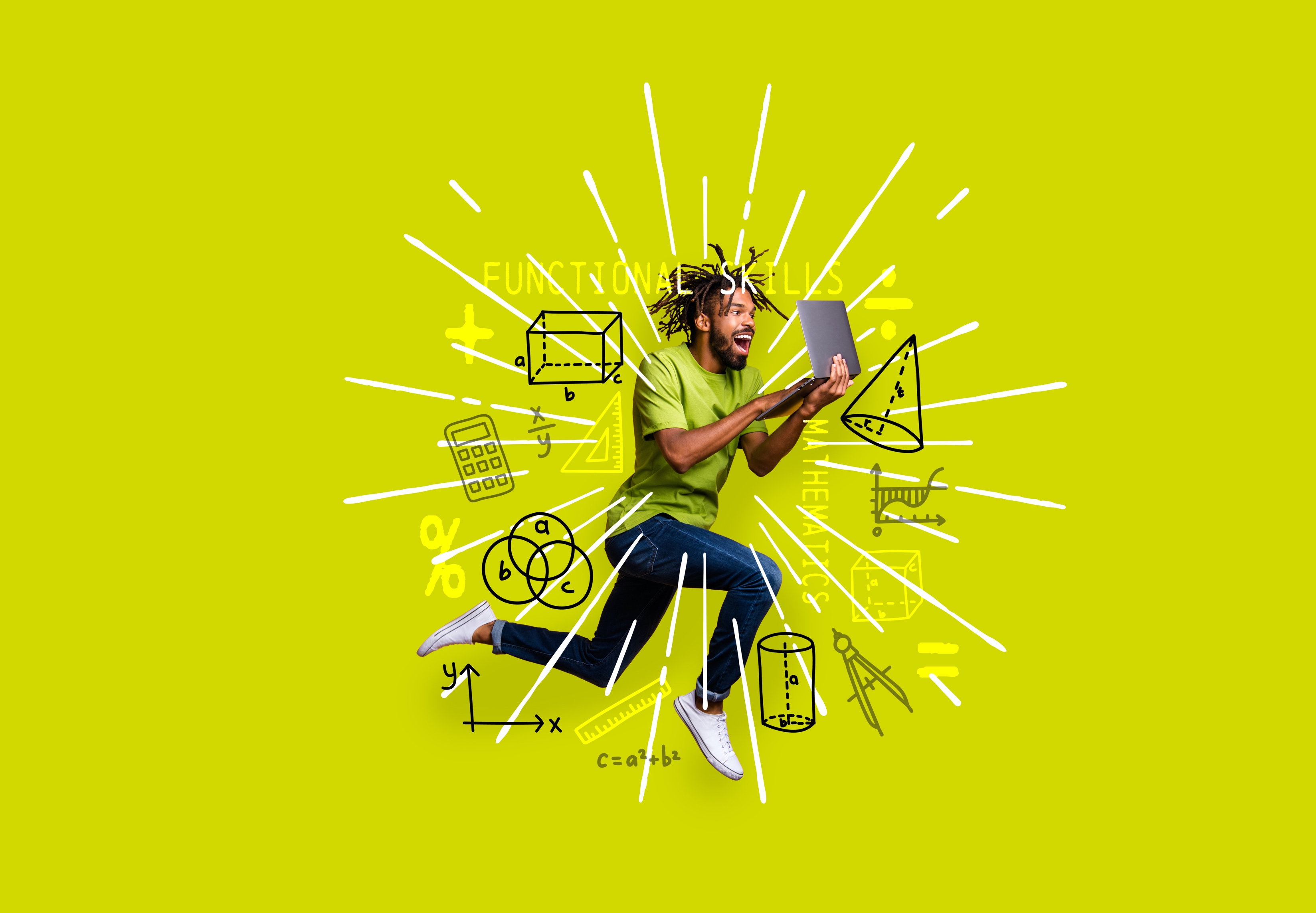
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**FUNCTIONAL SKILLS**

Maths Level 2



**15. Calculate using compound measures, including speed, density and rates of pay**

**Speed**

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Speed is a measurement of the time taken to travel a certain distance.

The standard units of measurement are:

* miles per hour (mph)
* kilometres per hour (km/h)
* metres per second (m/s)

**Speed, Distance and Time**

Speed, distance and time are related by the following equations:

Speed = Distance ÷ Time

Distance

Speed

Time

D = S x T

S = D ÷ T

T = D ÷ S

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Distance = Speed x Time

Time = Distance ÷ Speed

**Calculating Speed**

Sarah runs 6km in 30 minutes. What is her speed in km/h?

You have been asked for the speed in kilometres per hour, however, the time is given in minutes. So first, convert from minutes to hours.

30 minutes = of an hour = 0.5 hours.

Now work out the speed using the formula:

Speed = Distance ÷ Time = 6 ÷ 0.5 = 12km/h

**Using the information provided, work out the answers to the following questions.**

**Question 1**

You walk 25km in 10 hours.

Calculate your speed.

(Show your working out)

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**Question 2**

A bus covers 18km in 2 hours.

Calculate its speed.

(Show your working out)

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**Question 3**

A car moves from B to C at a speed of 40km/hr and comes back from C to B at a speed of 20km/hr.

Calculate the average speed during the journey.

(Show your working out)

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**Calculating Distance and Time**

A train is moving at a speed of 20m/s. How much time does it take for the train to travel 80m?

