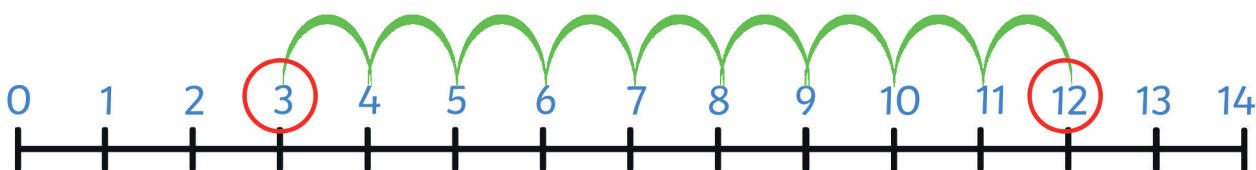


Addition Strategies

Number Line

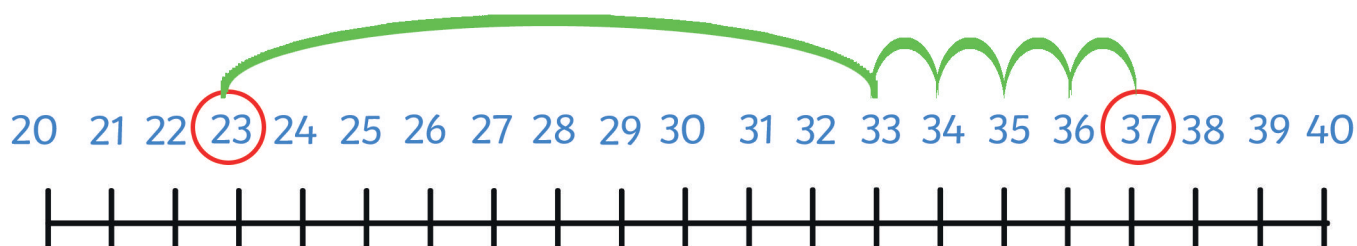
$$3 + 9$$



Draw a number line. Start at 3 and hop 9 hops to find the answer.

$$3 + 9 = 12$$

$$23 + 14$$



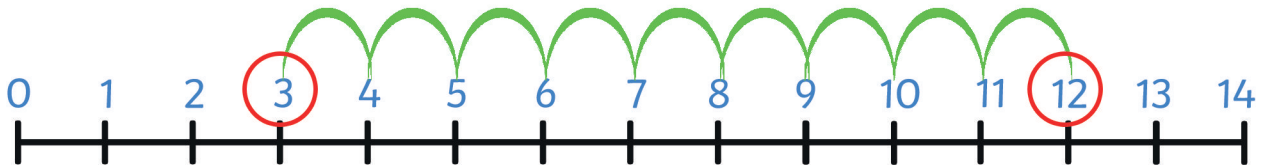
Draw a number line. Start at 23, partition 14 into tens and ones.
Do one hop of 10 and then 4 hops of 1 to reach the answer.

$$23 + 14 = 37$$

Addition Strategies

Number Line

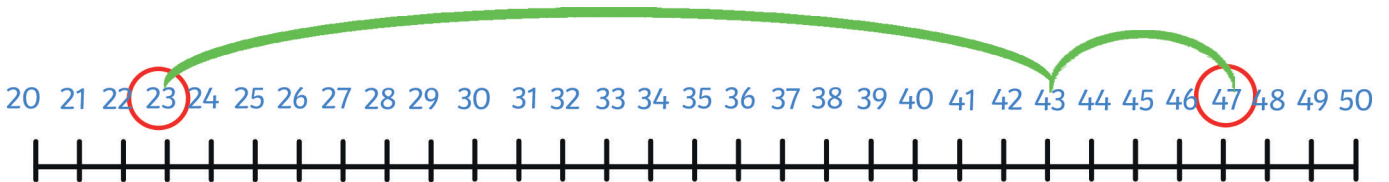
$$3 + 9$$



Draw a number line. Start at 3 and hop 9 hops to find the answer.

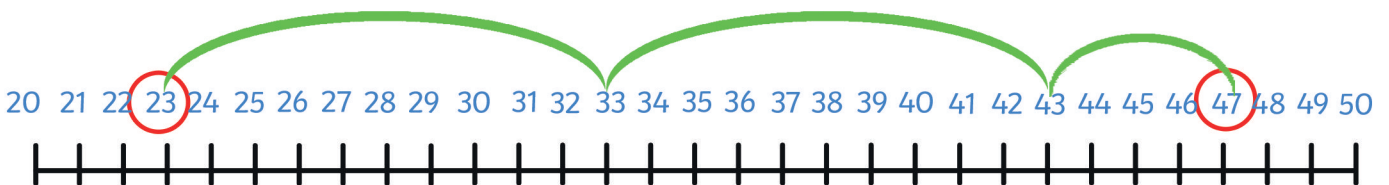
$$3 + 9 = 12$$

$$23 + 24$$



Draw a number line. Start at 23. Partition 24 into 1 hop of 20 and one hop of 4 to get the answer.

or



Draw a number line. Start at 23. Partition 24 into two hops of 10 and 1 hop of 4 to get the answer.

$$23 + 24 = 47$$

Addition Strategies

Partitioning

$$52 + 76$$

$$\begin{array}{r} 50 + 2 \\ + 70 + 6 \\ \hline 120 + 8 = 128 \\ \hline \end{array}$$

- Write the numbers underneath each other lining up the tens and ones.
- Partition the tens and ones.
- Add the tens.
- Add the ones.
- Combine the totals.

Addition Strategies

Expanded Columns

Write the numbers underneath each other lining up the tens and ones.

$$\begin{array}{r} 54 \\ + 68 \\ \hline \end{array}$$

Add the ones.

$$12$$

Add the tens.

$$+110$$

Combine your ones and tens.

Line up any hundreds.

$$122$$

Addition Strategies

Column Method

$$\begin{array}{r} 1 \\ 65 \\ + 72 \\ \hline 137 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \ 1 \\ 296 \\ + 46 \\ \hline 342 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \ 1 \\ 276 \\ + 459 \\ \hline 735 \\ \hline \end{array}$$

- Write the numbers underneath each other and line up the hundreds, tens and ones.
- Add the units and regroup any tens.
- Add the tens and regroup any hundreds.
- Add the hundreds.

Division Strategies

Dividing by 10

Use place value to work out how to divide in 10s

$$674 \div 10 = ?$$

If you divide a number by 10, the digits move one place value to the right.

Hundreds	Tens	Ones	Tenths	Hundredths
6	7	4	.	

Hundreds	Tens	Ones	Tenths	Hundredths
	6	7	.	4

$$674 \div 10 = 67.4$$

If you divide a number by 100, the digits will move two places to the right.

Hundreds	Tens	Ones	Tenths	Hundredths
6	7	4	.	

