Booster Pages
KS2

Properties of Numbers

Level 3/4

Number of practice sheets: 10

MathSphere

Notes

Calculators may be used on more difficult questions. You should push the children to do as much in their heads or on paper as they can as this gives very good practice. Obviously, there comes a point when use of a calculator becomes desirable.

Some answers are more open ended and have many possibilities. We have tried to show patterns of possible answers where this is feasible.

The 'I'm Thinking of a Number' game pages may be read out to save paper if you do not wish to repeatedly photocopy them.

A good knowledge of odd, even, square, triangle and prime numbers is required for this work and children should be regularly tested to see if they know these. Calculation of factors and multiples is also required.

They should also be familiar with the tests for divisibility and how to combine them. The following simple tests should be well known.

Divisibility by 10:   Number ends in 0
Divisibility by 5:   Number ends in 0 or 5
Divisibility by 3:   Sum of digits is divisible by 3
                      Eg 2743281 is divisible by 3 because digits total
                      27 which is divisible by 3.
Divisibility by 9:   The above test for divisibility for 3 may be
                      extended to 9. Number is divisible by 9 if sum of
                      digits is divisible by 9.
Divisibility by 2:   Number ends in even digit.
Divisibility by 4:   Last two digits of number are divisible by 4.

Combining divisibility tests:

To test if a number is divisible by 6, for instance, we note that
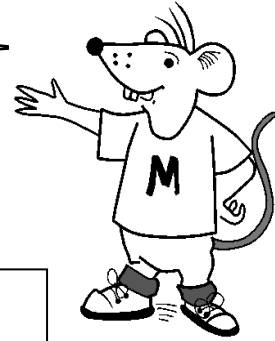$6 = 2 \times 3$, so number must be even and divisible by 3.
Eg 7352634 is divisible by 6 because it is even and digits add up to 30, which is divisible by 3.

This idea may be extended indefinitely.
Eg to test if a number is divisible by 45 apply the divisibility for 5 and for 9 tests.

Here's a practice page to see if you know all the types of numbers you need to know.

1.

a) Write down the first **10 odd** numbers, beginning with 1.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

b) Write down the first **10 even** numbers, beginning with 2.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

c) Write down the first **10 square** numbers, beginning with 1.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

d) Write down the first **10 triangle** numbers, beginning with 1.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

e) Write down the first **10 prime** numbers, beginning with 2.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

f) Write down the first **10 multiples of 6**, beginning with 6.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

g) Write down all the **factors of 12**.

☐ ☐ ☐ ☐ ☐ ☐

You may like to look at your lists of numbers to help with this page.

1. What could the missing numbers be?

   a) An **even** number **greater than 21**.

   b) An **odd** number **between 16 and 24**.

   c) A **square** number **between 40 and 50**.

   d) A **prime** number **less than 12**.

2. What could the missing numbers be?

   a) A **multiple of 7** that is **greater than 50**.

   b) A **factor of 30** that is **greater than 10**.

   c) A **multiple of 12 between 40 and 50**.

   d) A **multiple of 9 less than 25**.

3. Write down all the **factors of 20** and **circle** the ones that are **odd**.

_____

4. Write down all the **factors of 24** and **circle** the ones that are **even**.

_____

I hope you are revising your square, prime and triangle numbers.

1. What could the missing numbers be?

   a) An **even** number **between 17 and 23**.

   b) An **odd** number **less than 13**.

   c) A **square** number **between 73 and 90**.

   d) A **prime** number **greater than 30**.

2. What could the missing numbers be?

   a) A **multiple of 12** that is **greater than 70**.

   b) A **factor of 48 between 10 and 15**.

   c) A **multiple of 30 greater than 100**.

   d) A **factor of 28 more than 12**.

3. Write down all the **factors of 28**. Add them all up (except 28).

_____

4. Write down all the **factors of 32** and **circle** the ones that are **odd**.

_____

Hi, guys and gals. Let me introduce you to my old friend the Venn Diagram.

