

因數與倍數 2

Factors and Multiples 2

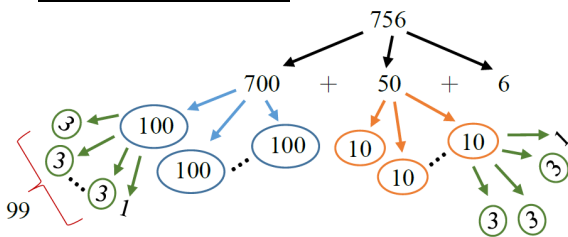
Class: _____ Name: _____

1. 分裝糖果

學校買了一些糖果讓各班分裝，大包裝一袋有 100 顆糖果，小包裝一袋有 10 顆糖果。每班拿到糖果後各自包裝，每 3 顆裝一包，裝完為止。

- (1) 將 1 袋大包裝糖果拿去分裝後剩幾顆？
- (2) 有 7 個班各拿一袋大包裝，這 7 個班共剩幾顆？
- (3) 將 1 袋小包裝糖果拿去分裝後剩幾顆？
- (4) 有 5 個班各拿一袋小包裝，這 5 個班共剩幾顆？
- (5) 若學校將前面班級剩餘的糖果收集起來，連同原本學校有的 6 顆糖果合在一起裝袋，最後還剩幾顆？

2. 3 的倍數判別法



$$756 = 700 + 50 + 6$$

$$= \underline{\quad} \times 100 + \underline{\quad} \times 10 + \underline{\quad}$$

$$100 \div 3 = 33 \cdots 1 \quad \underline{\quad} \text{ is left over after each 100 is divided by 3.}$$

There are 7 100s in 700, so all together $\underline{\quad}$ is left over.

$$10 \div 3 = 3 \cdots 1 \quad \underline{\quad} \text{ is left over after each 10 is divided by 3.}$$

There are 5 10s in 50, so all together $\underline{\quad}$ is left over.

$$\text{The remainder of dividing 756 by 3 is } \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

Is 756 a multiple of 3?

$$1000 \div 3 = \underline{\quad} \cdots \underline{\quad}$$

$$10000 \div 3 = \underline{\quad} \cdots \underline{\quad}$$

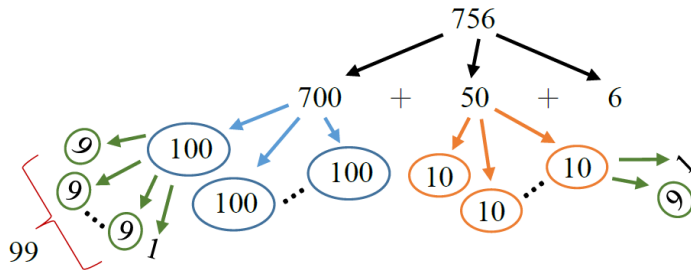
What do you find?

When we want to check whether 756 is a multiple of 3, we only need to check whether the sum of its digits is a multiple of 3.

Which numbers are multiple of 3? Circle them!

257	341	582	7545	2547
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3. 9 的倍數判別法



$$756 = 700 + 50 + 6$$

$$= \underline{\quad} \times 100 + \underline{\quad} \times 10 + \underline{\quad}$$

$100 \div 9 = 11 \dots 1$ $\underline{\quad}$ is left over after each 100 is divided by 9.

There are 7 100s in 700, so all together $\underline{\quad}$ is left over.

$10 \div 9 = 1 \dots 1$ $\underline{\quad}$ is left over after each 10 is divided by 9.

There are 5 10s in 50, so all together $\underline{\quad}$ is left over.

The remainder of dividing 756 by 9 is $\underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$

Is 756 a multiple of 9?

$$1000 \div 9 = \underline{\quad} \dots \underline{\quad}$$

$$10000 \div 9 = \underline{\quad} \dots \underline{\quad}$$

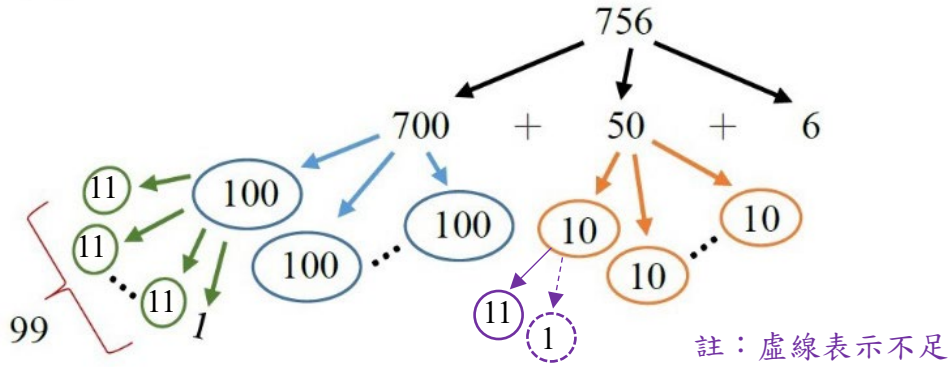
What do you find?

If we want to check whether 756 is a multiple of 9, we only need to check whether the sum of its digits is a multiple of 9.