Hundreds	Tens	Ones	Tenths	Hundredths	
		6	.	7	4

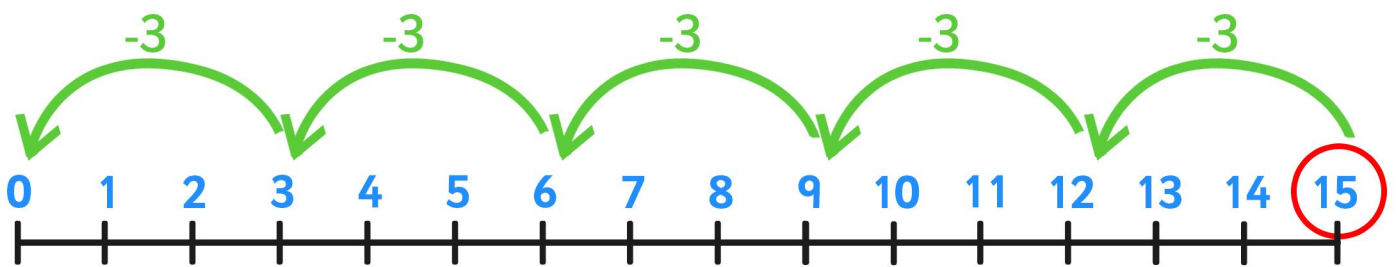
$$674 \div 100 = 6.74$$

Division Strategies

Repeated Subtraction

You can use repeated subtraction to see how many times a smaller number goes into a bigger one.

$$15 \div 3 = ?$$



The number of times you can take 3 from 15 is 5.

$$15 - 3 - 3 - 3 - 3 - 3 = 0$$

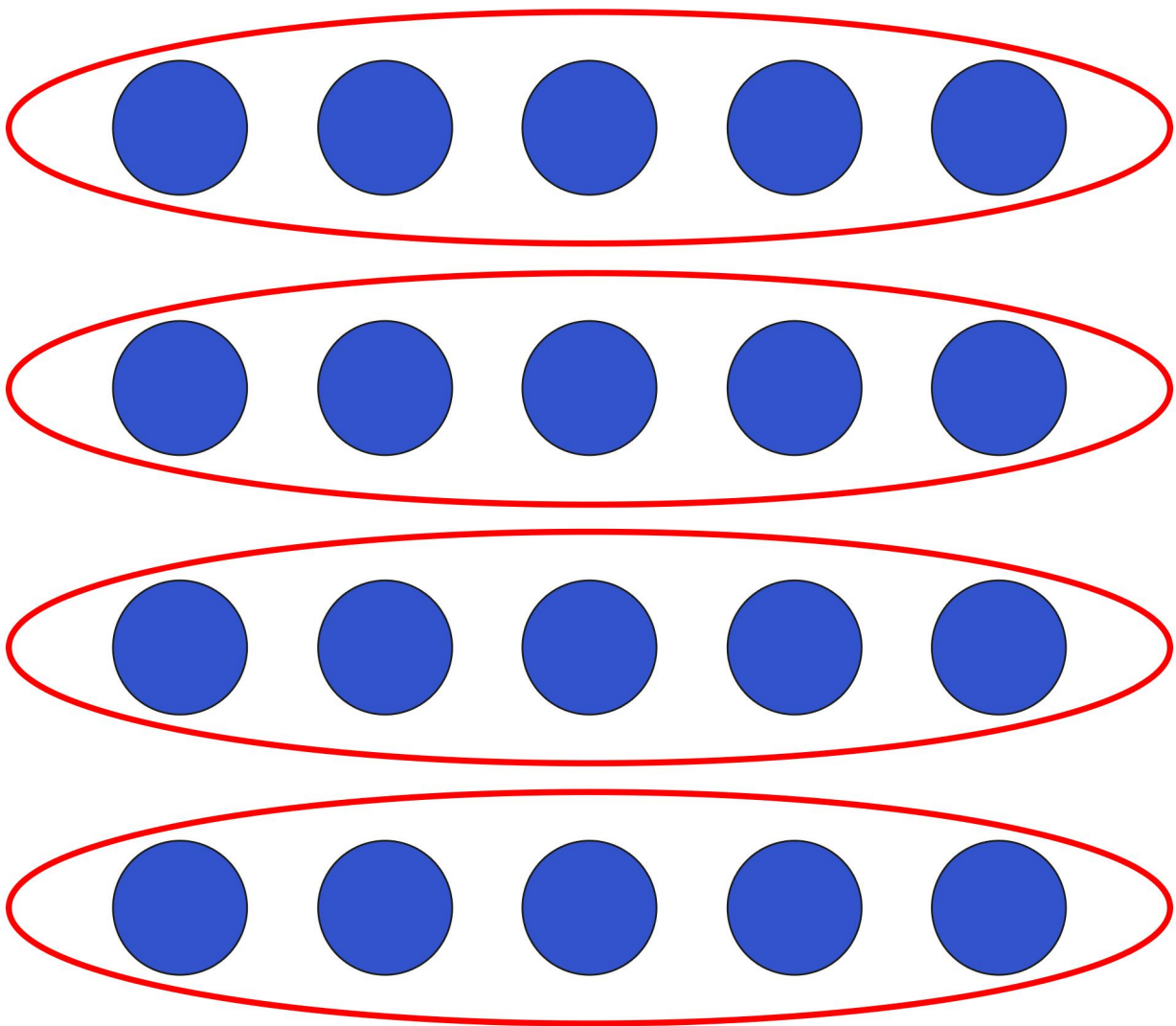
$$15 \div 3 = 5$$

Division Strategies

Grouping

$$20 \div 5 = 4$$

20 divided by 5 gives 4 groups.



Grouping using arrays.

Division Strategies

Repeated Addition

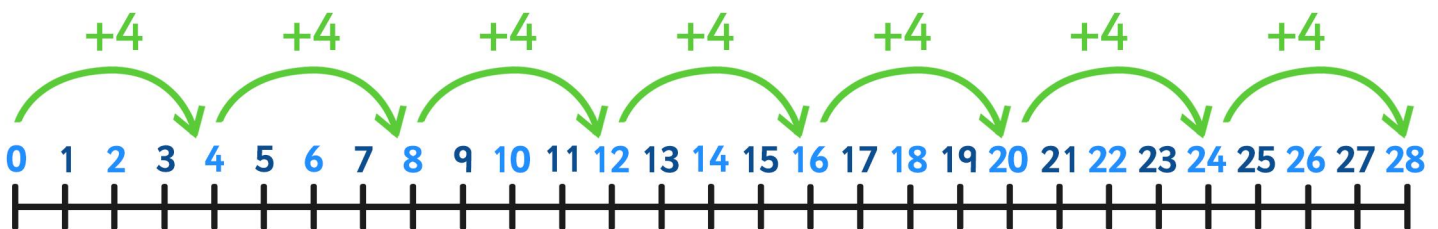
$$28 \div 4 = 7$$

Draw a number line starting at 0.

Count on in 4s until you reach 28.

Count how many hops it took.

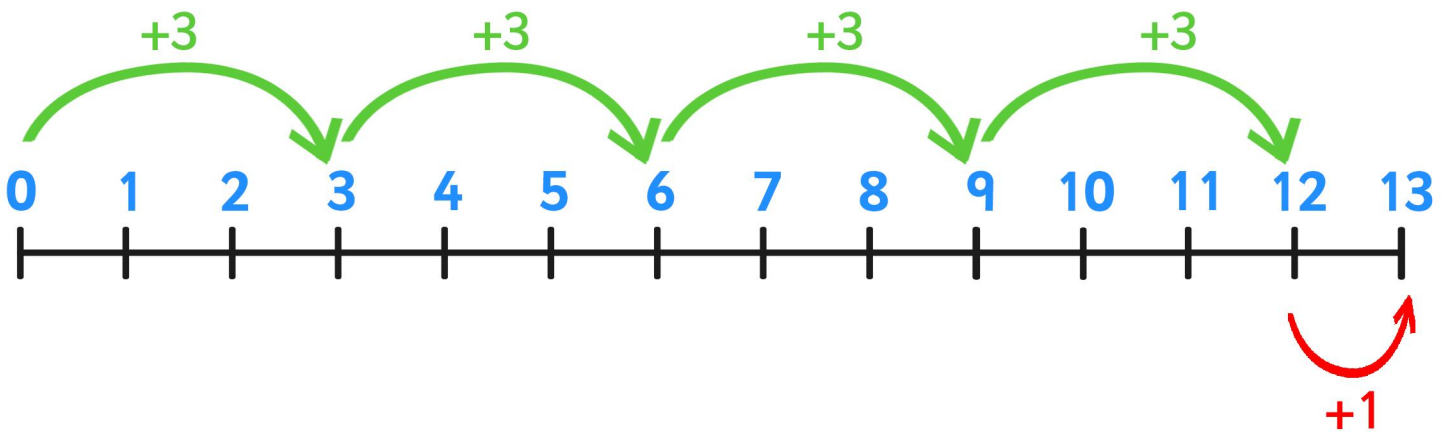
28 divided by 4 is 7.



