

Functional Skills Maths

Level 2

Carry out calculations with numbers of any size in practical contexts, to a given number of decimal places
v1.0

Functional Skills Maths:

Level 2

Skill Standard:

2

Coverage and Range:

Carry out calculations with numbers of any size in practical contexts, to a given number of decimal places.

- Use efficient methods to carry out calculations involving two or more steps, including efficient use of a calculator.
- Understand multiple and factor, and relate them to multiplication and division facts.
- Understand primes and know prime numbers up to 20.
- Know and use strategies to check answers, for example approximate calculation, estimation.
- Give the level of accuracy of results, for example nearest pound, nearest hundredth, in the context of money 12.458 on the calculator means £12.46.¹

¹ QCA Functional Skills guidance: amplification of the standards June 2008 QCA/08/3700

Explain the Skill**Rounding**

Large numbers are often rounded if you need an approximate value rather than the exact value.

To round a number count along to the last digit you need. If the next digit is 5 or more, you round the number up. If it is less than 5, you round down.

To round 23 578 to the nearest 1000 you need to look at the digit in the hundreds place. This is 5 so you round the number up. The answer is 24 000.

The population of New York is 8 405 837. To round this number to the nearest million you look at the digit in the hundreds of thousands place. It is a 4 so we round down. The answer is 8 million.

Practise the Skill

1) Round these numbers to the nearest 100 000.

$$895\,472 = \underline{\hspace{2cm}}$$

$$5\,352\,369 = \underline{\hspace{2cm}}$$

$$651\,652\,004 = \underline{\hspace{2cm}}$$

2) Round these numbers to the nearest million.

$$1\,986\,159 = \underline{\hspace{2cm}}$$

$$78\,520\,405 = \underline{\hspace{2cm}}$$

$$981\,559\,951 = \underline{\hspace{2cm}}$$

3) Add 345 000 to 1.7 million.

4) 456 000 has been rounded to the nearest thousand.

What was the smallest possible number this could have been?

- 5) The Daily Focus newspaper has a circulation of 382 198.
Round this number to the nearest 100 000. _____
- 6) There are 254 212 610 registered cars in the United States.
What is this number rounded to nearest million? _____
- 7) The profits for a large international bank were \$2 234 569 000.
What is this number rounded to the nearest billion. \$ _____ billion
- 8) Scientists have calculated that the Earth is 454 000 000 000 years old.
How many billion years is this? _____ billion
- 9) Five years ago the population of the UK was 64.1 million. It has grown by 400 000.
What is the population of the UK now? _____ million
- 10) In Britain an average of 16 400 000 packets of crisps were eaten each day. After a campaign by the health department this amount reduced by 3.9 million.
How many packets of crisps were eaten after the campaign? _____ million

Explain the Skill

Multiples

A multiple of a number is a number that can be divided exactly by that number.

Multiples are the numbers you find in that number's times table.

The multiples of 5 are 5, 10, 15, 20, 25,

The multiples of 11 are 11, 22, 33, 44, 55,

Factors

A factor is a whole number that divides exactly into another number.

The factors of **12** are **1, 2, 3, 4, 6 and 12** because all these numbers divide exactly into 12 leaving no remainder.

The factors of **18** are **1, 2, 3, 6, 9, 18**.

Prime Numbers

A prime number is a number with only two factors – the number itself and 1.

3 is a prime number because only **1** and **3** will divide into 3 with no remainders.

19 is a prime number because it cannot be divided by any number other than 1 and itself.

10 is not a prime number because it has four factors 1, 2, 5 and 10.