Time = Distance ÷ Speed

80 ÷ 20 = 4 seconds

How far does the train travel in 9 seconds?

Distance = Speed x Time

20 x 9 = 180m

**Question 4**

You are on a train. The train is travelling at 100mph.

Calculate how far you will travel in 4 hours.

(Show your working out)

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**Question 5**

You go on a cycling trip. In the first half of the journey, you travel at 10mph for 2 hours. In the second half, you travel at 20mph for 90 minutes.

Calculate how far you travel in total.

(Show your working out)

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**Question 6**

A car travels at a speed of 40kmph.

Calculate how far will it travel in 18 minutes.

(Show your working out)

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**Density**

Density measures the relationship between the mass and volume of an object.

The units used for density are usually:

* kilograms per cubic metre (Kg/m³)
* grams per cubic centimetre (g/cm³)

**Density, Mass and Volume**

Density, mass and volume are related by the following equations:

Density = Mass ÷ Volume

Mass

Density

Volume

D = M ÷ V

M = D x V

V = M ÷ D

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Mass = Density x Volume

Volume = Mass ÷ Density

**Calculating Density**

Mark puts a measuring jug on top of some weighing scales and sets the scale to zero. He then pours water into the jug. What is the density (to 2 decimal places) of the water?

There is 25ml = 25 cm³ of water. It weighs 19.41g.

Use the formula: Density = Mass ÷ Volume

= 19.41 ÷ 25 = 0.7764

= 0.78g/cm³

Note: If the volume provided is in cm3, always check whether the answer is required in cm3 or m3.

**Question 7**

An object has a mass of 490g and a volume of 1950cm³

Calculate the object’s density to 3 decimal places.

(Show your working out)

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**Question 8**

A block of wood has a volume of 196cm³ and a density of 0.8g/cm

Calculate the mass of the block of wood.

(Show your working out)

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**Question 9**

A block of gold has a density of 19.3g/cm³ and a mass of 2500g.

Calculate the volume of the gold block to 1 decimal place.

(Show your working out)

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**Rates of Pay**

The rate-of-pay is the cost of something per unit of time, for example, a phone call may cost 23p per minute or someone may get paid £11.75 per hour.

Questions will often require you to combine a rate of pay with a fixed fee or combine two different rates of pay.

Example: Mark earns £13.50 per hour and works 38 hours per week.   
In addition, he earned £42 in tips this week.

How much did he earn in the week?

1. Calculate how much he earns from his hourly rate:   
   38 x £13.50 = £513
2. Then calculate his total earnings for the week:   
   £513 + £42 = £555

**Question 10**

You want to re-tile your bathroom and replace the sink.

A tiler charges £25 per hour and says it will take 12 hours to complete.

A plumber charges £29.50 per hour and says it will take 10 hours to fit the new sink.

Calculate how much it will cost you to have the work completed**.**

(Show your working out)

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**Question 11**

A premium-rate telephone line charges £4.60 per minute, plus a fixed cost of £1.50.

Calculate how much a call would cost if lasted 30 minutes.

(Show your working out)

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**Question 12**

You have a job that pays £550 a week.

Calculate how much you will earn in 12 weeks.

(Show your working out)

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Description automatically generated**Exam Question 1 – Non-calculator**

A car can travel 480 miles on a full tank of petrol. The tank holds 60 litres.   
The fuel gauge shows there are 15 litres left in the tank.

**How many more miles can the car travel before it runs out of petrol?**

Show your working out and write the answer in the box below.

***(1 marks)***

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Description automatically generated **Exam Question 2 – Calculator**

You apply for a new job that pays £8.50 a week more (after tax).

You will work 5 days a week and drive to work, the same way you do in your current job.

Your new job is 6 miles further away from your house.

Your car travels 8.5 miles per litre of petrol. Petrol costs £1.26 per litre.

**Calculate if you will be better off with the new job after you take the petrol into consideration.**

Show your working out and write the answer in the box below.

***(4 marks)***

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**Your functional skills exam**

Your functional skills exams will consist of 2 papers.   
These papers will take place over the following time periods:

* calculator paper – 40 minutes
* non-calculator paper – 1 hour 50 minutes

Further information on the format that your test will take can be obtained from your training provider.

**Hints and tips**

* Find out what format your exam will be in. It may be paper-based   
  or on-screen.
* Plan what you are going to revise in advance. Don’t leave it until the last minute.
* Do as many past papers as you can so you are prepared for the day. If possible, try to complete the past papers following the same format as the actual exam.
* Find a quiet place to study and revise. It helps to sit at a table or a desk. Don’t revise in bed.
* Don’t stay up all night revising the night before your exam. It’s important to have a good rest so you feel refreshed and ready to go.
* Read the question 3 times. The first time to ensure you understand what is being asked, the second time to get an understanding of what you need to do, and a third time to figure out exactly what maths techniques you should be applying.
* If you are struggling with a question, skip it and come back to it later. Try not to sit getting worked up about a difficult question, it will only waste exam time. Move on and come back to it after you have answered the other questions.
* Take note of the number of marks available. This will give you an indication of how much working out you must show. For example, 1 mark will need an answer only and more marks will need you to show your workings out.
* When you’ve finished the exam, go back and check your answers. If you still have time remaining, use it to check your answers and when you have checked your answers check them again.