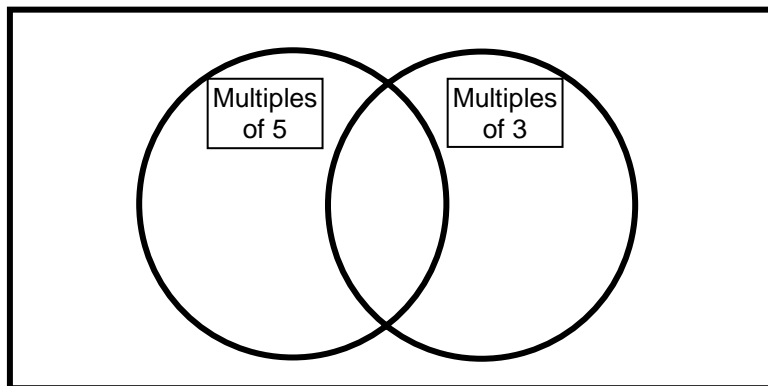You need to put two sets of numbers on this diagram.

Numbers in **neither** set go in here.
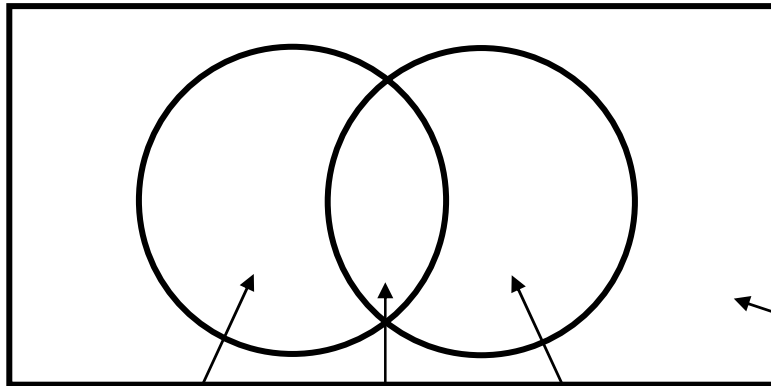
Numbers in the **first** set but **not** in the **second** set go in here.

Numbers in **both** sets go in here.

Numbers in the **second** set but **not** in the **first** set go in here.
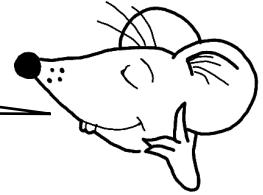
Put these numbers on this Venn Diagram:

15   6   10   7   30   12   20   9   11

Multiples of 5

Multiples of 3

Transfer the numbers in the double box to each Venn Diagram.

a)

| 3   6   8   12   14 |
| 16 19 21 28   35 |
| 50 56 70 |

Multiples of 7   Multiples of 4
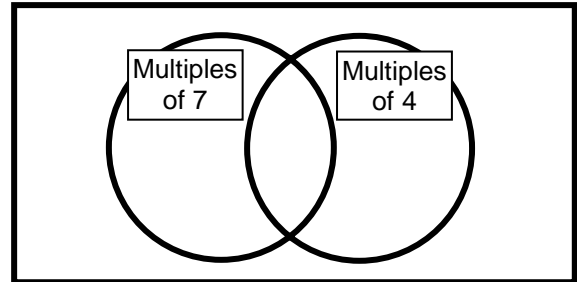
b)

| 7   8   9   13   17 |
| 23 26 29 32   60 |
| 64 87 99 |

Even numbers   Odd numbers
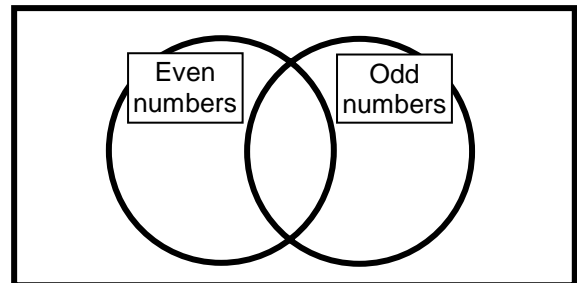
c)

