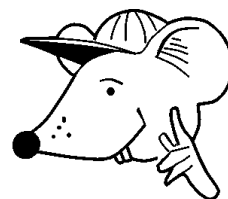# MATHEMATICS

N.S. Yr. 5   P.19

**Recognise odd and even numbers.
Multiples and tests of divisibility.**

Equipment

Paper, pencil, ruler

MathSphere

Concepts

Children should be able to use the words: *multiple, digit, divisible, divisibility, factor*

Children should be able to carry out **tests of divisibility**, i.e. see quickly if a number is divisible by another. The most common tests are:

Divisible by 100   Number ends in 00   e.g. 300
Divisible by 10   Number ends in 0   e.g.   40
Divisible by 5   Number ends in 0 or 5   e.g. 35, 60
Divisible by 2   Number ends in 0, 2, 4, 6 or 8   e.g. 42, 78, 90

Divisible by 3   Add the digits in the number.   E.g. 57. Sum of digits
                             If the total is divisible by 3, $= 5 + 7 = 12$.
                             then so is the number.   12 is divisible by 3,
                                                                                therefore so is 57.

Divisible by 4   Last two figures (digits) are divisible by 4 e.g. 328

Divisible by 6   Even and divisible by 3.

Divisible by 8   Halve the number and test for divisibility by 4 **or**
                             Last three numbers are divisible by 8

Divisible by 9   Add the digits and see if sum of digits is divisible by 9

Divisible by 25   If the last two digits are 00, 25, 50 or 75.

Children should **r**ecognise multiples in the 6, 7, 8 and 9 times tables up to 10 times and beyond where possible, and in the 11 times table up to 99.

Children should recognise multiples of **10, 100 and 1000**
E.g. 5 000 is a multiple of 1 000
          500 is a multiple of 100
           50 is a multiple of 10

Children should be able to put numbers on a Venn diagram.

1. Put any two numbers in the **top row** to complete it and any two
numbers in the **left column** to complete it.

×	7	8		
6	Even			
11	Odd			

Without working out the answers, write **odd** or **even** in the table to show if
the **product** of the numbers is odd or even. Two have been done for you.
Product is the answer when numbers are **multiplied**.

2. In this table put whether the answer is **odd** or **even** for each pair of
numbers. The number in the left column is **multiplied** by the number
in the top row.

Eg. 673 × 355 is odd.

×	355	86	473	846
890	Even			
673	Odd			
3577				

1. Put any two numbers greater than 100 in the **top row** to complete it
and any two numbers greater than 100 in the **left column** to complete
it.

✕	549	154		
845	Even			
945	Odd			

Without working out the answers, write **odd** or **even** in the table to show if
the **product** of the numbers is odd or even.

2. In this table put the **last digit of the answer** only.

  Eg. Last digit of 784 ✕ 877 is 8.

✕	877	946	379	444
784	8			
847	9			
9789				

1. Can you spell and explain these words:

   multiple, digit, divisible, divisibility, factor.

   Ask someone to test you.

2. Did you know that an odd number can be written as twice a whole number plus one, like this:

$$9 = 4 \times 2 + 1$$

   or

$$27 = 13 \times 2 + 1$$

   Do the same with these odd numbers:

   a) 13   **b)** 31   **c)** 87   **d)** 23   **e)** 65

3. a) Put a ring around the numbers that are multiples of **6**:

36,   80,   24,   48,   14,   12,   42,   49

   b) Put a ring around the numbers that are multiples of **7**:

28,   18,   70,   21,   45,   42,   80,   23

   c) Put a ring around the numbers that are multiples of **8**:

36,   24,   34,   72,   56,   80,   45,   32

   d) Put a ring around the numbers that are multiples of **11**:

22,   44,   99,   88,   33,   55,   66,   77,   11

1. Which sentence is true?

   5 is a **multiple** of **20**.

