Multiplying Doubles and Digits

Learning Objective:

To use place value knowledge, times tables knowledge and a formal written method to double large numbers.

Next

144 × 2

Can you calculate this mentally?

Can you explain how you did it?

Double
100 is 200…
double 40 is 80…
double 4 is 8…
which equals 288!

One way of doubling a large number is to partition it and double one part at a time. We could show this mental method using a grid:

×	100	40	4
2	*200*	*80*	*8*

= 288

Let’s practise…

PRACTISE:

356 × 2

×			

Make a grid to show how 356 can be mentally partitioned and doubled.

PRACTISE:

356 × 2

×	300	50	6
2	*600*	*100*	*12*

= 712

Did you get it right?
Let’s try another…

PRACTISE:

495 × 2

×			

Make a grid to show how 495 can be mentally partitioned and doubled.

PRACTISE:

495 × 2

×	400	90	5
2	*800*	*180*	*10*

= 990

PRACTISE:

628 × 2

×			

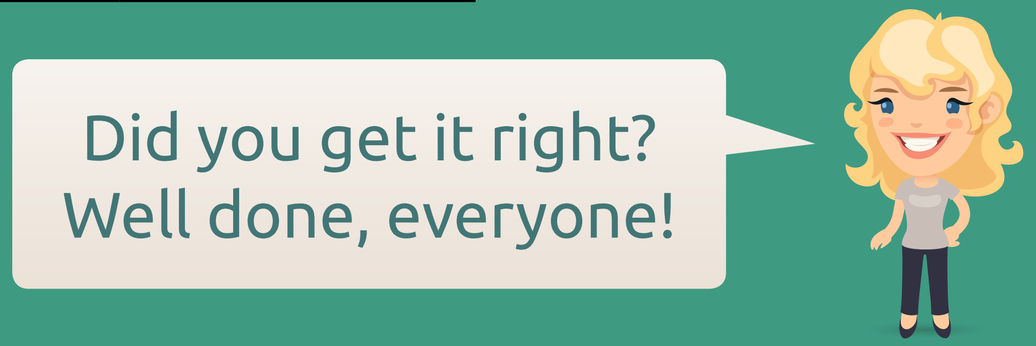
Make a grid to show how 628 can be mentally partitioned and doubled.

PRACTISE:

628 × 2

×	600	20	8
2	*1,200*	*40*	*16*

= 1,256



With the grid method, and with mental doubling, most people start by doubling the largest part. This approach works well for numbers up to around three digits, but it’s a bit slow when doubling bigger numbers, as each partitioned amount needs to be added after it’s been doubled.

Can you think of a quicker, written method for doubling larger numbers?

We could use short multiplication. It's quick, especially when doubling or multiplying large numbers.

$$\begin{array}{r} 3,421 \\ \times \quad\quad 2 \\ \hline \\ \hline \end{array}$$

Starting with the **ONE** digit, multiply each digit by 2.

Write the total in the same column, below.

Work from right to left, multiplying each digit by 2.

Did you get it right? Let's practise doubling more big numbers using the short multiplication method…

$$\begin{array}{r} 3,421 \\ \times \quad\quad 2 \\ \hline 6,842 \\ \hline \end{array}$$

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Work from right to left, multiplying each digit by 2.

