Functional Skills – Level 1-2 Maths
The Apollo Missions

Objectives

- Convert between units of time
- Use compound measures
- Use 3 figure bearings
- Calculate with fractions and percentages
- Calculate mean and range

Name _____

Date _____

You will need: pen, pencil, ruler, protractor, calculator.

Total marks available 32

Calculator ___ / 23. Non-calculator ___ / 9

L1-2 Functional Maths – The Apollo missions

Name _____ Date _____

You must show your working out. You can use a calculator.

1. The moon is approximately 240 000 miles from the earth. How many days would it take a car to travel this distance at 30 mph? Round your answer appropriately.

(4 marks)

2. a) If the car achieves 50 miles per gallon of petrol, how many gallons of petrol will it take to travel to the moon?

(2 marks)

You must show your working out. You can use a calculator.

2. b) If petrol costs £5.90 per gallon, how much would it cost to drive to the moon?

(2 marks)

c) Show a check for your answer to 2b.

(1 mark)

3. In July 1969 Apollo 11 took 51 hours and 49 minutes to reach and orbit around the moon. How long is this in days, hours and minutes?

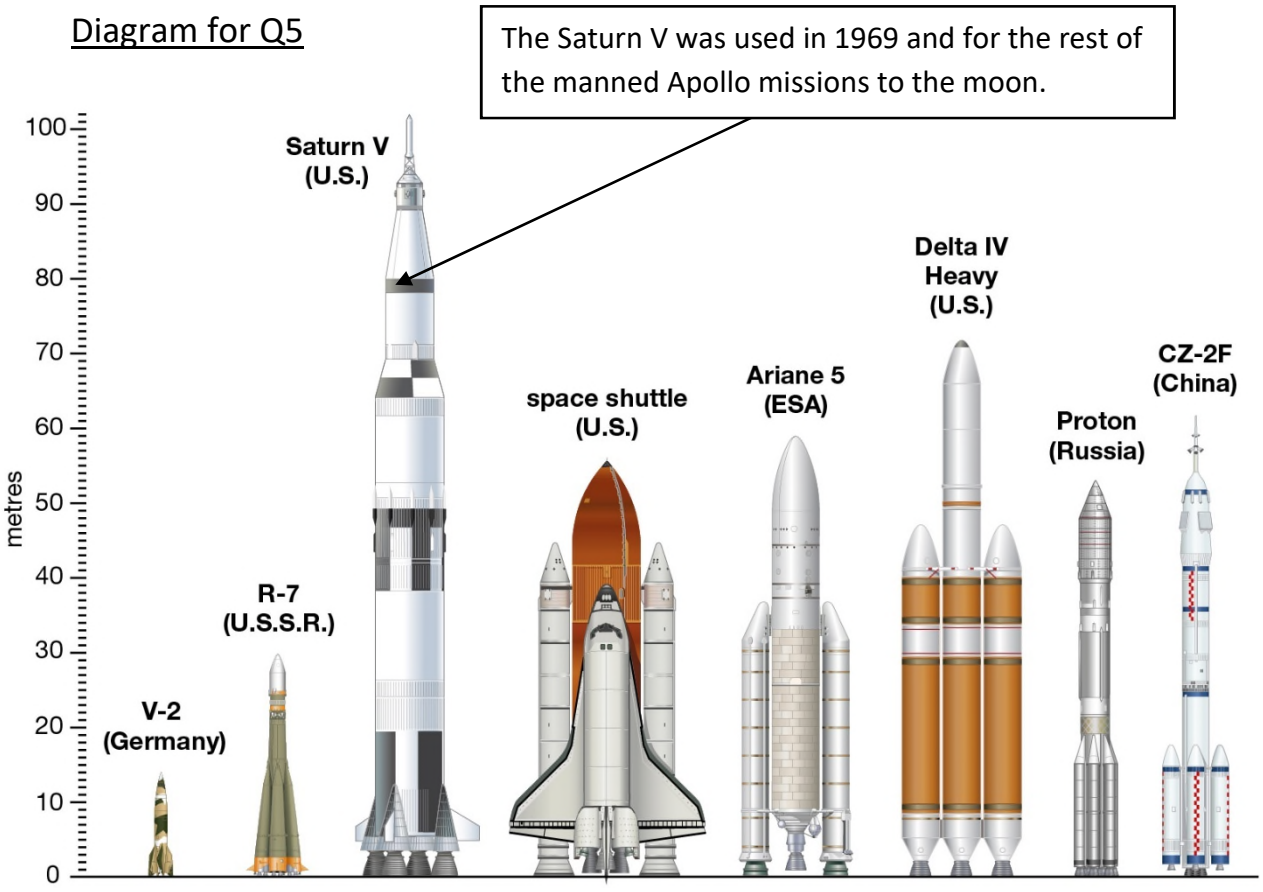
(2 marks)

You must show your working out. You can use a calculator.

4. Buzz Aldrin and Neil Armstrong (the first two men on the moon) were in orbit and on the moon's surface for a total of 58 hours and 7 minutes. They spent a further 70 hours and 56 minutes on their return to earth. How long were the astronauts in space? Give your answers in days, hours and minutes.