Division Strategies

Repeated Addition (with remainders)

$$13 \div 3 = 4 \text{ r } 1$$



Draw a number line starting at 0.

Count on in 3s getting as close to 13 as you can but not going past it.

Count your hops to get the answer.

Any left over is the remainder.

Division Strategies

Partitioning

$$84 \div 4$$

$$80 \div 4 = 20$$

$$4 \div 4 = 1$$

21

Partition the number into tens and ones.

Divide the tens and ones.

Combine your totals.

$$84 \div 4 = 21$$

Division Strategies

Inverse

Use multiplication tables to work out a division question.

$$63 \div 9 = ?$$

You can work this out by knowing...

$$7 \times 9 = 63$$

So using the inverse, we know that...

$$63 \div 9 = 7$$

Division Strategies

Halving

Sometimes you can use halving to divide into 2s, 4s, and 8s.

$$120 \div 2 = 60$$

We can use this to divide by 4 by halving twice.

$$120 \div 2 = 60$$

then

$$60 \div 2 = 30$$

so

$$120 \div 4 = 30$$

We can use this to divide by 8 by halving 3 times.

$$120 \div 2 = 60$$

then

$$60 \div 2 = 30$$

then

$$30 \div 2 = 15$$

so

$$120 \div 8 = 15$$

Division Strategies

Short Division

two digit numbers

$$84 \div 6 = ?$$

Partition 84 into tens and ones.

Work out how many 6s divide into 80 so that the answer is a multiple of 10.

In this case the highest multiple of 10 divisible by 6 is 60.

Partition 84 into 60 and 24 then divide each number by six.

Combine your totals.

$$\begin{array}{r} 10 + 4 = 14 \\ \hline 6 \overline{) 60 + 24} \end{array}$$

This method can be shortened to:

$$\begin{array}{r} 14 \\ \hline 6 \overline{) 8^2 4} \end{array}$$

Division Strategies

Short Division

three digit numbers

$$434 \div 7 = ?$$

Work out how many 7s go into 430. (The answer must be a multiple of 10.)

In this case 7 goes into 430 sixty times leaving a remainder of 10.

Add this 10 to the remaining 4 from the original 434 to make 14.

Divide 14 by 7 to get 2.

Combine 60 and 2 to get the answer.

$$7 \overline{) 430 + 4} = 7 \overline{) 420 + 14} \quad \begin{array}{r} 60 + 2 \\ \hline \end{array}$$

This method can be shortened to:

$$7 \overline{) 43^1 4}$$

Division Strategies

Long Division

$$399 \div 15 = ?$$

$$\begin{array}{r} 26 \frac{3}{5} \\ 15 \overline{) 399} \\ \underline{300} \\ 99 \\ \underline{90} \\ r9 \\ \frac{9}{15} = \frac{3}{5} \end{array}$$

First partition the number.

Divide 300 by 15. Write this on the answer line above the correct units.

Divide 99 by 15.

Write any remainders as a fraction as simplified as possible.

Division Strategies

Long Division

$$399 \div 15 = ?$$

divide

$$15 \overline{) 399}$$

$$\begin{array}{r} 26 \\ 15 \overline{) 399} \\ \underline{30} \\ 99 \end{array}$$

multiply

$$15 \overline{) 399} \\ \underline{30}$$

$$\begin{array}{r} 26 \\ 15 \overline{) 399} \\ \underline{30} \\ 99 \\ \underline{90} \end{array}$$

subtract

$$\begin{array}{r} 2 \\ 15 \overline{) 399} \\ \underline{- 30} \\ 9 \end{array}$$

$$\begin{array}{r} 26 \\ 15 \overline{) 399} \\ \underline{30} \\ 99 \\ \underline{- 90} \\ r9 \end{array}$$

bring down

$$\begin{array}{r} 2 \\ 15 \overline{) 399} \\ \underline{30} \\ 99 \end{array}$$

repeat!

$$399 \div 15 = 26 \text{ r}9$$

or

$$399 \div 15 = 26 \frac{9}{15}$$

Division Strategies

Long Division

$$4374 \div 27 = ?$$

divide

$$27 \overline{) 4374} \quad 1$$

multiply

$$27 \overline{) 4374} \quad 1$$
$$27$$

subtract

$$27 \overline{) 4374} \quad 1$$
$$\begin{array}{r} - 27 \\ \hline 16 \end{array}$$

bring down

$$27 \overline{) 4374} \quad 1$$
$$\begin{array}{r} 27 \\ \hline 167 \end{array}$$

repeat!

$$27 \overline{) 4374} \quad 16$$
$$\begin{array}{r} 27 \\ \hline 167 \end{array}$$

$$27 \overline{) 4374} \quad 16$$
$$\begin{array}{r} 27 \\ \hline 167 \\ 162 \end{array}$$

$$27 \overline{) 4374} \quad 16$$
$$\begin{array}{r} 27 \\ \hline 167 \\ - 162 \\ \hline 5 \end{array}$$

$$27 \overline{) 4374} \quad 16$$
$$\begin{array}{r} 27 \\ \hline 167 \\ - 162 \\ \hline 54 \end{array}$$

$$27 \overline{) 4374} \quad 162$$
$$\begin{array}{r} 27 \\ \hline 167 \\ - 162 \\ \hline 54 \end{array}$$