| 5   6   11   12   15 |
| 18 20   27   29   30 |
| 32 35 40 |

Multiples of 4   Multiples of 5
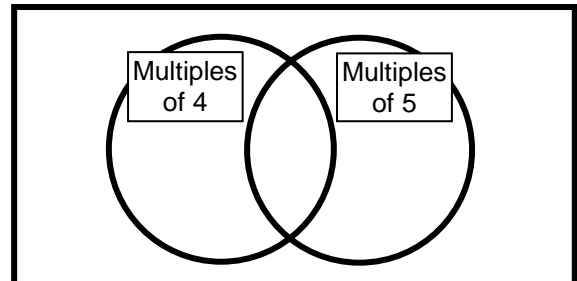
d)

| 3   6   9   12   15 |
| 18 21 24 27   30 |
| 33 36 39 |

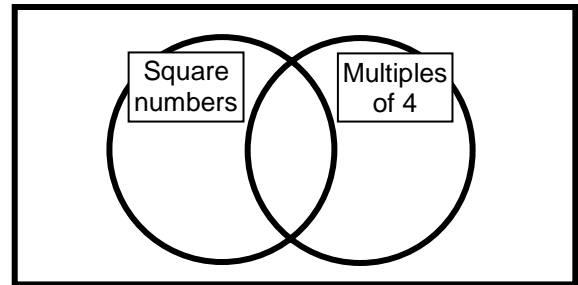Multiples of 3   Multiples of 9
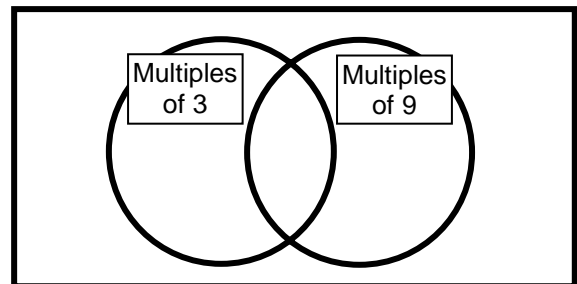
Nice man, Mr Venn, giving you all this lovely work to do!

A woman phoned her local radio to tell them she had sixteen children. The reporter was a bit deaf and said, "Please repeat that."
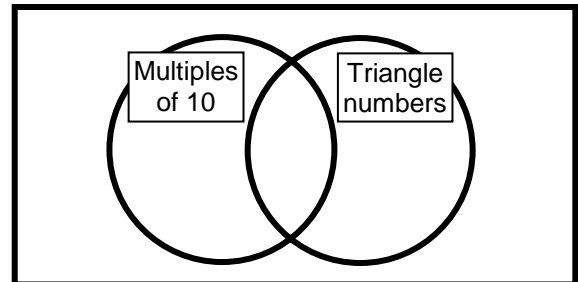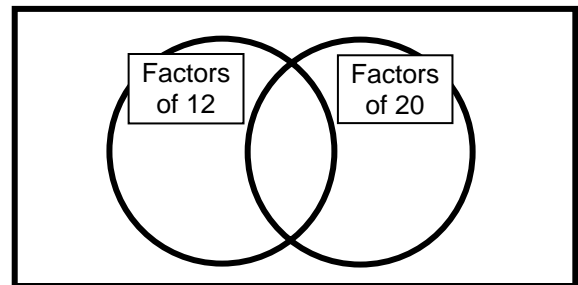"Not blooming likely!" said the woman.

a)

1	3	4	10	16
17	20	22	25	32
36	38	40		

Square numbers | Multiples of 4

b)

2	3	5	10	15
20	23	28	30	31
32	36	40		

Multiples of 10 | Triangle numbers

c)