(3 marks)

Diagram for Q5



You must show your working out. **You can use a calculator.**

5. a) The Saturn V rocket was one of the tallest rockets ever made. Use the diagram to find the height of each rocket. Present this information in a table.

(3 marks)

b) Using your table, calculate the **mean** average height of the 8 rockets and the **range** of heights.

(4 marks)

c) Show checks for your answers to 5b.

(2 marks)

You must show your working out. Do not use a calculator.

6. The Apollo space missions brought back over 2000 moon rocks weighing 382Kg. These are stored in nitrogen and approximately 12% of them have been distributed around the world to other laboratories. What is 12% of 382Kg?

(2 marks)

7. a) 12 astronauts walked on the moon from the 6 successful Apollo missions, but each mission had an additional astronaut remaining in orbit around the moon. How many astronauts in total went to the moon?

(2 marks)

b) What is 12 astronauts as a fraction of the total? (Simplify your answer)

(2 marks)

You must show your working out. Do not use a calculator.

7. This is a map of Florida where the original Apollo moon missions were launched from Cape Canaveral. Locate Cape Canaveral and Miami on the map and find the bearing of Miami **from** Cape Canaveral. You must show how you get your answer.

Source: https://www.state-maps.org/fl-map.htm

(3 marks)

Subject content – Reformed FUNCTIONAL SKILLS MATHEMATICS 2018

(takes effect from September 2019)

✓ indicates main **content** and **problem-solving skill(s)** covered in this resource, although these will vary with the student group and how the resource is used by the teacher. → or ← = not covered but included to show progression across levels (*content at each level subsumes and builds upon the content at lower levels).*
Full content at: DfE (Feb 2018) https://www.gov.uk/government/publications/functional-skills-subject-content-mathematics

1. Fundamental mathematical knowledge and skills These must be demonstrated in their own right, **both with and without a calculator**, in addition to being used to solve problems or complete tasks.

Entry Level 3	Level 1	Level 2
Using numbers and the number system (N)		
N 1-9 E3.1 Count, read, write, order and compare numbers up to 1000 → E3.2 Add and subtract using three-digit whole numbers → E3.3 Divide three-digit whole numbers by single and double digit whole numbers and express remainders → E3.4 Multiply two-digit whole numbers by single and double digit whole numbers → E3.7 Read, write and understand thirds, quarters, fifths and tenths including equivalent forms ✓ Q8	N 1-17 L1.1 Read, write, order and compare large numbers (up to one million) ✓ Q1 L1.3 Multiply and divide whole numbers and decimals by 10, 100, 1000 L1.9 Find fractions of whole number quantities or measurements ✓ Q7b L1.11 Add, subtract, multiply and divide decimals up to 2 decimal places ✓ Q6 L1.14 Calculate percentages of quantities, including simple percentage increases / decreases by 5% and multiples thereof → L1.17 Work with simple ratio and **direct proportions** ✓Q7a	N 1-12 L2.2 Carry out calculations with numbers up to one million including **strategies to check** answers including estimation and approximation ✓ Q1 Q2b Q5b L2.5 Work out **percentages of amounts** and express one amount as a percentage of another ✓ Q6
Using common measures, shape and space (MSS)		
MSS 10-20 E3.10 Calculate with money using decimal notation & express money correctly in writing in pounds and pence ✓ Q2b E3.12 Read, measure and record time using am and pm → E3.14 Use and compare measures of length, capacity, weight and temperature using metric or imperial units to the **nearest labelled or unlabelled division** ✓ Q5a E3.20 Use appropriate positional vocabulary to describe position and direction including eight compass points and including full / half / quarter turns →	MSS 18-26 20. Convert between units of length, weight, capacity, money and **time**, in the same system ✓ Q3 Q4 L1.26 Use angles when describing position and direction, and measure angles in degrees ✓ Q8	MSS 13-22 L2.15 Calculate using compound measures including **speed**, density and rates of pay ✓ Q1, 2a L2.22 Calculate values of angles and/or coordinates with 2-D and 3-D shapes ←
Handling information and data (HD)		
HD 21-23 E3.23 Organise and represent information in appropriate ways including tables, diagrams, simple line graphs and bar charts ✓ Q5a	HD 27-31 L1.29 Find the mean and range of a set of quantities ✓ Q5b	HD 23-28 L2.25 Use the mean, median, mode and range to compare two sets of data ←

2. Mathematical problem solving (at all levels of Functional Mathematics)

Although underpinning knowledge is tested in its own right, problem solving is a core element of Functional Skills mathematics yet should not obscure or add additional mathematical complexity beyond the level of the qualification. Defining problem solving is a challenge but the attributes below may help. Not all (often just one) of the listed attributes must be present in a single task for it to be considered to be problem solving. ✓ indicates why all or parts of this resource can be considered to be problem solving.
Source: DfE (Feb 2018) https://www.gov.uk/government/publications/functional-skills-subject-content-mathematics.