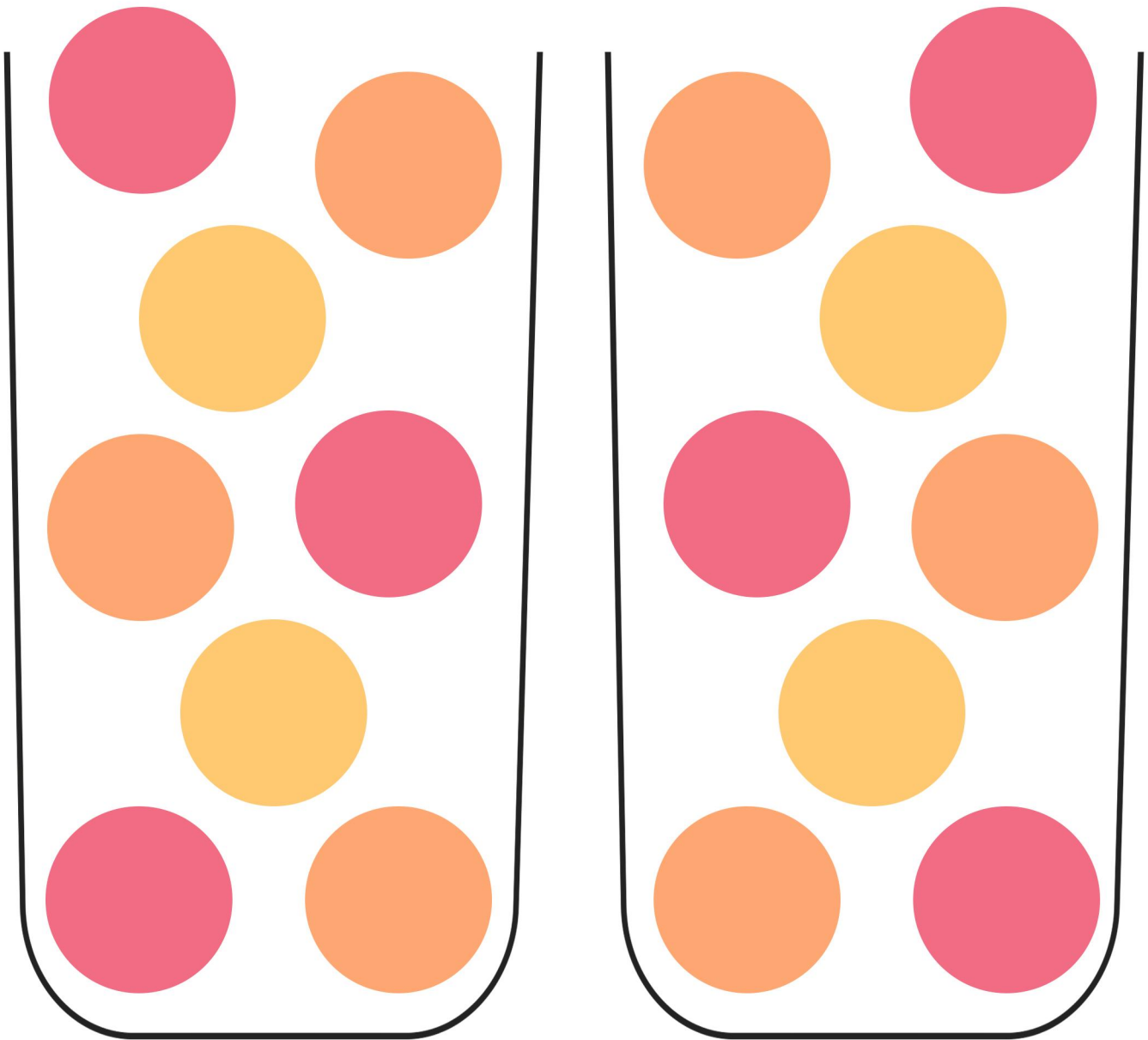
$$4374 \div 27 = 162$$

Division Strategies

Sharing

$$16 \div 2 = 8$$

16 shared equally between 2 gives you 8.

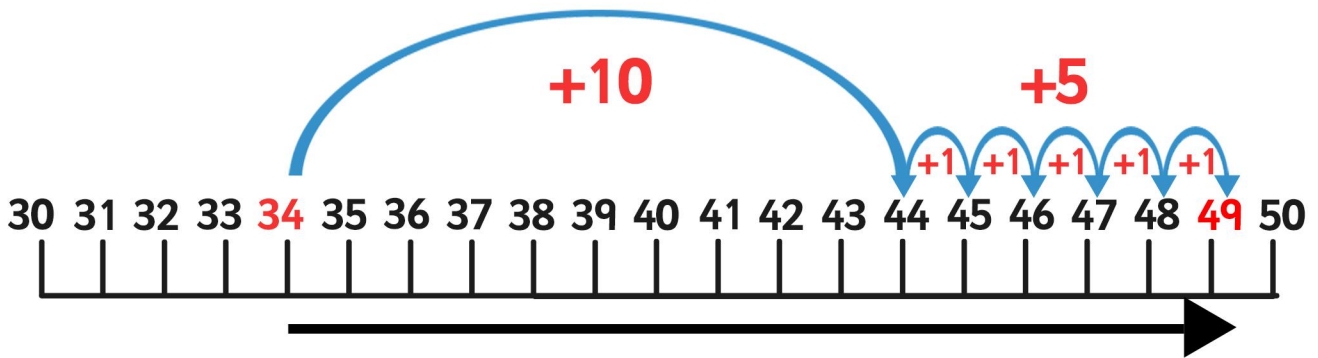


Mental Maths Strategies

Counting On

For adding and subtracting numbers close to each other.
This strategy works well with a number line or square.
You can even do it mentally!

$$34 + 15 =$$



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

Mental Maths Strategies

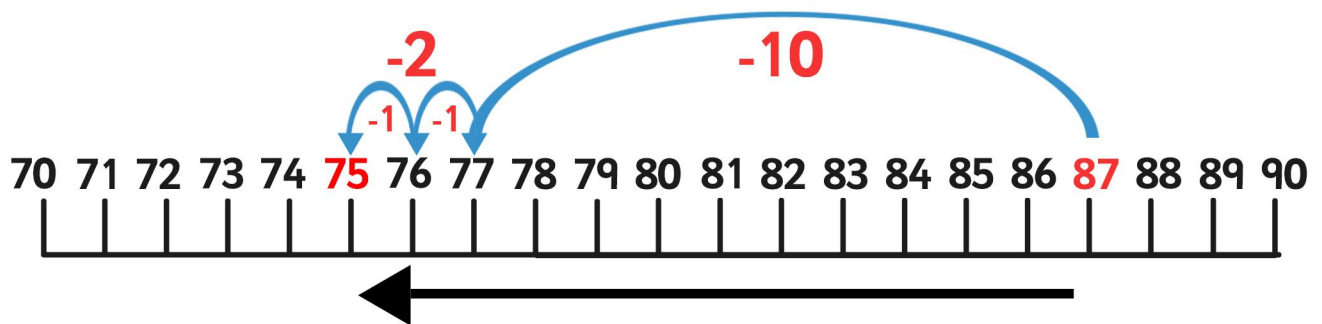
Counting Back

For subtracting smaller numbers.

This strategy works well with a number line or square.

You can even do it mentally!

$$87 - 12 =$$



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

Near Doubles

For adding similar numbers.

Double one of the numbers and adjust by adding or subtracting the difference.

$$26 + 25 =$$

I know double 25 is 50.

$$26 + 25 =$$

1 more than double 25 = 51

Near Halves

For subtracting when the number is a near half.

$$25 - 12 =$$

I know half of $24 = 12$

$$25 - 12 = 13$$

(25 is 1 more than 24, so answer is
1 more than $12 = 13$)

Mental Maths Strategies

Using Pairs to Ten

For adding where numbers add to 10, or ends with a 0.

$$23 + 67 =$$

$$\text{I know } 3 + 7 = 10$$

$$23 + 67 = 20 + 60 + 10 = 90$$

$$160 - 37 =$$

$$\text{I know } 10 - 7 = 3$$

$$160 - 37 = 160 - 30 - 7 = 130 - 7 = 123$$

Mental Maths Strategies

Part, Part, Whole

Use known facts to add and subtract.

$$17 - 8 =$$

I know $8 + 9 = 17$

so

$$17 - 8 = 9$$

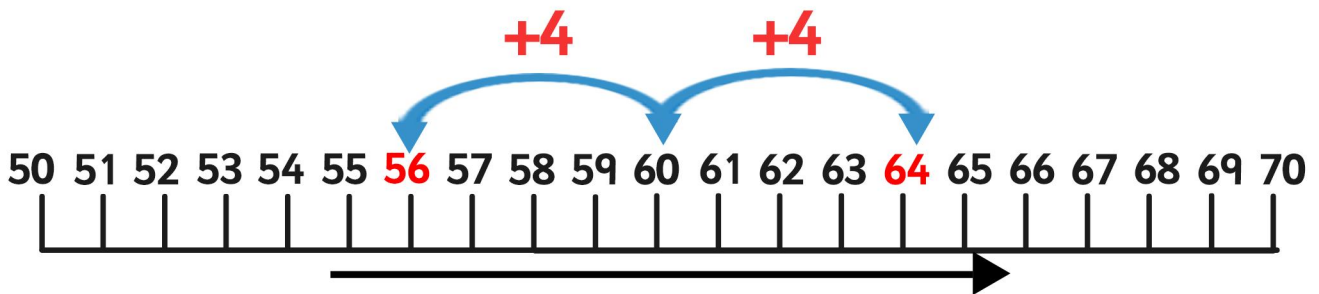
Mental Maths Strategies

Make Ten and Then Some

Add or subtract past tens.