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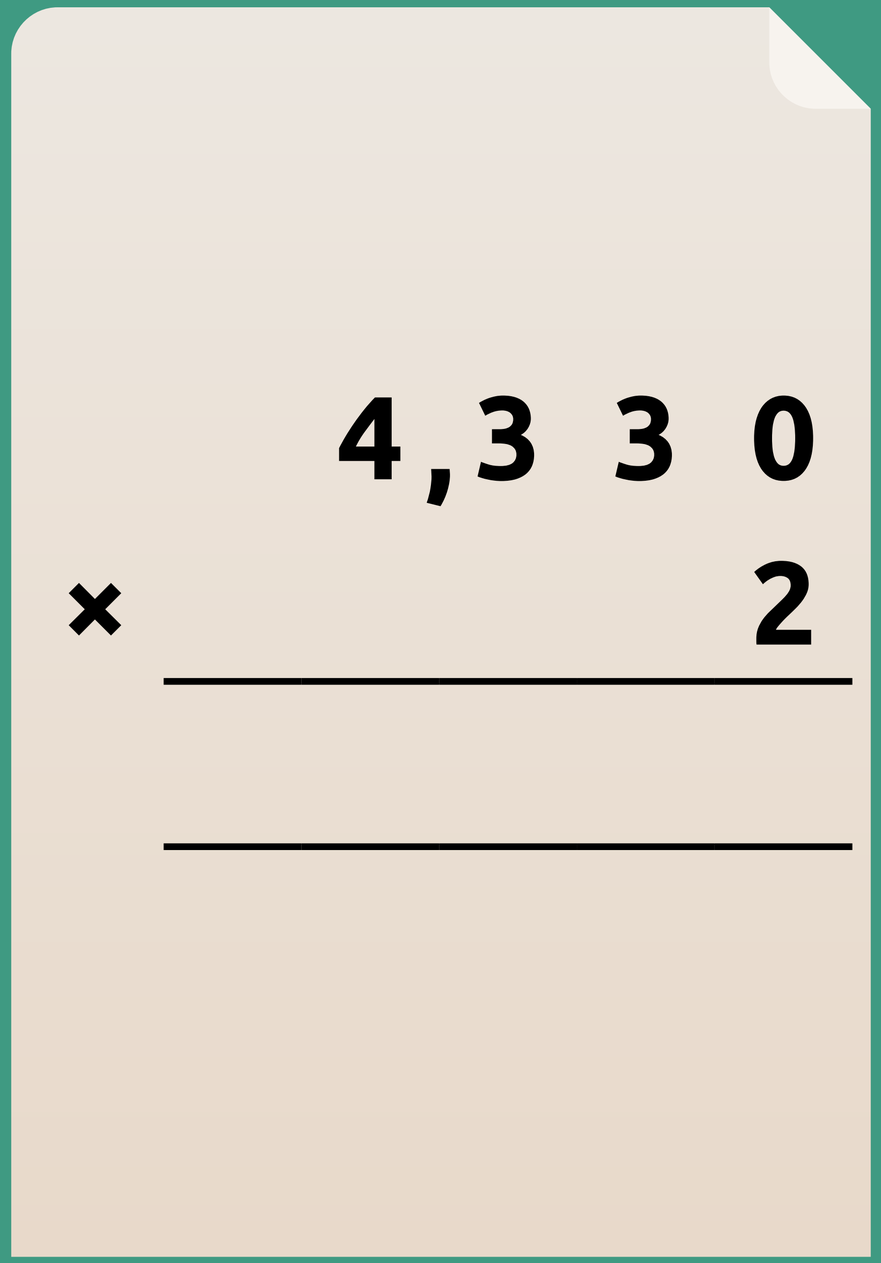


Starting with the **ONE** digit, multiply each digit by 2.

Write the total in the same column, below.

Work from right to left, multiplying each digit by 2.

$$\begin{array}{r} 4,330 \\ \times \quad\quad 2 \\ \hline 8,660 \\ \hline \end{array}$$

Did you get it right?
Let's try one more…

Starting with the **ONE** digit, multiply each digit by 2.

Write the total in the same column, below.

Work from right to left, multiplying each digit by 2.

$$\begin{array}{r} 1,041 \\ \times \quad\quad 2 \\ \hline 2,082 \end{array}$$

Did you get it right? Well done, everyone!

$$
\begin{array}{r}
2,336 \\
\times \quad 2 \\
\hline
2 \\
\hline
1
\end{array}
$$

This doubling calculation is a bit trickier.

2 × 6 = 12, which can't be written in the **ONES** column. We need to exchange it for one **TEN** and two **ONES**.

The ten is written below the answer area, in the **TENS** column.

What do we do next?