One or more of the following attributes may be present in a single task for it to be considered problem solving.	
A Tasks that have little or no scaffolding: there is little guidance given to the student beyond a start point and a finish point. Questions do not explicitly state the mathematical process(es) required for the solution. **Most questions**	✓
B Tasks that provide for multiple representations, such as use of a sketch or a diagram as well as calculations. **Q5a, Q8.**	✓
C The information is not given in mathematical form or in mathematical language; or there is a need for the results to be interpreted or methods evaluated, for example, in a real-world context. **Most questions**	✓
D Tasks have a variety of techniques that could be used. **Percentage and time questions. E.g. Q4 & Q6.**	✓
E The solution requires understanding of the processes involved rather than just application of the techniques. **E.g. Q4, Q7a, Q8.**	✓

KEY: MCA = appropriate mathematical content area(s). NS = Using numbers and the number system. MS = Using common measures, shape and space. HD = Handling information and data.

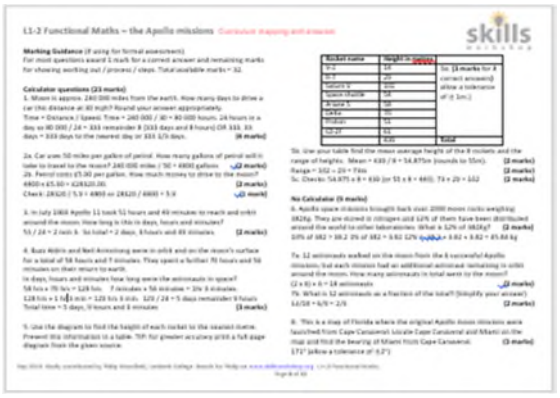
[1]A **simple mathematical problem** requires **working through one step or process**. At Entry Level it is expected that students will be able to address individual problems each of which draw upon knowledge and/or skills from **one** MCA (NS, MS or HD). **Context** should be familiar to all students and easily described.

[2]A **straightforward problem** requires students to either work through one step or process **or to work through more than one connected step or process**. Individual problems are based on the knowledge and/or skills in the MCA (i.e. NS, MS or HD). At Level 1 it is expected that the student will be able to address individual problems, some of which **draw upon a combination of any two of the MCA** and require students to make connections between those content areas. **The context** of individual problems at L1 will require some comprehension in order for the student to be able independently to identify and carry out an appropriate mathematical approach.

[3]**A complex problem** requires **a multi-step process, typically requiring planning and working through at least two connected steps or processes**. Individual problems are based on a combination of the knowledge and/or skills from the MCA (NS, MS or HD). At Level 2 it is expected that the student will be able to address individual problems some of which draw upon a combination of **all three MCA** and require students to make connections between those content areas. **The context** of individual problems at L2 will require interpretation and analysis in order for the student to be able independently to identify and carry out an appropriate mathematical process or processes.

L1-2 Functional Maths – the Apollo missions Curriculum mapping

Solving mathematical problems, carrying out tasks and decision making.				
Entry 1 students are expected to be able to:	**Entry 2 students** are expected to be able to:	**Entry 3 students** are expected to be able to:	**Level 1 students** are expected to be able to:	**Level 2 students** are expected to be able to:
Use the content knowledge and skills to recognise a [1]**simple problem** and obtain a solution			Use the content knowledge and skills to recognise and obtain a solution or solutions to a:	
E1a. Use given mathematical information and recognise and use simple mathematical terms appropriate to E1	E2a. E3a. Use given mathematical information including numbers, symbols, simple diagrams and charts		[2]**straightforward problem**. ✓	[3]**complex problem.** ✓
			L1a. L2a. Read, understand and use mathematical information and mathematical terms used at this level ✓	
	E2b. Recognise, understand and use simple mathematical terms appropriate to Entry Level 2	E3b. Recognise, understand and use simple mathematical terms appropriate to Entry Level 3	L1b. L2b. Address individual problems as described above ✓	
			L1c. L2c. Use knowledge and understanding to a required level of accuracy ✓	
E1b. E2c. E3c. Use the methods given above to produce, check and present results that make sense [*E3 only:* to an appropriate level of accuracy].				L2d. Identify suitable operations and calculations to generate results ✓
E1c. Provide a simple explanation for those results.	E2d. Present appropriate explanations using numbers, measures, simple diagrams, simple charts and symbols appropriate to Entry Level 2.	E3d. Present results with appropriate explanation using numbers, measures, simple diagrams, charts and symbols appropriate to Entry Level 3. ✓	L1d. L2e. Analyse and interpret answers in the context of the original problem ✓	
			L1e. L2f. Check the sense, and reasonableness, of answers ✓	
			L1f. Present results with appropriate explanation and interpretation demonstrating simple reasoning to support the process & show consistency with the evidence presented ✓	L2g. Present results and explain results clearly and accurately demonstrating reasoning to support the process and show consistency with the evidence presented



Page 8 (answer sheet & marking guidance) is only available to resource contributors.

If you are a skillsworkshop.org contributor please use the site contact link to request your free copy.

If you wish to become a contributor please use the same link to request a free log-in and membership