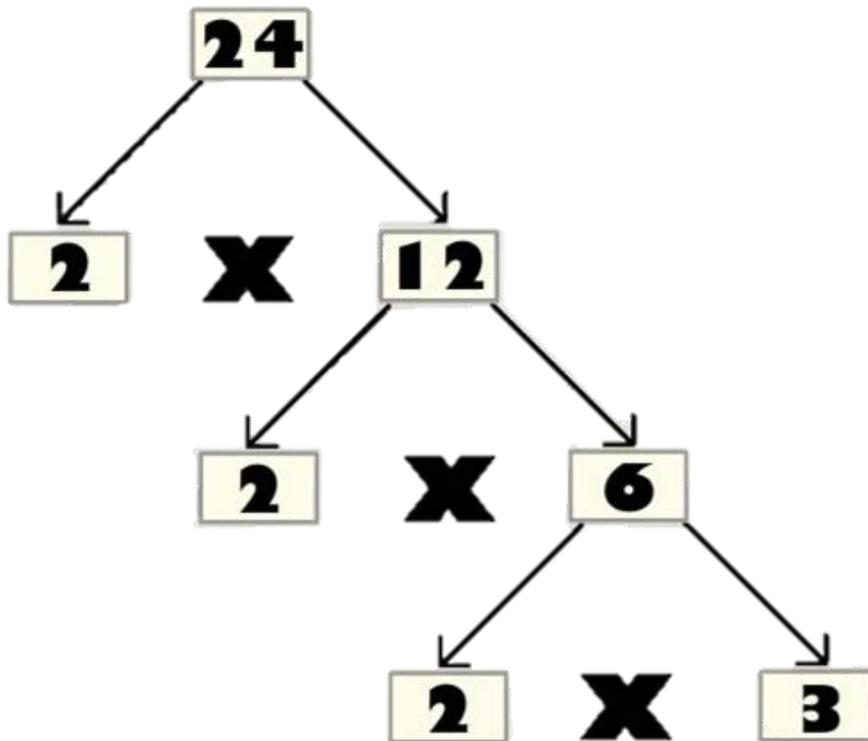
1 is **not** a prime number because it only has 1 factor.

2 is the only **even** prime number because all other even numbers can be divided by 2.

The prime numbers up to 20 are: 2, 3, 5, 7, 11, 13, 17, 19

Every number can be written as a product of its prime factors. You can use a factor tree to do this. The tree is constructed by splitting the number into factor pairs. You continue finding factor pairs until you only have prime numbers at the end of each 'branch'.

To write 24 as a product of its prime factors, start with the smallest prime number that divides into 24 and continue until you only have prime numbers at the end of each branch.



The prime factors of $24 = 2 \times 2 \times 2 \times 3$

Practise the Skill

- 1) a) List the first five multiples of 8.

____ , ____ , ____ , ____ , ____

- b) List the first three multiples of both 3 and 9?

____ , ____ , ____

- 2) What is the smallest number that is a multiple of both 4 and 6?

- 3) Circle all the factors of 20.

1 2 3 4 5 8 10 12 15 20

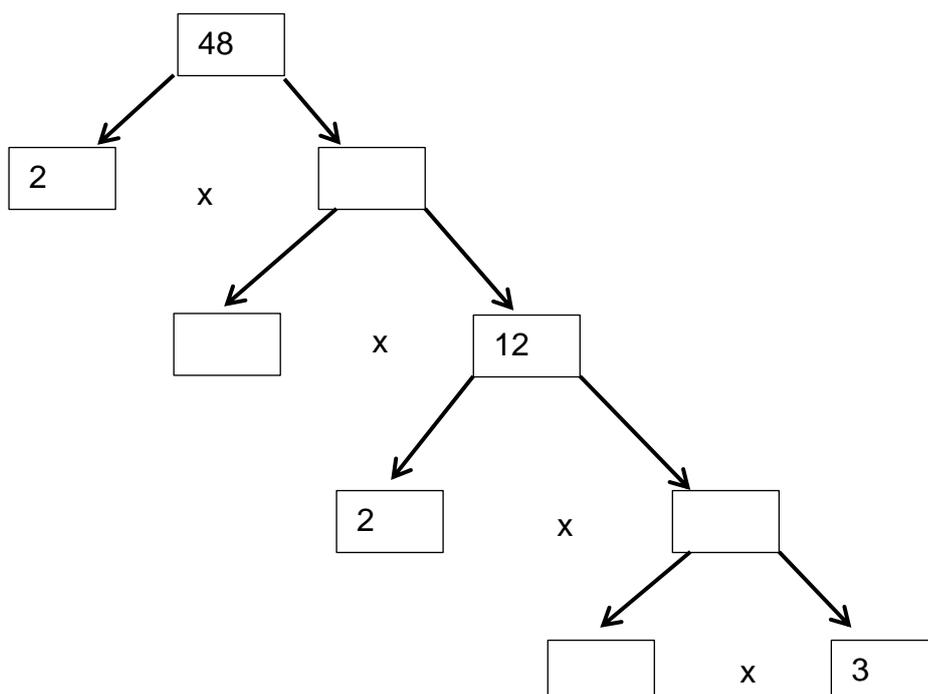
- 4) Circle all the factors of 18?