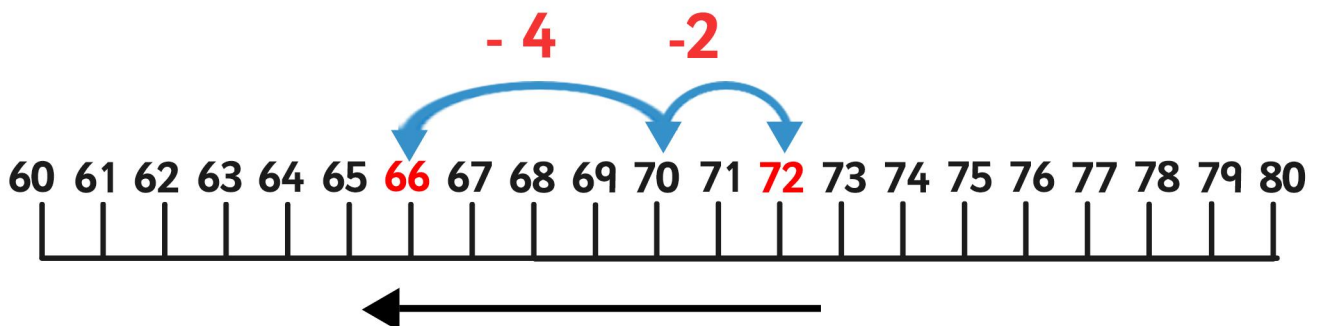
$$56 + 8 =$$

$$56 + 4 = 60 \quad \text{so} \quad 56 + 4 + 4 = 64$$



$$72 - 6 =$$

$$72 - 2 = 70 \quad \text{so} \quad 72 - 2 - 4 = 66$$



Mental Maths Strategies

Front-end Adding

For addition.

$$\begin{array}{r} 69 \\ \downarrow \\ 60 \\ \downarrow \\ 9 \end{array} + \begin{array}{r} 37 \\ \downarrow \\ 30 \\ \downarrow \\ 7 \end{array} =$$
$$\begin{array}{r} 60 \\ \downarrow \\ 9 \end{array} + \begin{array}{r} 30 \\ \downarrow \\ 7 \end{array} = 90$$
$$90 + 16 = 106$$

90
16
+
106

Mental Maths Strategies

Compensation for 8 or 9

For adding or subtracting where a number has 8 or 9 in ones.

Add 9 - add 10 and subtract 1
Subtract 8 - subtract 10 and add 2

Use strategy for:

Add 39 - add 40 and subtract 1
Subtract 79 - subtract 80 and add 1

$$\begin{aligned}34 + 9 &= \\34 + 10 &= 44 \\44 - 1 &= 43\end{aligned}$$

or

$$\begin{aligned}83 - 38 &= \\83 - 40 &= 43 \\43 + 2 &= 45\end{aligned}$$

Mental Maths Strategies

Use Multiples of 25

For adding or subtracting when numbers are near multiple of 25.

Add or subtract and compensate.

$$\begin{aligned}76 + 48 &= \\75 + 50 &= 125 \\125 + 1 - 2 &= 124\end{aligned}$$

or

$$\begin{aligned}174 - 128 &= \\175 - 125 &= 50 \\50 - 1 - 3 &= 46\end{aligned}$$

Common Zeros

For adding and subtracting numbers
with the same number of zeros.

$$\begin{aligned}60 + 130 &= \\6 \text{ tens} + 13 \text{ tens} &= 19 \text{ tens} \\60 + 130 &= 190\end{aligned}$$

or

$$\begin{aligned}1500 - 200 \\15 \text{ hundreds} - 2 \text{ hundreds} &= 13 \text{ hundred} \\1500 - 200 &= 1300\end{aligned}$$

Mental Maths Strategies

Trailing Zeros

For multiplying numbers ending in zero.

$$\begin{aligned}40 \times 8 &= \\4 \text{ tens} \times 8 &= 32 \text{ tens} \\40 \times 8 &= 320\end{aligned}$$

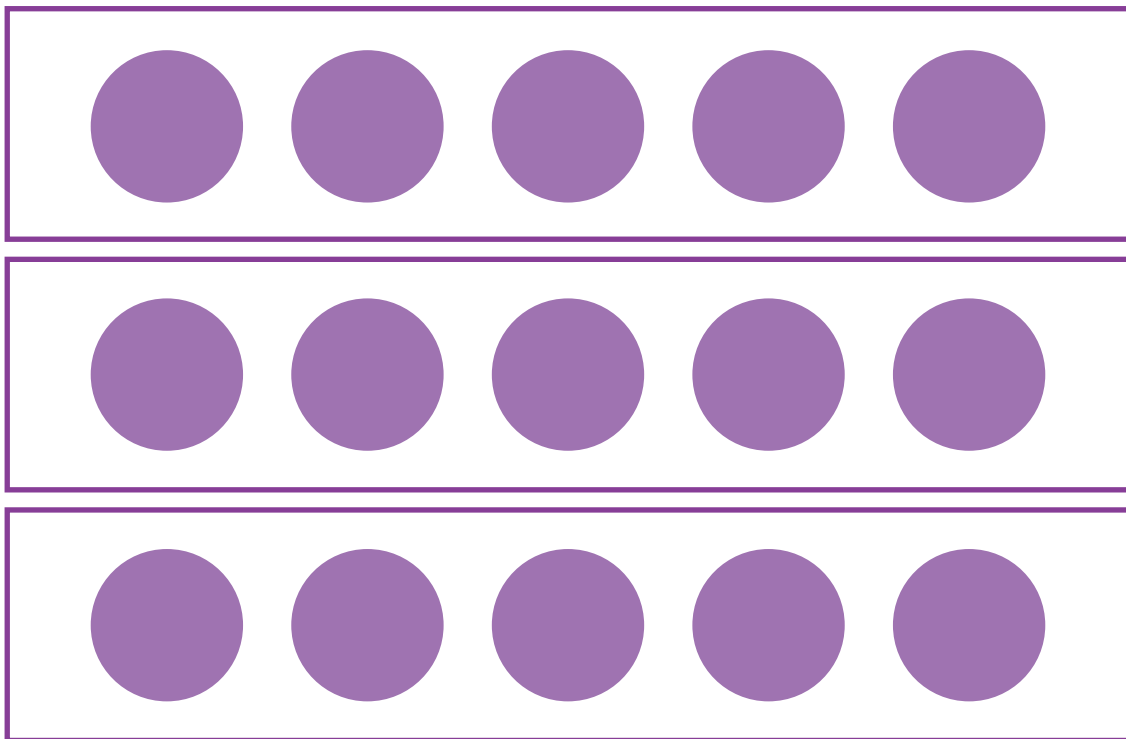
or

$$\begin{aligned}70 \times 60 \\7 \text{ tens} \times 6 \text{ tens} &= 42 \text{ hundreds} \\70 \times 60 &= 4200\end{aligned}$$

Multiplication Strategies

Array

Rows and columns with an equal amount in each.