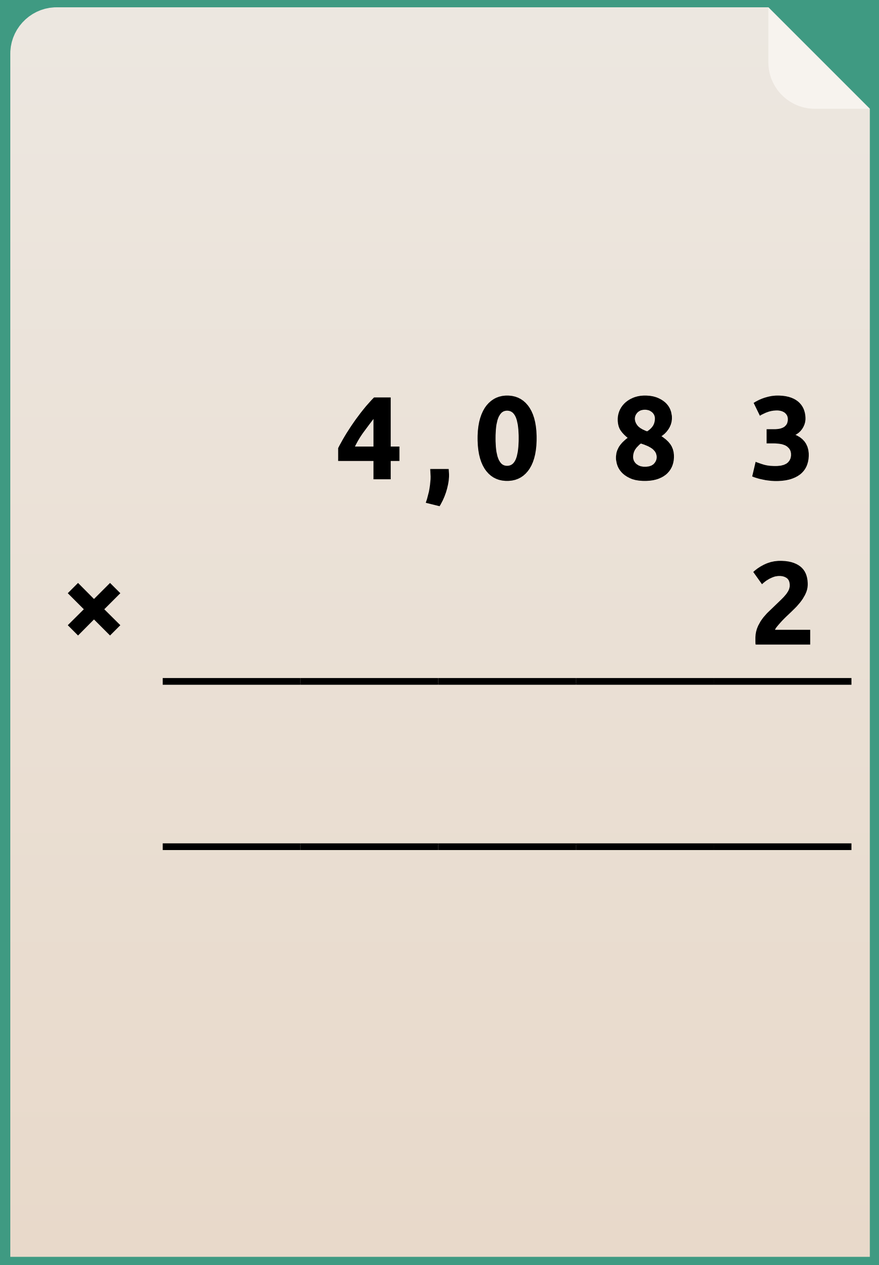
$$
\begin{array}{r}
2,336 \\
\times \quad 2 \\
\hline
72 \\
\hline
{\scriptstyle 1}
\end{array}
$$

2 × 30 = 60, which we add to the one ten written below the answer area.

Can you finish this calculation?

$$
\begin{array}{r}
2,336 \\
\times \quad 2 \\
\hline
4,672 \\
\hline
\scriptstyle 1
\end{array}
$$

Did you get it right?
Let’s try another doubling calculation which requires exchanging…



TOP TIPS

Work from right to left, doubling each digit.

If a double is too big to be written in its column, exchange it.

Write the exchanged amount in the correct column below the answer area.