1 2 3 4 6 8 9 12 16 18 20 24

- 5) What are the prime factors of 18? Circle your answer.

$2^2 \times 3^2$ $2^3 \times 3^2$ 2×3^2 $2^2 \times 3$

- 6) Write 48 as a product of its prime factors by completing the factor tree below.



- 7) Jill is going to the seaside for the day with her family. It is 60 miles away.
Write 60 as a product of its prime factors.

Circle your answer.

$2 \times 3 \times 5$

$2 \times 3 \times 5^2$

$2 \times 3^2 \times 5$

$2^2 \times 3 \times 5$

- 8) Jill parks the car and gets a ticket for 7 hours.

Circle the first five multiples of 7.

7 12 14 17 21 27 28 32 35 37 40

- 9) The family decide to buy ice creams. There is a choice of 30 different flavours.

Circle the factors of 30.

1 2 3 5 6 7 10 12 15 20 30 35 40

- 10) At the shop there are 3 different coloured buckets and 6 different coloured spades.

What is the smallest multiple of both 3 and 6?

- 11) Jill and her children build 8 sandcastles.

What are the first 4 multiples of 8?

_____, _____, _____, _____

- 12) The family walk along the beach and collect 36 shells.

Circle all the numbers that are **NOT** factors of 36.

1 2 3 4 6 8 9 12 18 36

Explain the Skill

Estimating and Checking

When you have carried out a calculation it is useful to check your answer to see if it is correct. You can check your answers using estimation or approximation and also by using inverse calculations.

Estimation

You can estimate by rounding to one significant figure.

The first significant figure in a number is the first non-zero digit reading from left to right.

In this number 503.420 – 5 is the first significant figure

In this number 0.00321 - 3 is the first significant figure

To round to 1 significant figure (1 s.f.) look at the digit to the right of the first significant figure. If it is 5 or more, round up. If it is less than 5, it doesn't change.

To round 268 to 1 s.f. - look at the digit to the right of the first significant figure (2). It is a 6 so you round up. The answer is 300.

To round 542 000 to 1 s.f. – look at the digit to the right of the first significant figure (5). It is a 4 so it doesn't change. The answer is 500 000.

Ben spends £39 per week on train fares travelling to work. *Approximately* how much does he pay if he works for 48 weeks.

To calculate the **exact** answer you would need to work out $£39 \times 48$.

You can **approximate** by rounding each number to 1 s.f. : $40 \times 50 = 2000$

Answer £2000

Inverse Calculation

When you have carried out a calculation you can check your answers by using inverse calculations.

328 letters were posted costing 53p each. How much did it cost to post all the letters? Use an inverse calculation to check your answer.

The calculation is $328 \times 53 = £173.84$

The inverse calculation to check the answer is $£173.84 \div 53p = 328$

Six friends go out for a meal. The meal costs £81.12. How much does each person pay? Use an inverse calculation to check your answer.

To calculate how much each person pays: $£81.12 \div 6 = £13.52$

To carry out an inverse calculation start with £13.52 then multiply by 6
 $£13.52 \times 6 = £81.12$

Practise the Skill

- 1) Round each of these numbers to 1 significant figure.

