

Dividing numbers up to 4 digits by a 2-digit number 1



Discover

We have 294 tubes of fruit puree to last 14 weeks.

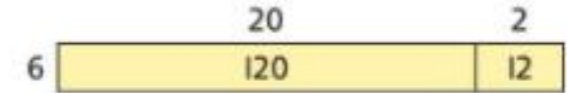
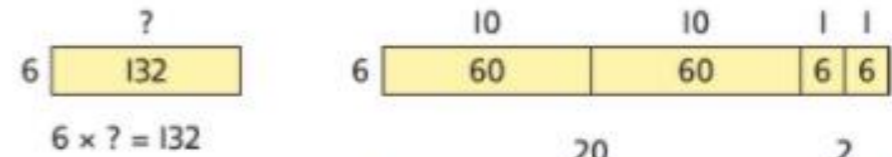
We each need to drink six bottles of water a day.



- Each astronaut has 132 bottles of water for their stay in the space station. How many days will this last for one astronaut?
- The astronauts eat the same amount of fruit puree each week. How many tubes of fruit puree will they eat each week?

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a) This model can help to work out how many 6s are in 132.

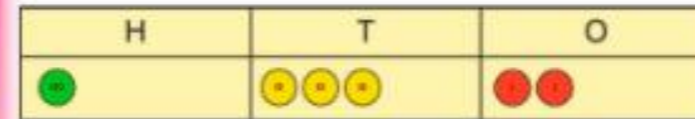


$$132 = 120 + 12$$

$$132 \div 6 = 20 + 2 = 22$$

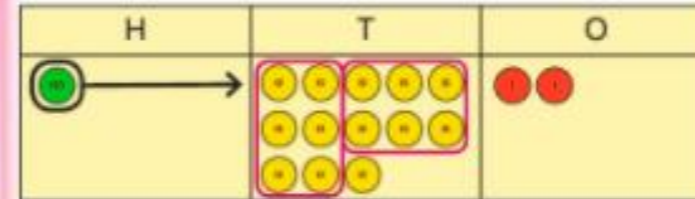


We can also use the method of short division.



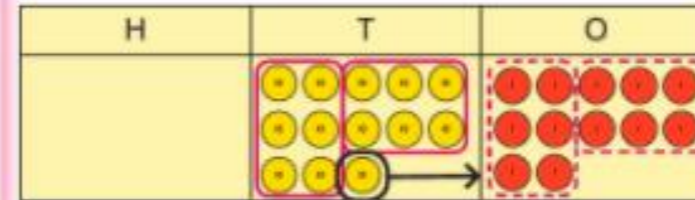
How many groups of 6 are in 100?

$$6 \overline{) 132} \begin{array}{r} 0 \\ \end{array}$$



How many groups of 6 are in 13 tens?

$$6 \overline{) 132} \begin{array}{r} 0 \ 2 \\ \end{array}$$



How many groups of 6 are in 12 ones?

$$6 \overline{) 132} \begin{array}{r} 0 \ 2 \ 2 \\ \end{array}$$

$$132 \div 6 = 22$$

132 bottles of water will last for 22 days for one astronaut.



Dividing numbers up to 4 digits by a 2-digit number 2



Discover



- a) How many times did the log flume boat run today?
- b) The log flume boat was running for 5 hours. How many people rode in the boat per hour?

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a)



There are 15 seats on the log flume boat. I will work out $750 \div 15$.

I can see a way to make this easier. I know that 15 is 3×5 so I will divide by using factors.



750	750
250 250 250	$750 \div 3 = 250$
50 50 50 50 50 50 50 50 50 50 50 50 50 50 50	$250 \div 5 = 50$



$750 \div 15 = 750 \div 3 \div 5$
The log flume boat ran 50 times today.

b) Use the fact $3 \times 5 \times 50 = 750$.

50	50	50	50	50	→	50				$3 \times 50 = 150$
50	50	50	50	50		50				$5 \times 150 = 750$
50	50	50	50	50		50				So $750 \div 5 = 150$

150 people rode in the log flume boat per hour.



I could have used short division to divide 750 by 5.



Dividing numbers up to 4 digits by a 2-digit number 3



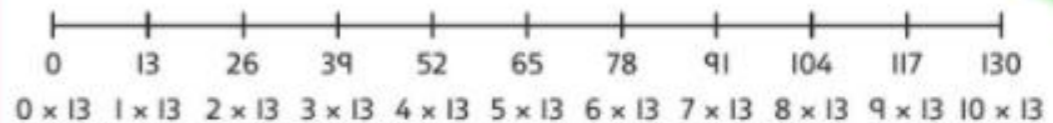
Discover

At this music festival, we will have 377 security officers in total, divided evenly into 13 groups.

- How many security officers will there be in each group?
- What multiplication can you do to check your answer is correct?

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a) There are 377 security officers in total. Divide these equally into 13 groups.