   5 is a **factor** of **20.**

2. Numbers are **added** and **multiplied**. Complete these tables with the words **odd** or **even**.

+	Odd	Even
Odd		
Even		

×	Odd	Even
Odd		
Even		

3. a) Put a ring around the numbers that are multiples of **6**:

6,   16,   26,   36,   46,   56,   66,   76,   86

   b) Put a ring around the numbers that are multiples of **7**:

7,   17,   27,   31,   47,   57,   67,   77,   87

   c) Put a ring around the numbers that are multiples of **8**:

8,   18,   28,   38,   48,   58,   68,   78,   88

   d) Put a ring around the numbers that are multiples of **11**:

89,   67,   33,   74,   45,   82,   94,   66,   12

1. What is the remainder when **17** is divided by **3** ?

2. What is the remainder when **25** is divided by **7** ?

3. Here is a sequence going up in fours:

> **5, 9, 13, 17, 21, 25, 29, 33, 37, 41**

Which of these numbers has a remainder of 3 when it is divided by **5** ?

4. Here is a sequence going up in sixes:

> **3, 9, 15, 21, 27, 33, 39, 45, 51, 57**

Which of these numbers has a remainder of **7** when they are divided by **8** ?

Use the tests for division to answer the next questions:

5. Which of these numbers are divisible by **10** with no remainder?

> **23, 50, 2 540, 300, 73, 2, 60, 370, 2 849 930, 3 845 985**

6. Which of these numbers are divisible by **3** with no remainder?

> **366, 51, 3 724, 8 289, 43, 285, 520, 6 735 , 761, 399**

7. Which of these numbers are divisible by **5** with no remainder?

> **35, 805, 6 740, 702, 154, 95, 480, 7 835 990, 3 844**

8. Which of these numbers are divisible by **2** with no remainder?

> **98, 67, 6 754, 987, 555, 2, 98, 3567, 6 987 566, 7 867 749**

9. Which of these numbers are divisible by **4** with no remainder?

> **99, 340, 5 614, 900, 945, 92, 80, 70, 8 910, 7 624**

1. Fred counts his model Maths Rats in groups of **five** and has **one** left over.
He then counts them in **threes** and also has **one** left over.
How many does he have?

2. Sandra counts her CDs in groups of **seven** and has **none** left over.
She then counts them in **eights** and has **one** left over.
How many CDs does she have?

3. George thinks of a number less than 100.
If he divides it by **five** there are **none** left over.
If he divides it by **three** there are **none** left over.
If he divides it by **eight** there are **three** left over.
What is George's number?

4. Rachael has noticed something special about the number **420**.
It is to do with the numbers **1, 2, 3, 4, 5, 6,** and **7**.
Can you see what it is?

Use the tests for division to answer the next questions:

5. Which of these numbers are divisible by **10** with no remainder?

   560, 9,   670,   6 754, 990, 900, 0, 650, 2 870, 8 475

6. Which of these numbers are divisible by **3** with no remainder?

   222, 641,   9 476,   6 886, 893, 243, 845, 7 777 , 876, 799

7. Which of these numbers are divisible by **5** with no remainder?

   40, 785,   7 648,   942, 645,   85, 440, 8 565 450, 5 734

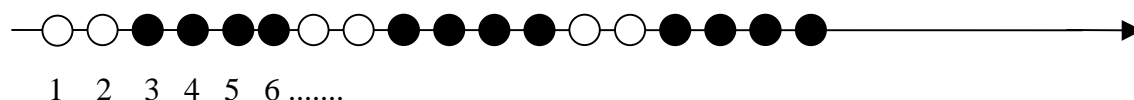**8.** Which of these numbers are multiples of **10** and **100** ?