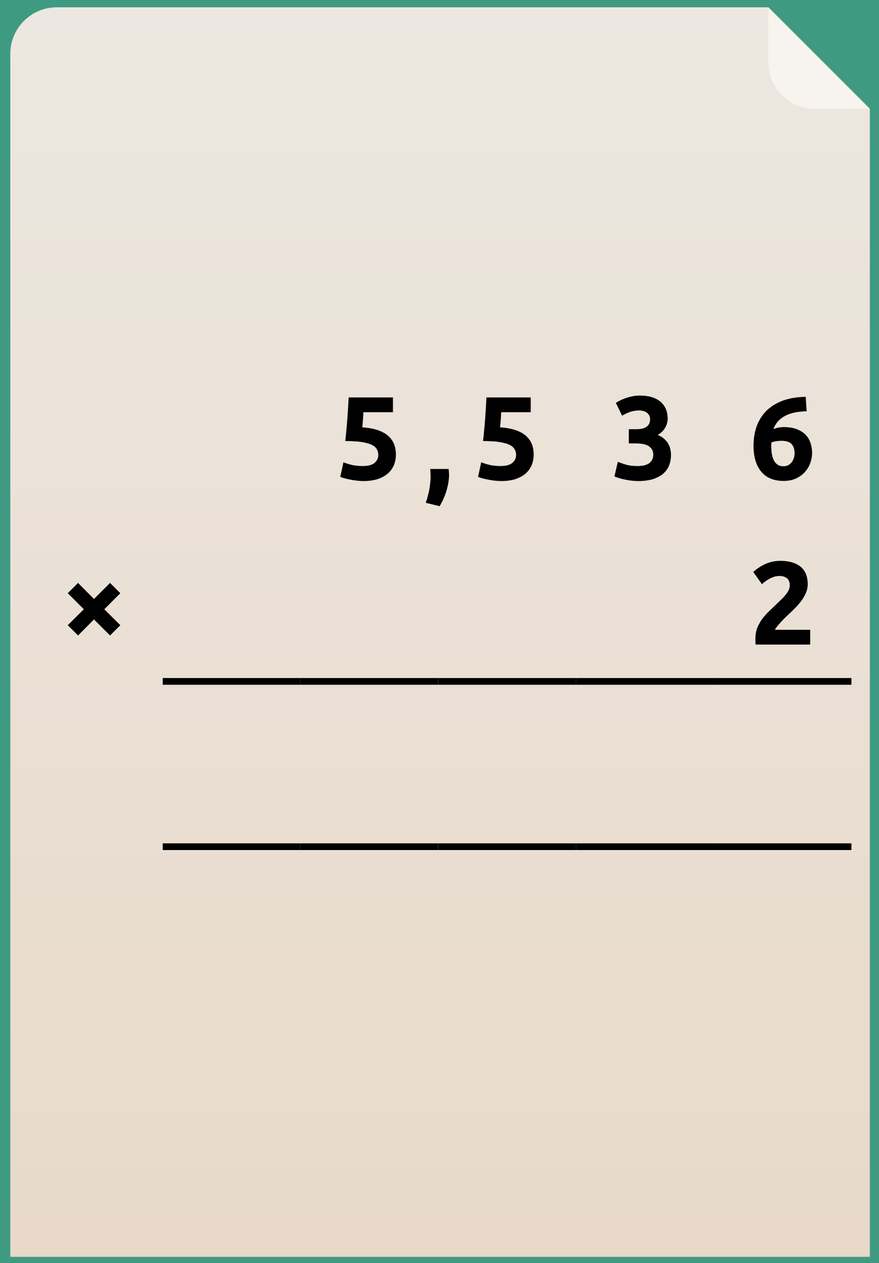
Don’t forget to add the exchanged amounts to the answer!

$$
\begin{array}{r}
4,083 \\
\times \quad 2 \\
\hline
8,166 \\
\hline
\end{array}
$$

1

Did you get it right?

Let’s try one more!



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If a double is too big to be written in its column, exchange it.

Write the exchanged amount in the correct column below the answer area.

Don’t forget to add the exchanged amounts to the answer!

$$
\begin{array}{r}
5,536 \\
\times \quad\quad 2 \\
\hline
11,072 \\
\hline
\quad 1 \quad\quad 1
\end{array}
$$

Did you get it right?

This one required two exchanges, and resulted in a five-digit number.

Well done, everyone!

Plenary

Oh dear! I think I've made a couple of mistakes in this doubling calculation.

Can you find the mistakes and correct them?

$$
\begin{array}{rr}
 & 7,066 \\
\times & 2 \\
\hline
 & 14,022 \\
\hline
 & \scriptstyle 1 \quad \scriptstyle 1
\end{array}
$$

$$\begin{array}{r} 7,066 \\ \times \quad\quad 2 \\ \hline 14,022 \\ \hline {\scriptstyle 1\quad 1} \end{array}$$

The exchanged amounts were not added correctly.

7,000 × 2 = 14,000, which needs to be written in the correct columns.

$$\begin{array}{r} 7,066 \\ \times \quad\quad 2 \\ \hline 14,132 \\ \hline {\scriptstyle 1\quad 1} \end{array}$$