I listed the first 10 multiples of 13 to help me with the division.



$$\begin{array}{r} ? \\ 13 \overline{) 377} \end{array}$$

$$\begin{array}{r} 10 \quad ? \\ 13 \overline{) 377} \\ \underline{130} \quad \quad \quad \\ 247 \end{array}$$

$$\begin{array}{r} 10 \quad 10 \quad ? \\ 13 \overline{) 377} \\ \underline{130} \quad \underline{130} \quad \quad \\ 117 \end{array}$$

$$\begin{array}{r} 10 \quad 10 \quad 9 \\ 13 \overline{) 377} \\ \underline{130} \quad \underline{130} \quad \quad \\ 117 \end{array}$$

$$\begin{array}{r} 29 \\ 13 \overline{) 377} \\ \underline{130} \quad \underline{130} \quad \quad \\ 117 \end{array}$$

$$\begin{array}{r} 29 \\ 13 \overline{) 377} \\ \underline{130} \quad \underline{130} \quad \underline{117} \\ 0 \end{array}$$

So $377 \div 13 = 29$
There will be 29 security officers in each group.

b) You can do the multiplication $29 \times 13 = 377$ to check your answer is correct.



I first subtracted 130, which is 10 groups of 13.

I then subtracted another 10 groups of 13.

Finally I subtracted 9 groups of 13 as this was equal to 117. I could have subtracted 5, and then 4 groups of 9.

Dividing numbers up to 4 digits by a 2-digit number 4

Discover



Our rescue centre got a donation of 2,478 tins of cat food.

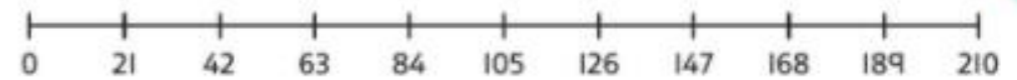


- 1** a) The cat rescue centre uses 21 tins of food each day. How many days will the food last for?
- b) After a while, there are 798 tins of food left. Is this enough to last 7 weeks?

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I will use repeated subtraction.

- a) There are 2,478 tins of food. 21 tins are used each day.



0×21 1×21 2×21 3×21 4×21 5×21 6×21 7×21 8×21 9×21 10×21



$$\begin{array}{r} ? \\ 21 \overline{) 2,478} \end{array}$$

$$\begin{array}{r} 21 \overline{) 2,478} \\ - 2,100 \\ \hline 378 \end{array}$$

$$\begin{array}{r} 100 \quad 10 \quad 8 \\ 21 \overline{) 2,478} \\ - 2,100 \\ \hline 378 \\ - 210 \\ \hline 168 \\ - 168 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 100 \\ - 210 \\ \hline 168 \\ - 168 \\ \hline 0 \end{array}$$

$$2,478 \div 21 = 118$$

The food will last for 118 days.

- b) Divide 798 by 21 to work out the number of days.

$$\begin{array}{r} 3 \\ 21 \overline{) 798} \\ - 630 \\ \hline 168 \end{array}$$

Subtract the biggest number of tens of multiples of 21 from 798 first.

If $3 \times 21 = 63$, $30 \times 21 = 630$.

Put the 3 tens above the line.

$$\begin{array}{r} 38 \\ 21 \overline{) 798} \\ - 630 \\ \hline 168 \\ - 168 \\ \hline 0 \end{array}$$

168 is left.

$8 \times 21 = 168$ so subtract this now.

Put the 8 ones above the line.

$$798 \div 21 = 38$$

The food will last for 38 days. This is not enough for 7 weeks (49 days).



I will use a method called **long division**.

Dividing numbers up to 4 digits by a 2-digit number 5



Discover

Some cicadas live and grow underground. Millions of them emerge as adults every 17 years.



- a) A scientist finds that cicadas have emerged this year. How many times will they emerge again over the next 100 years?
- b) How many times will they emerge over the next 200 years?

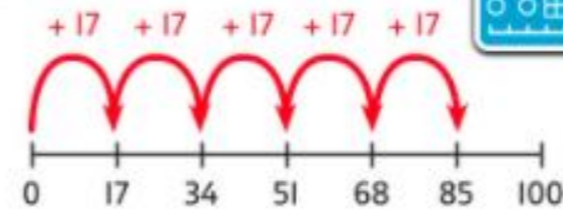
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I will start with a fact I know, $3 \times 17 = 51$.

I think there will be a remainder, because 100 is not a multiple of 17.



a) Method 1



$$17 \overline{) 100} \begin{array}{r} 3 \quad 2 \\ \underline{51} \quad \underline{34} \\ 15 \end{array}$$

$$100 = 51 + 34 + 15$$

$$100 \div 17 = 3 + 2 \text{ remainder } 15$$

$$= 5 \text{ remainder } 15$$



Method 2

$$17 \overline{) 100} \begin{array}{r} 3 \\ \underline{51} \\ 49 \\ \underline{34} \\ 15 \end{array}$$



$$100 \div 17 = 5 \text{ remainder } 15$$

The cicadas will emerge again 5 times over the next 100 years. There will then be 15 years left until 100 years have passed.

Method 3

$$17 \overline{) 100} \begin{array}{r} 5 \text{ r } 15 \\ \underline{85} \\ 15 \end{array}$$



b)

I thought it would be 10 times in 200 years, but 200 divided by 17 gives a remainder of 30, which is bigger than 17.

$$17 \overline{) 200} \begin{array}{r} 10 \\ \underline{170} \\ 30 \end{array}$$

$$17 \overline{) 200} \begin{array}{r} 10 \quad 1 \\ \underline{170} \quad \underline{17} \\ 13 \end{array}$$

$$200 \div 17 = 11 \text{ remainder } 13$$

The cicadas will emerge 11 times over the next 200 years. There will then be 13 years left until 200 years have passed.