1	2	3	4	5
6	7	8	10	12
20	22	40		

Factors of 12 | Factors of 20

d)

1	3	5	6	10
12	15	17	20	23
27	30			

Multiples of 5 | Factors of 30
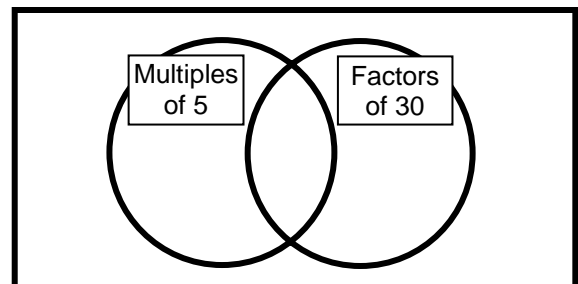
Good joke, but did you hear the one about the high wall?
Don't worry, you'll never get over it! Ha, Ha!!!!!!!!

1. Put a circle around all the numbers that are **multiples of 5**.

15   18   20   25   27   29   40   45   109   620

Explain how you knew which ones to circle.

_____

_____

2. Put a circle around all the numbers that are **multiples of 3**.

3   11   12   18   22   35   56   72   111   980

Explain how you knew which ones to circle.

_____

_____

3. Put a circle around the **prime numbers** in this list.

1   2   3   4   5   10   13   16   17   20

Explain what a prime number is.

_____

_____

4. Put a number in the box that is…
   **A square number and
   a multiple of 3**

5. Put a number in the box that is…
   **A prime number and
   an even number**

You may find a calculator useful for some of these questions.
Me? I just use my pencil.

1.
a) Which of these numbers can be **divided by 3** with **no remainder**? Put a circle around them.

3   18   28   67   138   287   357   450

b) Which of these numbers can be **divided by 7** with **no remainder**? Put a circle around them.

23   25   78   569   644   716   868   999

c) Which of these numbers can be **divided by 3** with **no remainder** <u>and</u> **by 8** with **no remainder**? Put a circle around them.

17   24   56   72   108   216   518   840

2. Complete this three digit number to make it a **multiple of 8**

| 3 | 4 | |

3. Complete these three digit numbers to make them **multiples of 6**

| 4 | 5 | | | 1 | | 8 | | 3 | | 4 |

| 2 | | | | | | 6 | | 4 | | |

I expect you'll need something delicious to eat after that. How about a piece of cheese?
Oh dear, I've just bumped my head!
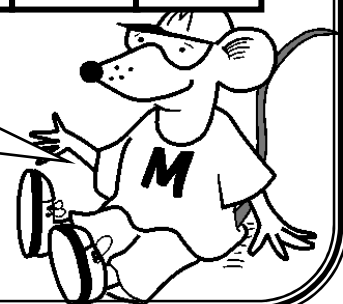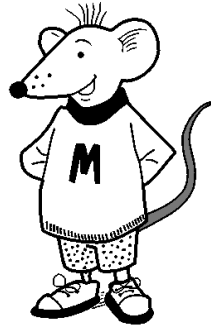
I'm Thinking of a Number (1)

Multy thinks of a number. Divvy tries to guess it..
Can you help Divvy?

a)

Divvy   Multy

Is it **greater than 30**?   Yes
Is it **less than 40**?   Yes
Is it a **square number**?   Yes

What is the number?

---

b)

Is it a **prime number**?   Yes
Is it **more than 20**?   No
Is it **greater than 10**?   Yes
Is it a **factor of 66**?   Yes

What is the number?

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c)

Give me a clue, please.   It's a **multiple of 9**
Is it an **odd number**?   No
Is it **less than 50**?   Yes
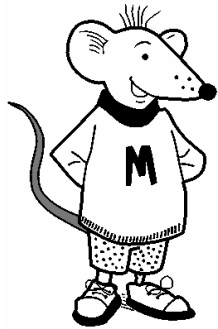Is it a **square number**?   No

What is the number?

