B   Tests of Divisibility

What You Will Learn:
- Understand and use the tests of divisibility.

Look Back

Izzy has 50 pencils. She wants to divide them such that each bundle has an equal number of pencils. How can she put them into bundles of 2, 3, 4 or 5 pencils with none left over?

How do you know?

She can divide them into bundles of 2 and 5, but not 3 or 4 because 3 and 4 are not factors of 50.

Is 50 divided by 2?
25 + 25

Is 50 divided by 3?

Is 50 divided by 4?

Is 50 divided by 5?

10 + 10 + 10 + 10 + 10

Thinking Cap

How many other ways can Izzy divide the pencils into equal bundles with no remainder?
Improve the method Izzy uses. Divide pencils into groups to help you.

42

She can also divide them into 10s or 25s. She could have just a group of 50 pencils or 50 groups of 1 pencil each as well.
To improve the strategy: She could find all the factors of 50.
She could also have used a strategy such as finding all the factor pairs.
For example, 10 bundles of 5 will also give 5 bundles of 10.

Let's Learn

Ralph has different containers of coins. He wants to know if each container of coins can be divided into 2, 5 and 10 groups. He looks at the ones digit of each number to find out.

a

7 6   7 8   8 0   8 4   8 2
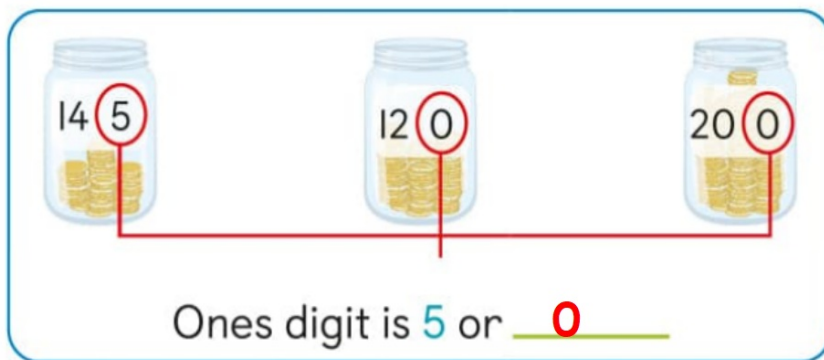
Ones digit is an **even** number

▼

Numbers are divisible by 2

Are all the numbers divisible by 2? How do you know?

Yes, because the numbers are even numbers.
Yes, because the umbers are multiples of 2.

Look at the ones digits. All the ones digits: 5 and 0

Think of a number that is divisible by 5, but not 2 and 10. Share with your partner.

14 **5**   12 **0**   20 **0**

Ones digit is 5 or __0__

▼

Numbers are divisible by 5

Are all the numbers divisible by 5? How do you know?

Yes, because the digits in the ones place of the numbers is 5 or 0.

Yes, because the numbers are multiples of 5.

The test of divisibility by 5 states that: If the digit in the ones place of a number is 5 or 0, the number is divisible by 5.

A number with the digit "5" in the ones place is not an even number. So, it is not divisible by 2.

75, 115, 195 and 225 are examples of numbers that are divisible by 5 but not 2 and 10.

Any number with "5" in the ones place meet the criteria.

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Think of a number that is divisible by 5, but not 2 and 10. Share with your partner.

15
25
35
45

The ones digit should be 5

Look at the ones digits. All the ones digits are 0.

12 0

20 0

Ones digit is ___0___

▼

Numbers are divisible by 10

Are all the numbers divisible by 10? How do you know?

Yes, because the digits in the ones place of the numbers is 0.
Yes, because the numbers are multiples of 10.

All the ones digits: 6, 8, 0, 4 and 2 are even numbers. The test of divisibility by 2 states that all numbers with even numbers in the one place are divisible by 2.

The test of divisibility by 5 states that all numbers with the digits 5 or 0 in the ones place are divisible by 5.

The test of divisibility by 10 states that all numbers with the digits 0 in the one place are divisible by 10.

Look at the tens and ones digits.
All the tens and ones digits in the four
numbers are 25, 50, 75 and 00.

b Caz has different bags of beans. She wants to know if each bag of beans can be divided into 25, 50 or 100 groups. She looks at the tens and ones digit of each number to find out.

25 is a factor of 225

2 (25) 3 (50) 1 (75) 6 (00)