   600, 980,   7 000,   90, 5,   9 900, 8 660, 7 800, 3 560

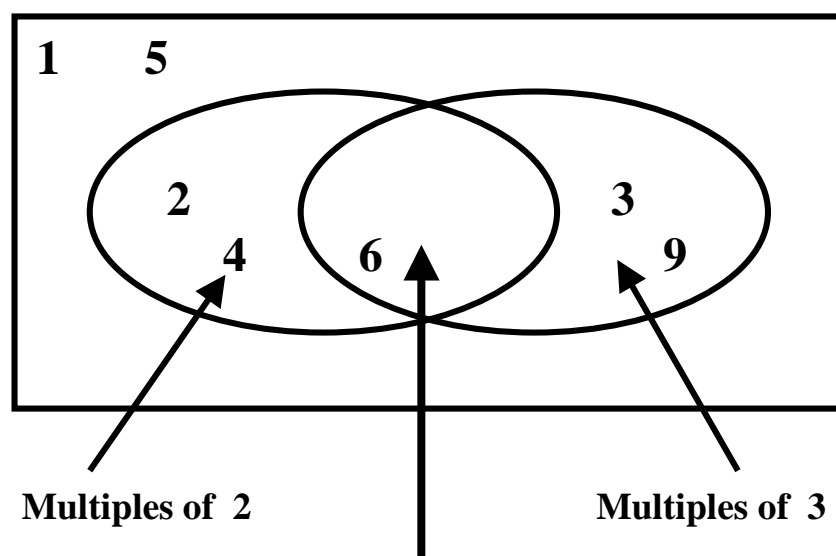**9.** Which of these numbers are divisible by **3** with no remainder?

   111, 222, 333, 444, 555, 666, 777, 888, 999

1. A line of counters is set out in a pattern with two white counters and four
   black counters, then two white counters and four black counters, and so on.

1   2   3   4   5   6 ....

   a) What colour is the 19th counter?

   b) What colour is the 45th counter?

   c) What position in the line is the 4th white counter?

   d) What position in the line is the 18th black counter?

2. Which of these numbers are divisible by 25?

   25,   75,   550,   655,   6 000,   5 675,   12 445

3. Which of these numbers are divisible by 9?

   28,   72,   540,   655,   6 813,   7 890,   25 245

4. a) Put the numbers from **1 to 30** on this Venn Diagram. Some are already
    done for you.

1   5

2

3

4   6   9

Multiples of 2   **Multiples of 3**

   b)   What are these numbers multiples of?

1. A line of counters is set out in a pattern with three white counters and three black counters, then three white counters and three black counters, and so on.

1   2   3   4   5   6 ....
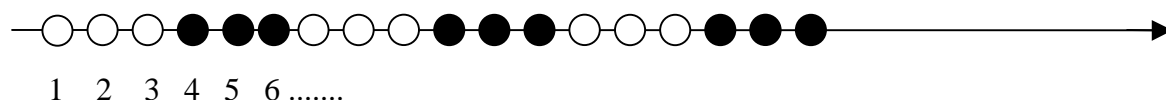
   a) What colour is the 20th counter?

   b) What colour is the 60th counter?

   c) What position in the line is the 5th white counter?

   d) What position in the line is the 39th black counter?

2. Which of these numbers are divisible by 25?

   125,   305,   275,   850,   955,   3 225,   14 605

3. Which of these numbers are divisible by 8?

   36,   400,   640,   555,   3 548,   6 480,   37 640

**4. a)** Put the numbers from **1 to 40** on this Venn Diagram. Some are already done for you.

1   2

10

5

4

8

Multiples of 5   Multiples of 4
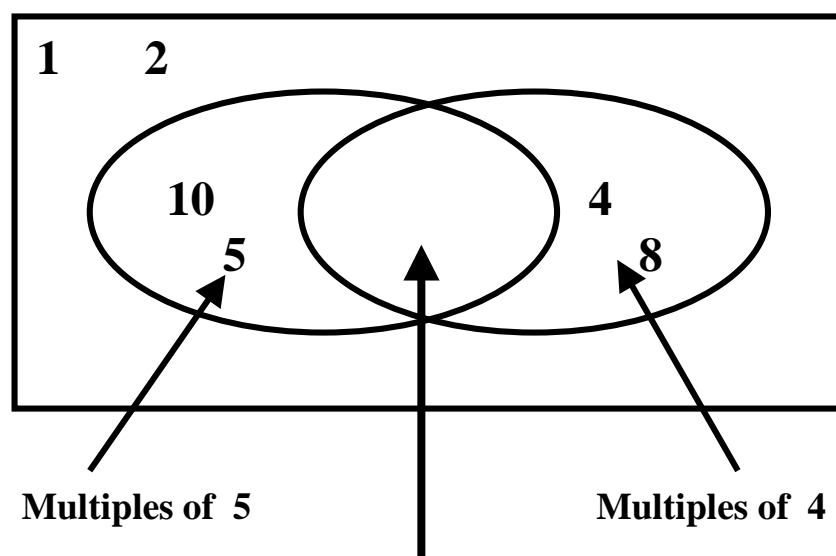
b)   **What are these numbers multiples of?**

1. Black and white rectangles are laid out in seven columns like this:
three blacks, two whites, three blacks, two whites.....