Which numbers are multiple of 9? Circle them!

756	254	612	5424	2579
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4. 11 的倍數判別法



$$756 = 700 + 50 + 6$$

$$= \underline{\quad} \times 100 + \underline{\quad} \times 10 + \underline{\quad}$$

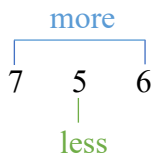
$100 \div 11 = 9 \cdots 1$ When we divide 100 by 11, we get a left over of $\underline{\quad}$.

There are 7 100s in 700, so all together we have a left over of $\underline{\quad}$.

$10 \div 11 = 0 \cdots 10$ 10 is not enough to be divided by 11 and 10 is $\underline{\quad}$ less than 11.

There are 5 10s in 50, so all together we have $\underline{\quad}$ less than 11.

When 756 is divided by 11, there are $\underline{\quad} + \underline{\quad} = \underline{\quad}$ more than 11
 , but there are $\underline{\quad}$ less than 11.



Is 756 a multiple of 11?

$1000 \div 11 = \underline{\quad} \cdots \underline{\quad}$ the remainder 1 more or 1 less than 11?

$10000 \div 11 = \underline{\quad} \cdots \underline{\quad}$ the remainder 1 more or 1 less than 11?

What do you find?

If we want to check whether 756 is a multiple of 11, we only need to check whether the difference between the sum of the digits at odd places and the sum of the digits at even places of the number is a multiple of 11.

Which numbers are multiple of 11? Circle them!

275	364	803	2548	5291
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一、設計理念：

1. 此份學習單參照《數學新世界》教材，前一份學習單已透過拆解整數方式解釋 2 的倍數、5 的倍數及 4 的倍數判別法，本學習單透過相同方式解釋 3 的倍數、9 的倍數及 11 的倍數判別法。
2. 拆解過程盡量以符號與圖示表示，以降低英文理解的負荷量，教師說明的過程中需要適時搭配板書，讓學生更容易理解目前所講述的內容。
3. 判別 11 的倍數有另一種說法是利用“the difference of the sum of alternative digits of a number is divisible by 11”來判斷，但本篇文章配合臺灣課本是利用「奇數位和與偶數位和的差」來表示，故在學習單中參照此概念直譯而成。

二、英文詞彙：

中文	英文
倍數	multiple
位數	digit
可整除	divisible
奇數	odd
偶數	even

三、數學英文用法：

數學表示法	英文
6 被 3 整除	Six is divisible by three.
$13 \div 4 = 3 \cdots 1$	Thirteen divided by four equals three with a remainder of one.

四、教學參考範例：(範例從第 2 點開始)

1	<p>在上一節課我們介紹了三種倍數的判別法。We have learned how to find multiples of 2, 5, and 4. We can check whether the number is a multiple of 2 or 5 by checking the last digit of the number, and we can check whether the number is a multiple of 4 by checking the last two digits of the number.接下來我們要試著找其他倍數的判別法。</p>
2	<p>Now, let's see how to find a multiple of 3. The first way is directly dividing the number by 3. If the number is divisible by 3, and the number is the multiple of 3. For example, 123 divided by 3 equals 41 remainder 0, so 123 is a multiple of 3.</p>
3	<p>Next, we want to find whether there is an easier way to find the multiple of 3.我們和前面一樣試著把 756 這個數字拆開。756 can be separated into "seven hundred", "fifty" and "six", so there are 7 hundreds, 5 tens, and 6 ones. Next, 100 divided by 3 equals 33 remainder 1, so 1 is left after each 100 is divided by 3. There are 7 hundreds in 700, so 7 are left here. In the same way, 10 divided by 3 equals 3 remainder 1, so 1 is left after each 10 is divided by 3. There are 5 tens in 50, so 5 are left here.</p>
4	<p>Because 7 are left in 700, 5 are left in 50, and the remainder of dividing 756 by 3 is 7 plus 5 plus 6. It is equal to 18. Is 756 a multiple of 3? Yes, 756 is a multiple of 3 because 18 is divisible by 3.我們再觀察一下規律。1000 divided by 3 equals 333 remainder 1. 10000 divided by 3 equals 3333 remainder 1. We find the remainder of 10, 100, 1000, and 10000 divided by 3 are all equal to 1.</p>
5	<p>Then, we have the following conclusion: when we want to check whether 756 is a multiple of 3, we only need to check whether the sum of its digits is a multiple of 3.所以我們找到另一種找 3 的倍數的判別方法，就是將每個位數相加。</p>

五、引入語言使用建議：

第 1 段	先用簡單中文提示上節課的學習內容，接著用英文敘述上節課已學習的倍數判別法，最後再用中文引出後續要進行的教學。
第 2 段	因為此部分數學容易，且可搭配板書呈現，故整段使用英文。
第 3 段	一開始將數字拆開部分用中文暗示，後續計算過程則直接使用英文。
第 4 段	進行計算語推廣皆為實際數字的運算，故使用中文，惟中間透過中文提示學生接下來要透過觀察規律進行推廣。
第 5 段	先用英文講述判別法的方式，再用中文簡單說明判別法的精髓。

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