I'm Thinking of a Number (2)

Divvy thinks of a number. Multy tries to guess it..
Can you help Multy?

a)

Multy   **Divvy**

Can you tell me anything?   It's a **triangle number**
Is it **less than 30**?   Yes
Is it an **odd number**?   No
Is it a **multiple of 7**?   Yes

What is the number?

b)

How many **factors** does it have?   2
How many digits does it have?   2
Is it **more than 20**?   No
What is it a **factor** of?   51

What is the number?

c)

Give me a clue, please.   It's **more than 100**
Another clue?   It's a **square number**
What is the **total of its digits**?   4
Is it **400**?   No, good try.

What is the number?

Answers

Page 3
1.
a) 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

b) 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

c) 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

d) 1, 3, 6, 10, 15, 21, 28, 36, 45, 55

e) 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

f) 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

g) 1, 2, 3, 4, 6, 12

Page 4
1.
a) One of 22, 24, 26 etc
b) One of 17, 19, 21, 23
c) 49
d) One of 2, 3, 5, 7, 11

2.
a) One of 56, 63, 70 etc
b) Either 15 or 30
c) 48
d) Either 9 or 18

3. (1)   2   4   (5)   10   20

4.   1   (2)   3   (4) (6) (8) (12) (24)

Answers (Contd)

Page 5

1.

a) One of 18,   20,   22

b) One of 1,   3,   5,   7,   9,   11

c) 81

d) Any prime greater than 30 such as 31,   37,   41…..

2.

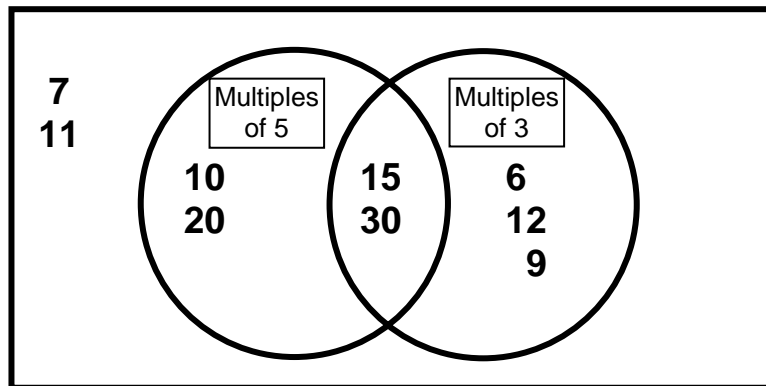**a)** Any multiple of 12 greater than 70 such as 72,   84,   96…..