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Row 1	Black	Black	Black	White	White	Black	Black
Row 2	Black	White	White	Black	Black	Black	White
Row 3	White	Black	Black	Black	White	White	Black
Row 4	Black	Black	White	White	Black	Black	Black
Row 5	White	White	Black	Black	Black	White	White
Row 6	Black	Black	Black	White	White	Black	Black
Row 7	Black	White	White	Black	Black	Black	White
Row 8	White	Black	Black	Black	White	White	Black
Row 9	Black	Black	White	White	Black	Black	Black
Row 10	White	White	Black	Black	Black	White	White

a) What is the colour of the rectangle in the **third row** and **fourth column**?

b) What is the colour of the rectangle in the **sixth row** and **third column**?

c) If the table had many more rows, what would the colour of the rectangle in the **15th row** and **fifth column** be?

d) What would the colour of the rectangle in the **20th row** and **seventh column** be?

2. Put numbers in the boxes. They should be **multiples of 5** and **multiples of 3.**

30
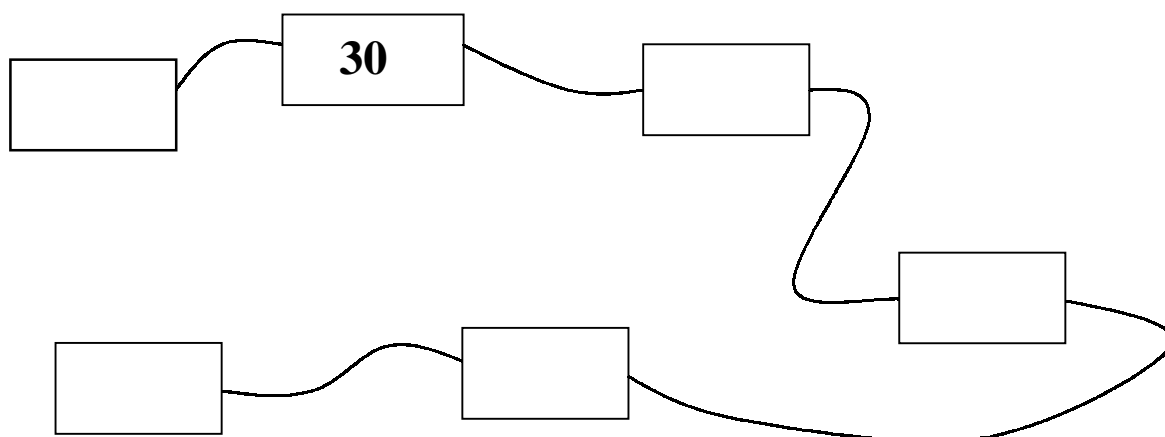
Answers

Page 3
 1. Entries in the table depend on which numbers pupil chooses.
 2.

x	355	86	473	846
890	Even	**Even**	**Even**	**Even**
673	Odd	**Even**	**Odd**	**Even**
3577	**Odd**	**Even**	**Odd**	**Even**

Page 4
 1. Entries in table depend on which numbers pupil chooses
 2.

x	877	946	379	444
784	8	**4**	**6**	**6**
847	9	**2**	**3**	**8**
9789	**3**	**4**	**1**	**6**

Page 5
 2. a) $13 = 6 \times 2 + 1$ **b)** $31 = 15 \times 2 + 1$
   c) $87 = 43 \times 2 + 1$ **d)** $23 = 11 \times 2 + 1$
   e) $65 = 32 \times 2 + 1$

 3. a) 36, 24, 48, 12, 42   **b)** 28, 70, 21, 42
   c) 24, 72, 56, 80, 32   **d)** All of them.