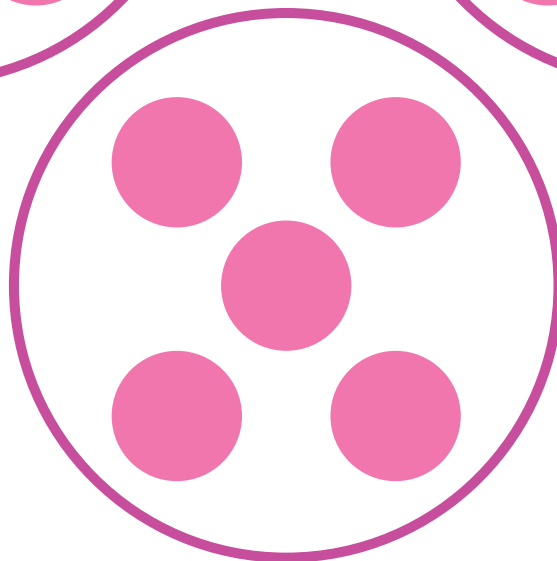
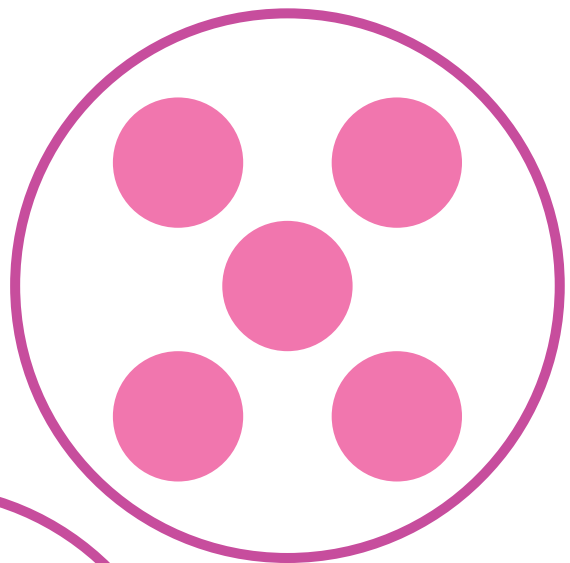
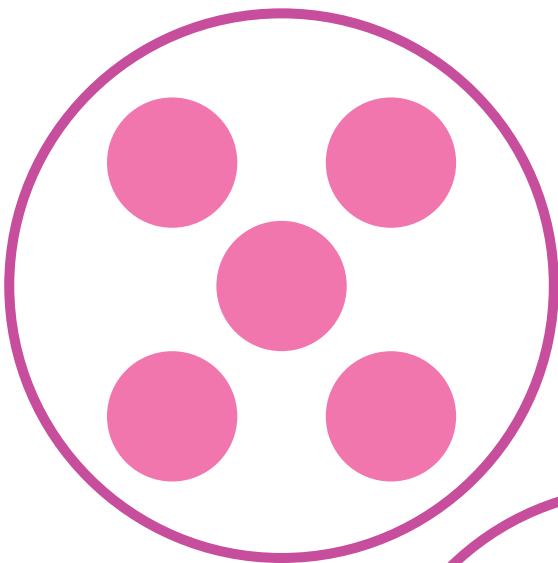
$$3 \times 5 = 15$$



Multiplication Strategies

Equal Groups

Use the same number of ones in each group.

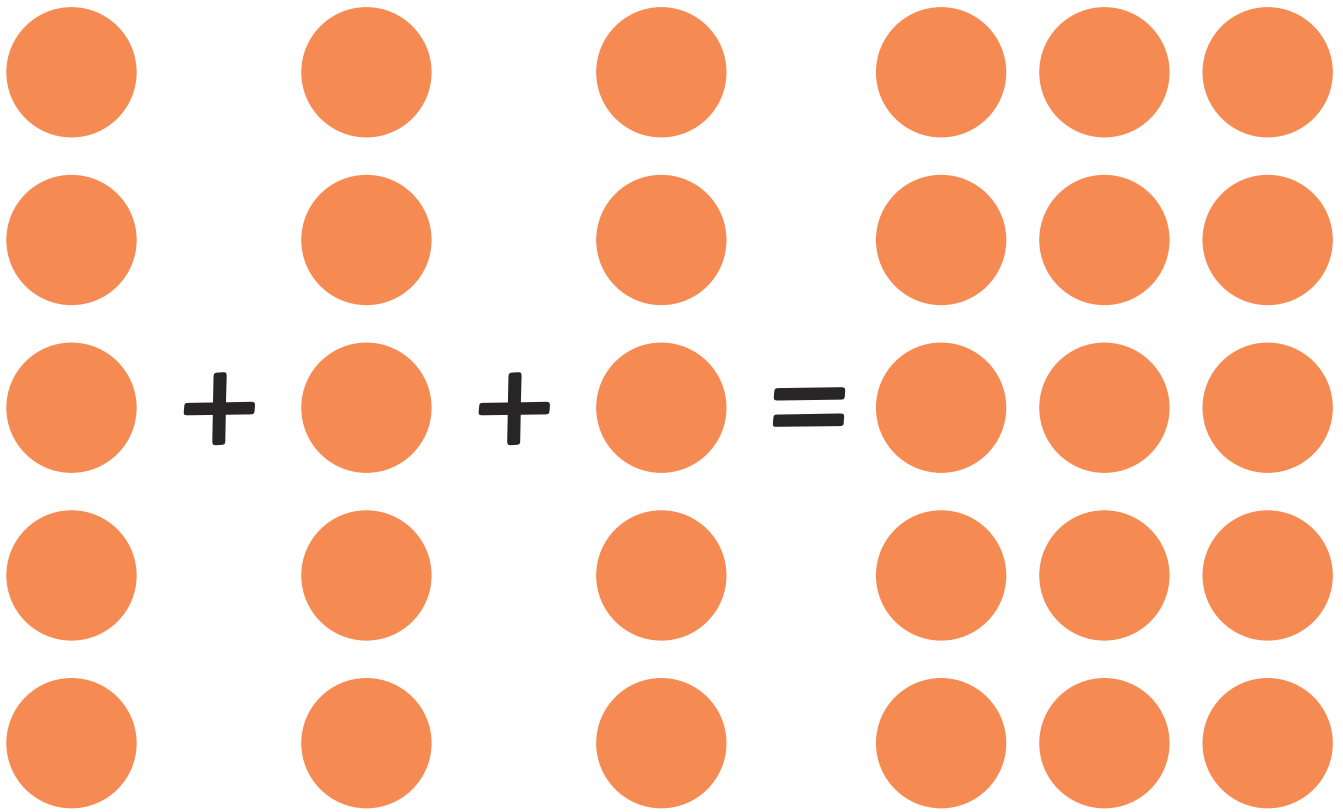


$$3 \times 5 = 15$$



Multiplication Strategies

Repeated Addition



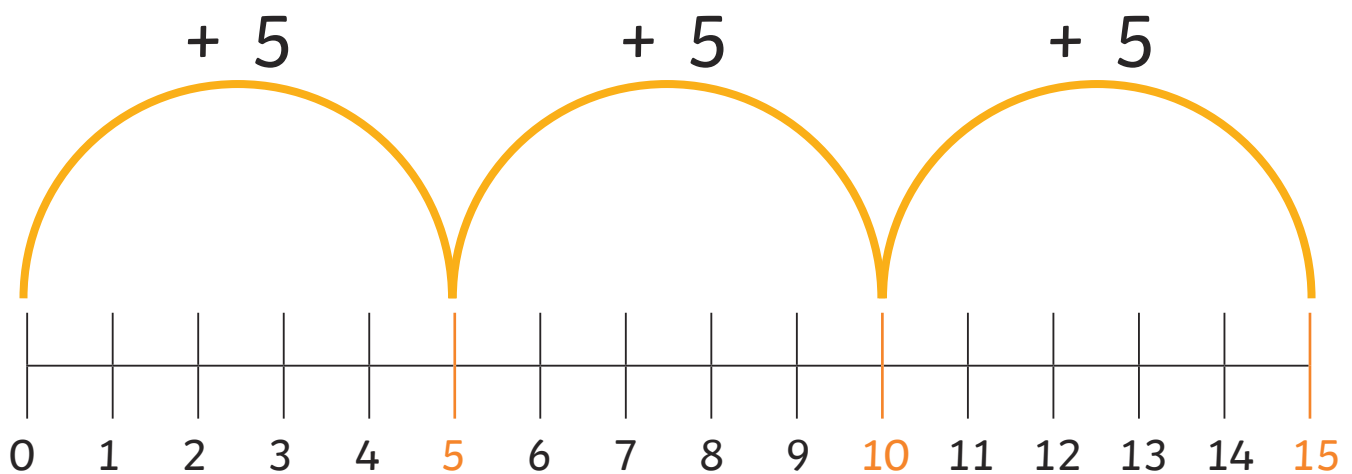
$$3 \times 5 = 15$$



Multiplication Strategies

Number Line

Starting from zero, hop 5 at a time.
Where do you land?



$$1 \text{ hop of } 5 = 5$$

$$2 \text{ hops of } 5 = 10$$

$$3 \text{ hops of } 5 = 15$$

$$3 \times 5 = 15$$



Multiplication Strategies

Lattice/Italian

Draw a grid to match the numbers.

