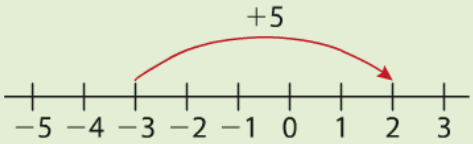
N3.1 Properties of numbers

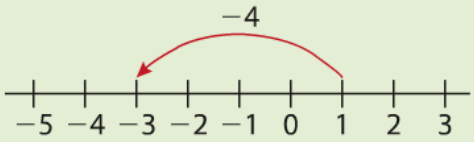
TASK 1: Positive & negative integers

Points to remember

- Numbers get less as you count back along the number line, so $-8 < -4$.
- To add a positive number, count on along the number line.
  To add a negative number, count back along the number line.



$(-3) + 5 = 2$



$1 + (-4) = -3$

- Adding -6 is the same as subtracting 6.
  Subtracting -6 is the same as adding 6.

1 Work out these sums and differences.

a $6 + (-3)$ **b** $(-2) + 7$ **c** $(-3) + (-8)$

d $5 + (-9)$ **e** $(-10) + 3$ **f** $(-6) + 1 + (-5)$

g $8 - (-2)$ **h** $(-9) - 7$ **i** $(-5) - (-9)$

j $(-9) - (-5)$

2 In a magic square, each row, column and diagonal has the same total.
In this square, the magic total is 6.
Make a 3 by 3 magic square using these numbers:
-4, -3, -2, -1, 0, 1, 2, 3, 4
Each row, column and diagonal must add up to 0.

3	−2	5
4	2	0
−1	6	1

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TASK 2: Order of operations & brackets

Points to remember

- Work out any calculation in brackets first.
- After brackets, multiply and divide before you add and subtract.

1 **Without using your calculator**, work out:

a $6 + 10 \times 4$ **b** $16 - 8 \div 4$ **c** $4 \times 5 - 1$

d $24 \div (5 - 1)$ **e** $(6 - 3) \times 5$ **f** $-3 + (12 \div 6)$

2 Find the missing number in each of these calculations.

a $10 - \square \times 2 = 8$ **b** $12 \div 3 + \square = 9$ **c** $\square - 20 \div 4 = 5$ **d** $3 \times \square - 8 = 10$

3 In this expression, you can replace each ● with one of the operations $+$, $-$, $\times$ and $\div$.

6 ● 3 ● 2

Replace each ● to make an expression with a value of:

a 12 **b** 0

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TASK 3: Solving problems

Points to remember

- Work out any calculation in brackets first.
- After brackets, multiply and divide before you add and subtract.

You can make the numbers 1, 2 and 3 using the digit 4, any of the operations $+$, $-$, $\times$ and $\div$, and brackets. For example:

$4 \div 4 = 1$ $\quad$ $(4 + 4) \div 4 = 2$ $\quad$ $4 - (4 \div 4) = 3$

Use the digit 3, any of the operations $+$, $-$, $\times$ and $\div$, and brackets.
Make the numbers 1 to 12.

- You can use the digit 3 as many times as you like each time.
- You don't need to use all four operations.
- You can repeat an operation if you want to.
- Use brackets where they are needed.

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TASK 4: Multiples & tests of divisibility

Points to remember

- A **multiple** of a number divides exactly by the number.
- There are simple **tests for divisibility** by 2, 3, 4, 5, 9 and 10.
- If a number is divisible by **6**, it must be divisible by **2** and divisible by **3.**
- The **square** of a number is the number multiplied by itself.
  If the square of 9 is 81, then the **square root** of 81 is 9 ($9^2 = 81$, $\sqrt{81} = 9$).
- Square before you multiply, divide, add or subtract.

Example

You can find the value of 5^2 by pressing these calculator keys: [5] [x^2]

You usually find the square root of 81 by pressing these keys: [√] [8] [1]

On some calculators you press the square root key last like this: [8] [1] [√]

1 Choose from the numbers in the box. Write:

- **a** five numbers that are divisible by 3
- **b** four numbers that are divisible by 4
- **c** three numbers that are divisible by 5
- **d** four numbers that are multiples of 7

35	12	60
15	84	
42		56

2 **Use your calculator** to work out the value of each of these.

- **a** 24^2
- **b** 2.7^2
- **c** $\sqrt{324}$
- **d** $\sqrt{225}$
- **e** 5×8^2
- **f** $112 \div 4^2$
- **g** $(19 - 8)^2$
- **h** $4^2 \div 5^2$

3 Try this investigation.
Use each of the digits 1 to 9 only once.

1 2 3 4 5 6 7 8 9

Make different multiples of 6.
Can you use all the digits?

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TASK 5: Factors, primes, HCF & LCM

Points to remember

- The **factors** of a whole number are all the whole numbers that divide into it exactly.
- Factors occur in pairs. The factor pairs for 10 are 1×10 and 2×5.
- **Prime numbers** have only two different factors, themselves and 1. 1 is not a prime number.
- You can find the **highest common factor (HCF)** of two numbers by looking at lists of their factors.
- You can find the **lowest common multiple (LCM)** of two numbers by looking at lists of their multiples.

1. Write all the factors of 56.

2. Write a factor of 75 that is bigger than 20 but smaller than 30.

3. What is the highest common factor (HCF) of 32 and 48?

4. What is the lowest common multiple (LCM) of 15 and 20?

5. 13 is a special prime number.

   When you reverse its digits the number you get is also prime.

   13 is a prime number.
   31 is a prime number.

   Besides 13 and 31, there are seven more prime numbers between 10 and 100 that are also prime when their digits are reversed.
   Find them all.

N3.2 Whole Numbers & Decimals

TASK 1: Place value

Points to remember

- $0.3 = \frac{3}{10}$ $0.09 = \frac{9}{100}$ $0.004 = \frac{4}{1000}$
- When a whole number or decimal is:
  – multiplied by 10, its digits move 1 place to the left;
  – multiplied by 100, its digits move 2 places to the left;
  – multiplied by 1000, its digits move 3 places to the left.
- When a whole number or decimal is:
  – divided by 10, the digits move 1 place to the right;
  – divided by 100, the digits move 2 places to the right;
  – divided by 1000, the digits move 3 places to the right.

1 Write these as fractions.

a 0.9 **b** 0.07 **c** 0.003
d 0.17 **e** 0.651 **f** 3.59

2 Write these as decimals.

a $\frac{7}{10}$ **b** $\frac{3}{100}$ **c** $\frac{8}{1000}$
d $\frac{75}{100}$ **e** $\frac{82}{1000}$ **f** $\frac{463}{1000}$

3 Copy and complete these calculations.

a $0.7 \times 100 =$ **b** $13.8 \div 100 =$ **c** $0.02 \times 1000 =$
d $3002 \div 1000 =$ **e** $0.05 \times 10 =$ **f** $0.035 \div 10 =$