Page 6
 1. 5 is a **factor** of 20
 2.

+	Odd	Even		×	Odd	Even
Odd	**Even**	**Odd**		Odd	**Odd**	**Even**
Even	**Odd**	**Even**		Even	**Even**	**Even**

 3. a) 6, 36,   66   **b)** 7, 77   **c)** 8, 48, 88   **d)** 33, 66

Page 7
1. 2   **2.** 4   **3.** 13 and 33   **4.** 15, 39
5. 50, 2 540, 300, 60, 370, 2 849 930
6. 366, 51, 8 289, 285, 6 735, 399
7. 35, 805, 6 740, 95, 480, 7 835 990
8. 98, 6 754, 2, 98, 6 987 566
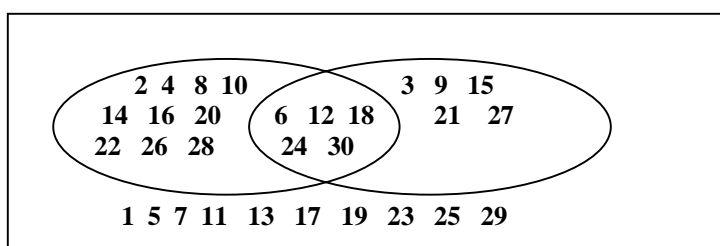**9**. 340, 900, 92, 80, 7 624

Page 8

1. 16 (There are other higher answers)

2. 49 (There are other higher answers)

3. 75 (There are other answers above 100 which you may like to investigate. Do they have a pattern?)

4. They all divide exactly into 420.

5. 560, 670, 990, 900, 0, 650, 2 870

6. 222, 243, 876,

7. 40, 785, 645, 85, 440, 8 565 450

8. 600, 7 000, 9 900, 7 800

9. All of them!

Page 9

 1. a) White **b)** Black **c)** 8th   **d)** 28th

 2. 25, 75, 550, 6 000, 5 675

 3. 72, 540, 6 813, 25 245

 4.

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┌─────────────────────────────────────────────────┐
│     ╭──────────────────────╮                      │
│    ╱  2  4  8  10    ╭──────┴──╮  3   9   15      │
│   │  14  16  20     │ 6  12  18 │  21    27        │
│    ╲  22  26  28    │ 24  30    │                  │
│     ╰───────────────┴──────────╯                  │
│          1 5 7 11  13  17  19  23  25  29          │
└─────────────────────────────────────────────────┘
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   The intersection are multiples of 6.

Page 10

 1. a) White **b)** Black **c)** 8th   **d)** 78th

 2. 125, 275, 850, 3 225

 3. 400, 640, 6 480, 37 640

 4.

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┌──────────────────────────────────────────────────┐
│   1   2   3   6   7   9   11   13  14  17  18  19  │
│    ╭───────────────╮     ╭─────────────────────╮  │
│   │  5  10  15     │ 20 40 │  4   8   12  16    │  │
│   │  25  30  35    │       │ 24  28  32  36     │  │
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│   21  22  23  26  27  29  31  33  34  37  38  39   │
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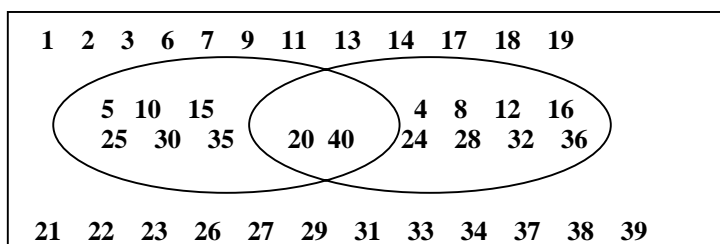
  The intersection are multiples of 20.

Page 11

 1. a) Black   b) Black   c) Black   d) White (This question may be most easily solved by realising that the pattern repeats every five rows).

 2. 15, 30, **45, 60, 75, 90** or other **multiples of 15.**