b) 12

c) Any multiple of 30 greater than 100 such as 120,   150, …. 300, 3000

d) Either 14 or 28

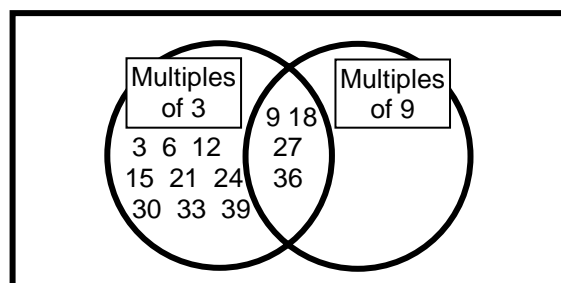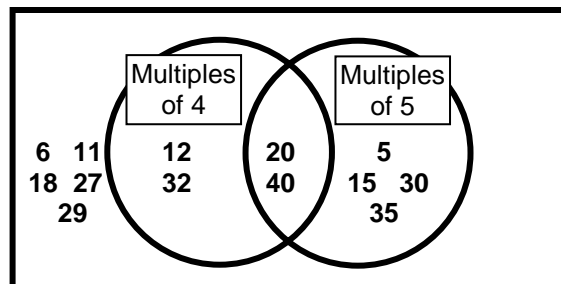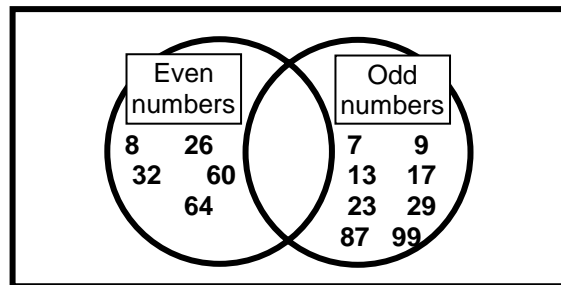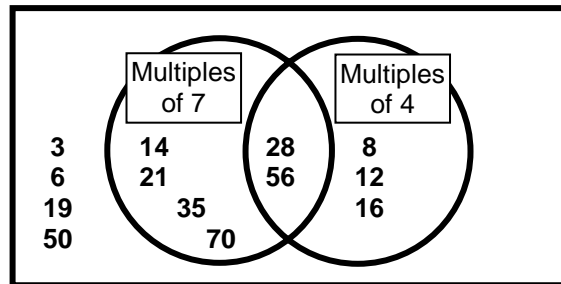**3.**   1   2   4   7   14   28   1 + 2 + 4 + 7 + 14 = 28

4. ① 2   4   8   16   32

Page 6

Answers (Contd)

Page 7

Venn diagram — Multiples of 7 / Multiples of 4

Outside: 3, 6, 19, 50
Multiples of 7: 14, 21, 35, 70
Intersection: 28, 56
Multiples of 4: 8, 12, 16

Venn diagram — Even numbers / Odd numbers

Even numbers: 8, 26, 32, 60, 64
Odd numbers: 7, 9, 13, 17, 23, 29, 87, 99

Venn diagram — Multiples of 4 / Multiples of 5

Outside: 6, 11, 18, 27, 29
Multiples of 4: 12, 32
Intersection: 20, 40
Multiples of 5: 5, 15, 30, 35

Venn diagram — Multiples of 3 / Multiples of 9

Multiples of 3: 3, 6, 12, 15, 21, 24, 30, 33, 39
Intersection: 9, 18, 27, 36
Multiples of 9: (none)

Answers (Contd)

Page 8

Square numbers | Multiples of 4

3 10
17
22
38
1
25
| 4
16
36
| 20
32   40

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2   5
23
31 32
Multiples of 10
20
30
40
| 10 | Triangle numbers
3   15
28   36

7
8
22
40
Factors of 12
3   6
12
| 1
2
4
| Factors of 20
5
10
20

12
17
23
27
Multiples of 5
20
| 5
10
15
30
| Factors of 30
1   3
6

Page 9

1.   Multiples of 5:   15, 20, 25, 40, 45, 620
          Last digit is 5 or 0

2.   Multiples of 3:   3, 12, 18, 72, 111
           Total of digits is divisible by 3

3.   Primes: 2, 3, 5, 13, 17 (A prime number is a number that
          has just two factors, 1 and the number itself)

4.   Any of 9, 36, 81, 144 etc   **5.** 2

Answers (Contd)

Page 10
1.
a) 3, 18, 138, 357, 450

b)   644, 868

c) 24, 72, 216, 840

2. 344

3. 450 or 456   Middle digit can   Middle digit can
                          be 0, 3, 6 or 9   be 2, 5 or 8

   Last two digits   First two digits   Last two digits
   must be a   must be a   must be a
   multiple of 6   multiple of 3   multiple of 6
   less 2   eg 126   plus 2
   eg 2<u>16</u>   eg 4<u>02</u>, 4<u>14</u>

Page 11
a) 36   **b)** 11   **c)** 18

Page 12
a) 28   **b)** 17   **c)** 121 (other possibilities such as 40000,
                                                 12100)