Numbers end with 25, 50, 75, or 00

▼
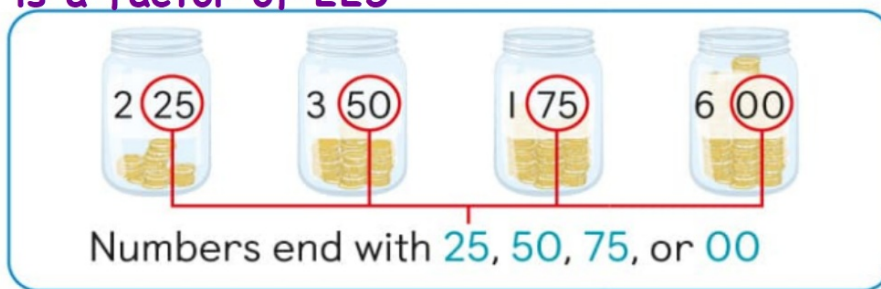
Numbers are divisible by 25

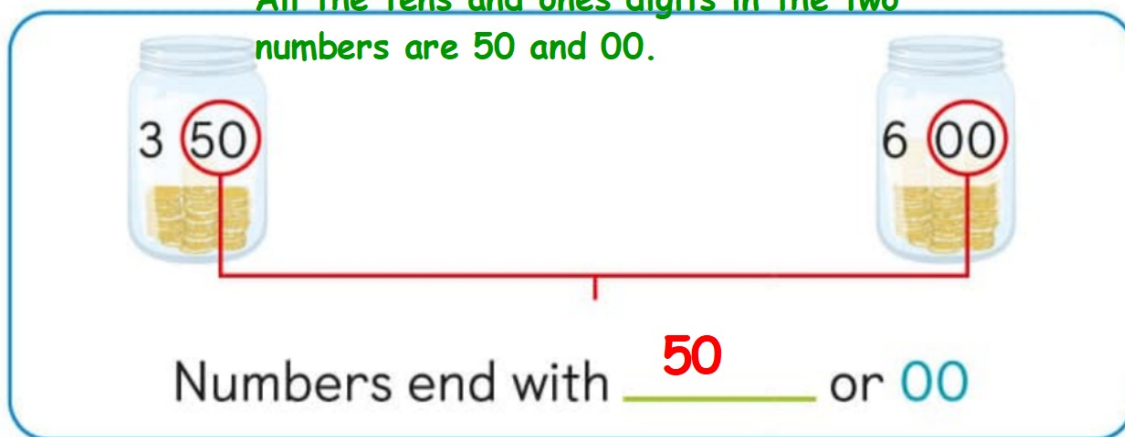Are the numbers divisible by 25?
How do you know?

We can count on in 25: 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 350 and so on.

Each number is a multiple of 25. It is divisible by 25.
E.g. $225 = 25 \times 9$,
$600 = 25 \times 24$

Look at the tens and ones digits.
All the tens and ones digits in the two
numbers are 50 and 00.

3 (50)   6 (00)

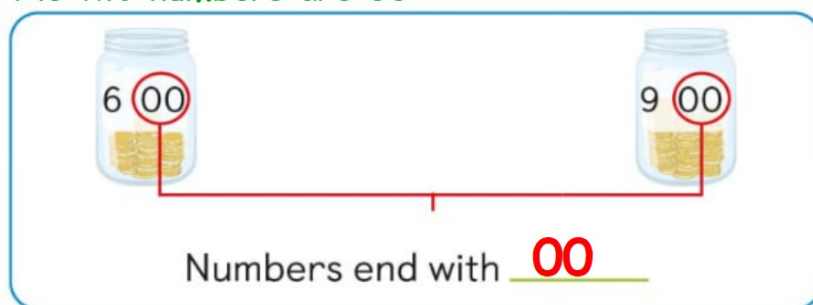Numbers end with ___50___ or 00

Numbers are divisible by 50

Are the numbers divisible by 50? How
do you know?

We can count on in 50: 50, 100,
150, 200, 250, 300, 350 and so on.

Each number is a multiple
of 50. It is divisible by 50.
E.g. 600 = 50 × 12

Look at the tens and ones digits.
All the tens and ones digits in
the two numbers are 00

6 (00)   9 (00)

Numbers end with __00__

Numbers are divisible by 100

What is 275 divisible by?
Make a conjecture about
what you can divide it by.

Are the numbers divisible by 100?
How do you know?

We can count on in 100: 100, 200, 300,
400, 500, 600 and so on.

Each number is a multiple
of 100. It is divisible by 100.
E.g. 900 = 100 × 9

The test of divisibility by 25 states that all numbers ending with 25, 50, 75 and 00 are divisible by 25.

The test of divisibility by 50 states that all numbers ending with 50 and 00 are divisible by 50.

The test of divisibility by 100 states that all numbers ending with 00 are divisible by 100.

Tests of Divisibility – Summary

What is 275 divisible by? Make a conjecture about what you can divide it by.

Divisible by	Criteria
2	Even number
5	Ones digit is 5 or 0
10	Ones digit is 0
25	Ends with 25, 50, 75 or 00
50	Ends with 50 or 00
100	Ends with 00

The ones digit in 275 is 5, so it is divisible by 5. 275 ends with 75, so it is divisible by 25.

275 is not an even number or end with 0, 50 or 00. So, 275 is divisible by 5 and 25 but not by 2, 10, 50 and 100.

The ones digit in 275 is 5. So, it is divisible by 5.

275 ends with 75, so it is divisible by 25.

Let's Practise

I   Is the number divisible by 2, 5, 10, 25, 50 or 100?

If yes, mark with a tick (✓). If no, mark with a cross (✗).

Number	Divisible by					
	2	5	10	25	50	100
70	✓	✓	✓	✗	✗	✗
375	✗	✓	✗	✓	✗	✗
600	✓	✓	✓	✓	✓	✓

Explain to a partner how you classified each number.

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I am between 100 and 160.

I am a multiple of 2 but not 25.

I am divisible by 5.

What am I?

Is there more than one answer? Explain how you know.

110/120/130/140

3 Eddy and his friends collected between 150 to 200 books for recycling.

count in 2s ⟶ 1 left over.

count in 5s ⟶ 2 left over.

count in 10s ⟶ 7 left over.

count in 25s ⟶ 7 left over.

How many books did they collect altogether? Explain how you can use divisibility tests to find out the answer.

Tick (✓) to show what you can do.

☐ I can understand and use the tests of divisibility.

He has 157 books.

If you count in 2s and have 1 left over then the number must be an odd number.

Odd numbers are divisible by 2 with 1 left over.

If you count in multiples of 5 and have 2 left over then the numbers must end in 2 or 7, but only those ending in 7 will also be odd.

So numbers ending in 2 or 7 are divisible by 5 but have 2 left over.

The number must have 7 in the ones place.

Counting in 25s with 7 left.