$56 = \underline{\hspace{2cm}}$

$270 = \underline{\hspace{2cm}}$

$1836 = \underline{\hspace{2cm}}$

$63\,500 = \underline{\hspace{2cm}}$

$8.6 = \underline{\hspace{2cm}}$

- 2) Twelve students are going on a field trip. The cost of the trip is £145.80 each.

What is the total cost of the trip? Use an inverse calculation to check your answer.

£

- 3) The 12 students and 2 tutors go out for a meal one evening. The meal costs £245. How much does each person have to pay? Use an inverse calculation to check your answer.

£

- 4) You are in France and have travelled 387 km.
If 5 miles are approximately 8 km, estimate how many miles have you travelled?

 miles

- 5) You are planning a trip to the United States. The exchange rate is \$1 = 78p
Approximately how many dollars will you get if you change £160 for dollars?

\$

Explain the Skill**Level of accuracy**

The answer you give should always be to the degree of accuracy which suits your purpose. A question may tell you what degree of accuracy to use. Sometimes you have to decide what size of answer is sensible. Use your common sense. The accuracy of an answer depends on the accuracy of the values used to produce it.

If you work out on a calculator that the cost of a meal is 12.579894233, for practical purposes you would round the number to 2 decimal places because you are dealing with money. So you would say the meal cost £12.58.

Practise the Skill

Use a calculator to work out the answers to the following questions.

- 1) The total cost of going to the theatre for 18 people is £823.89.
How much will each person need to pay?
£ _____

- 2) Jasmine is converting £200 to euros. The exchange rate is €1 = 77p.
How many euros will she get?
€ _____

- 3) A small glass holds 180 ml. How many glasses can be filled from a 2 litre bottle?

- 4) A medium sized apple weighs 130 grams. How many apples are there in 1 kilogram?

- 5) A carpenter cuts a 2 metre length of wood into 6 pieces. What is the length of each piece?
_____ mm

Apply the Skill**Recycling**

- 1) In England approximately 177 568 123 tonnes of waste is generated every year. What is this number rounded to the nearest hundred thousand?

- 2) 3 887 860 tonnes of paper was collected last year. Round this number to the nearest million.

_____ million

- 3) 609 910 tonnes of plastic was recycled. Round this number to 1 significant figure.

- 4) In the UK approximately 32% of household waste is recycled. What are the factors of 32? Circle your answers.

1 2 3 4 6 8 12 16 24 32

- 5) A used aluminium can is recycled and back on the supermarket shelf as a new can in 60 days.

What is 60 as a product of its prime factors? Circle your answer.

 $2 \times 3 \times 5^2$ $2 \times 3^2 \times 5$ $2 \times 3 \times 5$ $2^2 \times 3 \times 5$

- 6) It has been calculated that the average baby uses 3 528 nappies which end up in landfill sites. There were 698 512 births last year in the UK.

By rounding these figures to 1 significant figures, estimate the number of nappies that will be used. **Give your answer in billions to 1 significant figure.**

_____ billion

- 7) The energy saved by recycling one glass bottle will power a computer for 28 minutes.
Estimate how many minutes a computer will run for by recycling 187 glass bottles.
(Estimate by using 1 s.f.) _____ minutes
- 8) 25 two litre plastic bottles can be recycled into an adult sized fleece jacket.
How many fleece jackets can be made from 18 925 plastic bottles?
Use an inverse calculation to check your answer. _____ jackets
- 9) A newspaper reported that there were 1460 pieces of litter along every mile on a motorway.
If 21 900 pieces of litter were collected, how many miles had been travelled?
Use an inverse calculation to check your answer. _____ miles
- 10) You decide not to use your car and cycle to work every day. You calculate that you will cycle 350 miles a month.
How many kilometres is this? (Use 5 miles to approximately 8 km). _____ km
- 11) Your office is raising money for charity by collecting aluminium cans for recycling. They get 36p per kilo of cans. A kilo is approximately 72 cans. They have collected 8645 cans.
How much money have they raised?
£ _____