Write the partitioned number on top and to the right.

5	2	
		3
		8

Draw diagonals.

Multiply the numerals.

Write the answers in the relevant box, writing the digits either side of the diagonal.

5	2	
1	0	3
5	6	
4	1	8
0	6	

Add the diagonals in turn.

Carry any "tens" as required.

	5	2	
1	1	0	3
	5	6	
9	4	1	8
	0	6	
	7	6	

$$52 \times 38 = 1976$$



Multiplication Strategies

Partitioning

$$53 \times 38$$

Multiply each partition together and add the products.

$$50 \times 30 = 1500$$

$$3 \times 30 = 90$$

$$50 \times 8 = 400$$

$$3 \times 8 = 24$$

$$2014$$

$$53 \times 38 = 2014$$



Multiplication Strategies

Grid Method

×	50	2
30		
8		

Draw a Grid.

Write the partitioned numbers at the top left of the grid.

×	50	2
30	1500	60
8	400	16

Multiply the partitioned number.

$$\begin{array}{r} 1500 \\ + 400 \\ + 60 \\ + 16 \\ \hline 1976 \end{array}$$

Add the products.

$$52 \times 38 = 1976$$



Multiplication Strategies

Column Method

\times 52
 38

Write the numbers above each other in the columns.

\times 52
 38

 416

Multiply 52×8

\times 52
 38

 416

 1560

Multiply 52×30

 416
+ 1560

 1976

Add the products.

$$52 \times 38 = 1976$$



Multiplication Strategies

Expanded Column Method

Line up the ones and the tens.

Multiply the ones.

Multiply tens.

Add the totals together.

$$\begin{array}{r} 42 \\ \times 6 \\ \hline 12 \\ 240 \\ \hline 252 \end{array} \quad \begin{array}{l} (2 \times 6) \\ (40 \times 6) \end{array}$$

$$42 \times 6 = 252$$



Multiplication Strategies

Column Method

3-digit \times 2-digit carrying not shown

$$\begin{array}{r} 368 \\ \times 24 \\ \hline \end{array}$$

Write the numbers above each other in the columns.

$$\begin{array}{r} 368 \\ \times 24 \\ \hline 1472 \\ \hline \end{array}$$

Multiply 368×4

$$\begin{array}{r} 368 \\ \times 24 \\ \hline 1472 \\ 7360 \\ \hline \end{array}$$

Multiply 368×20

$$\begin{array}{r} 1472 \\ + 7360 \\ \hline 8832 \\ \hline \end{array}$$

Add the products.



$$368 \times 24 = 8832$$

Multiplication Strategies

Column Method

4-digit \times 2-digit carrying not shown

5368 Write the numbers above each other
 \times 24 in the columns.

$$\begin{array}{r} 5368 \\ \times \quad 24 \\ \hline 1472 \end{array}$$

Multiply 5368×4

$$\begin{array}{r} 5368 \\ \times \quad 24 \\ \hline 21472 \\ 107360 \end{array}$$

Multiply 5368×20

$$\begin{array}{r} 21472 \\ + 107360 \\ \hline 128832 \end{array}$$

Add the products.

$$5368 \times 24 = 128\ 832$$



Multiplication Strategies

Column Method

5-digit \times 2-digit carrying not shown

25368
 $\times \quad 24$ Write the numbers above each other
in the columns.

$$\begin{array}{r} 25368 \\ \times \quad 24 \\ \hline 101472 \end{array}$$

Multiply $25\ 368 \times 4$

$$\begin{array}{r} 25368 \\ \times \quad 24 \\ \hline 101472 \\ 507360 \end{array}$$

Multiply $25\ 368 \times 20$

$$\begin{array}{r} 101472 \\ + 507360 \\ \hline 608832 \end{array}$$

Add the products.

$$25\ 368 \times 24 = 608\ 832$$



Multiplication Strategies

Column Method

6-digit \times 2-digit carrying not shown

125368
 $\times \quad 24$ Write the numbers above each other
in the columns.

$$\begin{array}{r} 125368 \\ \times \quad 24 \\ \hline 501472 \end{array}$$

Multiply $125\ 368 \times 4$

$$\begin{array}{r} 125368 \\ \times \quad 24 \\ \hline 501472 \\ 2507360 \end{array}$$

Multiply $125\ 368 \times 20$

$$\begin{array}{r} 501472 \\ + 2507360 \\ \hline 3008832 \end{array}$$

Add the products.

$$125\ 368 \times 24 = 608\ 832$$



Multiplication Strategies

Multiplying by 10

Use place value to work out how to multiply by 10.

$$674 \times 10 = ?$$

If you multiply a number by 10, the digits move one place value to the left.

Thousands	Hundreds	Tens	Ones
	6	7	4

Thousands	Hundreds	Tens	Ones
6	7	4	0

Zeros will be added after the digits have moved.

$$674 \times 10 = 6740$$

Use place value to work out how to multiply by 100.

$$674 \times 100 = ?$$

Ten Thousands	Thousands	Hundreds	Tens	Ones
		6	7	4

Ten Thousands	Thousands	Hundreds	Tens	Ones
6	7	4	0	0

Zeros will be added after the digits have moved.

$$674 \times 100 = 67\ 400$$



Multiplication Strategies

Multiplying Decimals by 10

Use place value to work out how to multiply by 10.

$$6.74 \times 10 = ?$$

If you multiply a number by 10, the digits move one place value to the left.

Hundreds	Tens	Ones	Tenths	Hundredths
		6	7	4

Hundreds	Tens	Ones	Tenths	Hundredths
	6	7	4	

$$6.74 \times 10 = 67.4$$

Use place value to work out how to multiply by 100.

$$6.74 \times 100 = ?$$

Hundreds	Tens	Ones	Tenths	Hundredths
		6	7	4

Hundreds	Tens	Ones	Tenths	Hundredths
6	7	4	0	0

If you multiply a number by 100, the digits move two places to the left.

$$6.74 \times 100 = 674$$



Subtraction Strategy

Partitioning

$$72 - 39$$



$$72 - 30 = 42$$

$$42 - 9 = 33$$

Always start with the biggest number.

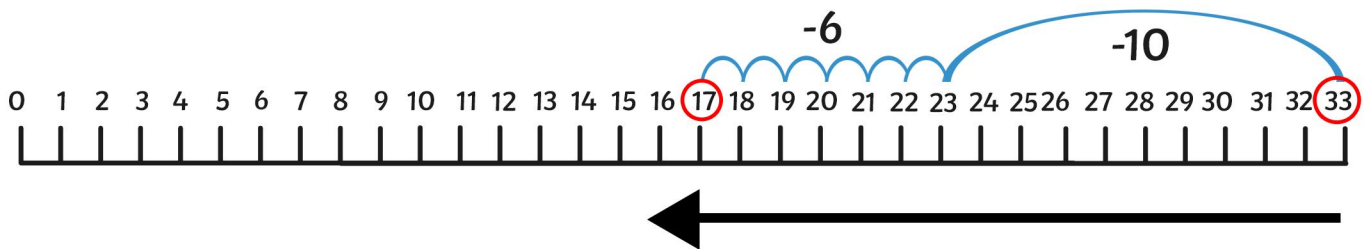
Partition the smaller number and take away the tens.

Take away the ones from this new number.

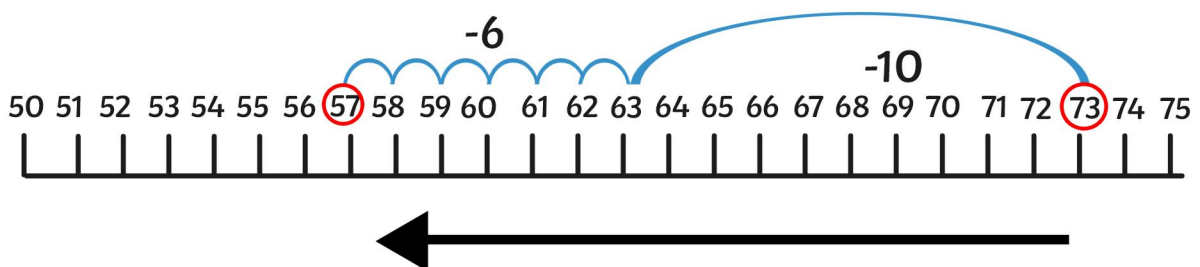
Subtraction Strategy

Counting Back

$$33 - 16 =$$



$$73 - 16 =$$

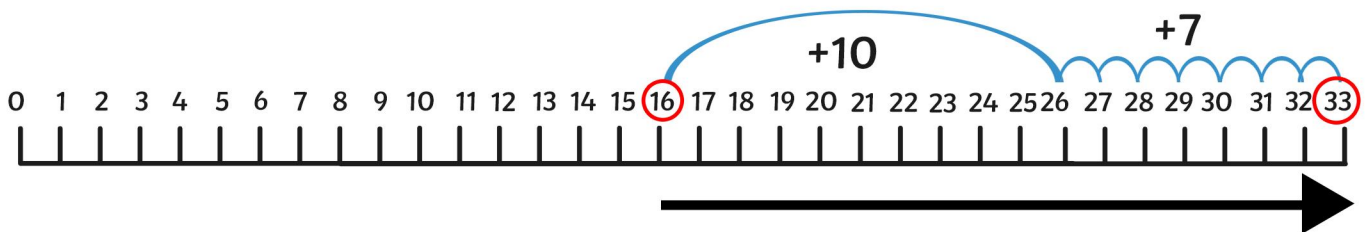


Subtraction Strategy

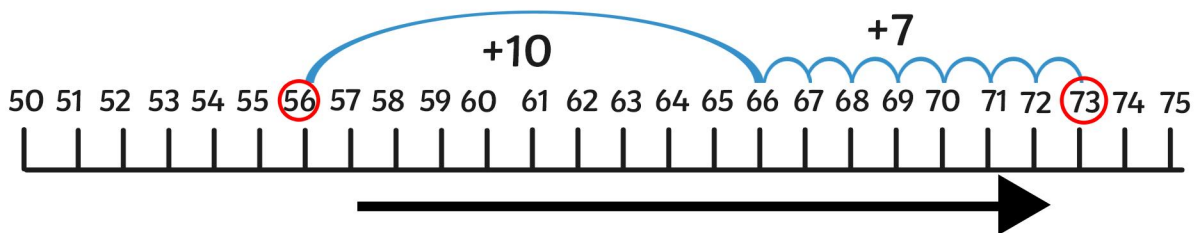
Counting On

$$33 - 16 =$$

Start at the lower number and count on to the higher number. The number of steps you make to the higher number is the answer!



$$73 - 56 =$$



Subtraction Strategy

Column Method

Line up the tens and ones with the big number on top.

Subtract the ones.

If the bottom number in the ones column is bigger than the top then adjust from the tens before you subtract.

Subtract the tens

tens	ones	
² 3	¹ 3	-
1	6	
<hr/>		
20	13	-
10	6	
<hr/>		
1	7	
<hr/>		

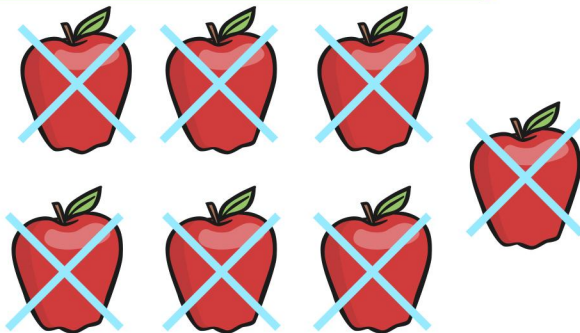
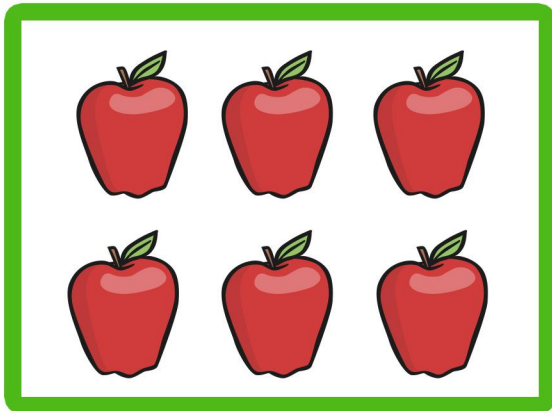
Subtraction Strategy

Difference and Take Away

Subtraction means:

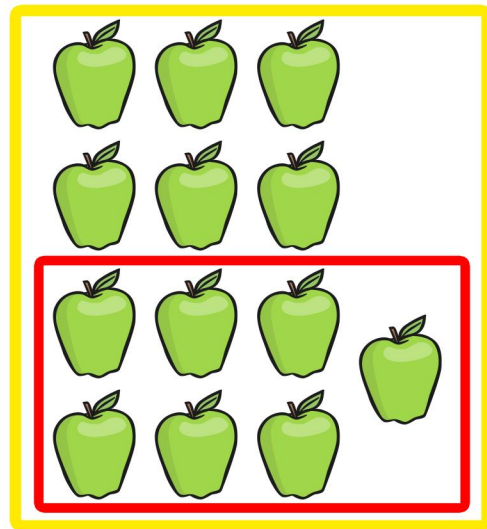
take away

$$13 - 7$$

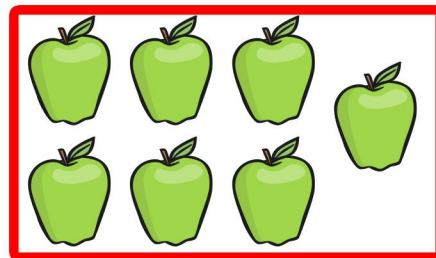


difference

$$13 - 7$$



13



7

Subtraction Strategy

Language of Subtraction

Subtract

Minus

Less

Decrease

Take Away

Fewer

Leave

Difference

Subtraction Strategy

Column Method

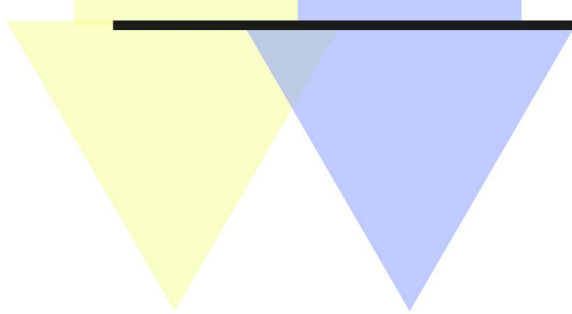
Line up the tens and ones with the big number on top.

Subtract the ones column.

Subtract the tens column.

Answer underneath.

tens	ones	
7	7	
		-
4	2	
<hr/>		
3	5	
<hr/>		



Subtraction Strategy

Column Method

Line up the hundreds, tens and ones with the big number on top.

Subtract the ones column.

Subtract the tens column

Subtract the hundreds column.

Answer underneath.

hundreds	tens	ones	
2	7	8	
1	3	4	-
<hr/>			
1	4	4	
<hr/>			