# Functional Skills in Mathematics Level 2 – Mark scheme

## Sample Assessment Materials - Paper: RFSML2SAM01

| Task 1 NC | Process (Task description) | Total mark | Mark allocation | Comments | PS or US | Subject content |
|---|---|---|---|---|---|---|
| **Question 1** | Correct addition of fractions | 2 | **1 mark:** Correct addition of two or more fractions or mixed numbers, eg $1\frac{1}{2} + \frac{3}{4} = 2\frac{1}{4}$ | | US | 7b |
| | Correct mileage | | **1 mark:** Calculate total mileage ie $4\frac{1}{6}$ miles | Accept 4.16, 4.17 | US | 7b |
| **Question 2** | Correct order | 1 | **1 mark:** 3/8, 5/8, ¾, 7/6, 4/3 | Do not accept largest to smallest. Accept 1 1/6 and 1 1/3. | US | 7a |
| **Question 3** | Correct division | 1 | **1 mark:** $273696 \div 24 = 11404$ | | US | 2 |
| **Question 4** | Use formula to calculate surface area | 2 | **1 mark:** 15 x 15 = (225) 225 x 6 = (1350) | | US | 17b |
| | Correct answer with units | | **1 mark:** $1350\text{cm}^2$ | Must show units | US | 17b |
| **Question 5a** | Use scale accurately | 2 | **1 mark:** Valid method to calculate length, eg 7.5 x 1500 = (11250) OR 1.5 x 7.5 = (11.25) OR Other valid method | May be implied if 11.25 seen | PS | 18a |
| | Correct length in metres | | **1 mark:** correct length shown ie 11.25 (m) | Units not required | PS | 18a |
| **Question 5b** | Method to find area of patio | 3 | **2 marks:** Valid method to find the area of the trapezium eg $\frac{1}{2}(8.4 + 6.6) \times 4 = (30)$ OR $(8.4 \times 4) - (1/2 \times 1.8 \times 4)$ OR $(6.6 \times 4) + (1/2 \times 1.8 \times 4)$ OR Other valid method | Award 1 mark for correct area of triangle, $3.6\text{m}^2$ | PS | 16b |
| | Correct area of patio | | **1 mark:** Overall area of patio, ie $30\text{m}^2$ | Units required | PS | 16b |

| Question 5c | Calculate amount of dry mixture | 4 | **1 mark:** Calculate total amount of dry mixture required, eg<br>30 × 20kg = 600kg. | Allow FT for their area. | PS | 11a |
|---|---|---|---|---|---|---|
| | Understanding of ratio shown | | **1 mark:** Evidence of understanding of correct use of ratio, eg<br>1 in 6 OR 1/6th OR 6 parts seen OR 20/6 OR other valid calculations of ratio. | Award if 3.33 seen<br>Award if 100 seen | PS | 11a |
| | Method to calculate number of bags of cement | | **1 mark:** Method to calculate no of bags of cement, eg<br>(600 × 1/6) ÷ 25 OR<br>600 ÷ 6 ÷ 25 OR<br>3.33 × 30 AND 99.99 ÷ 125<br>OR<br>equivalent valid calculation. | Allow FT for their amount of dry mix. | PS | 11a |
| | Correct number of bags of cement | | **1 mark:** Correct answer, ie<br>4 bags. | Allow FT for their amount of dry mix | PS | 11a |

| Task 2 | Process (Task description) | Total mark | Mark allocation | Comments | PS or US | Subject content |
|---|---|---|---|---|---|---|
| **Question 6** | Calculate total budget for house | 5 | **1 mark:** ((28 145 x 3.5) + 4 875) = (£)103 382.50 | Accept 103 382.5 | PS | 2 |
| | Method to convert distance | | **1 mark:** 0.6 (m) x 1.6 = (0.96 km) | Accept any valid method to convert distance from miles to km<br><br>Implied if 0.96 seen | PS | 14a |
| | Interpret scatter graph | | **1 mark:** Identify cost of available house at required distance from station = | Allow between 105 000 and 107 000<br><br>Award mark if implied by explanation. | PS | 28b |
| | Correct final answer and reason | | **1 mark:** No (with valid calculations)<br><br>**1 mark:** for valid reason, eg because he needs £105 000 but he can only afford £103 382.50 | Accept second mark for reason on FT if a correct reason is given based on their calculations. | PS | 28b |
| **Question 7** | Find the mode | 1 | **1 mark**: Correct mode, ie 11 | | US | 23b |
| **Question 8** | List in order of size | 2 | **1 mark**: Correct order ie:<br>9  9.5  10  10.5  11  12  15  23 | | US | 23a |
| | Correct median | | **1 mark**: Correct median, ie 10.75. | | US | 23a |
| **Question 9** | Calculate time taken to walk | 2 | **1 mark:** Correct calculation of the time to walk to the station, eg<br>2 miles at 3mph = 2 ÷ 3 × 60 = 40 mins | Accept 0.66 hours. | PS | 15a |
| | Correct time for leaving house | | **1 mark:** Correct time to leave home, ie 9.22(am) | | PS | 15a |

| Question 10 | Method to calculate compound interest | 5 | **1 mark**: Correct calculation of interest 1.75% of £8500 eg<br>0.175 × 8500 = (£)148.75 for Money Saver | Award if 8648.75 or 8954.10 seen | PS | 13a |
| | Correct interest after 3 years for Money Saver | | **2 marks**: Correct calculation for compound interest used to find Money Saver balance after 3 years, eg<br>Correct amount after 1 year ie 8500 + 148.75 = (£)8648.75 then<br>Correct amount after 2 years ie 8648.75 + 151.35 = (£)8800.10 then<br>Correct amount after 3 years ie 8800.10 + 154.00 = (£)8954.10 | Award 1 mark for correct balance of Money Saver account after 2 years.<br><br>Award 2 marks if 8954.10 seen.<br><br>Award 1 mark for correct method.<br><br>Allow FT for their interest.<br>Units not required. | PS<br><br>PS | 13a<br><br>13a |
| | Correct interest for Bonus Saver<br>Difference in total balances | | **1 mark:** Correct answer for Bonus Saver ie (£)8946.25 | Units not required | PS | 13b |
| | | | **1 mark**: £7.85 | | PS | 13a |
| **Task 3** | **Process (Task description)** | **Total mark** | **Mark allocation** | **Comments** | **PS or US** | **Subject content** |
| Question 11 | Correct substitution<br>Correct answer to part in brackets | 3 | **1 mark**: Correct substitution into formula. | | US | 3 |
| | | | **1 mark**:<br>0.2 OR<br>1/5 OR<br>1/25 seen. | May be implied if 4 seen | US | 12 |
| | Correct % given | | **1 mark**: 4 | % sign not required | US | 12 |
| Question 12a | Method to calculate sun hours in 2017 | 3 | **1 mark:** Valid method to calculate 2017 sun hours from the given mean, eg 94.5 × 12 months = 1134 | May be implied if 31 seen. | PS | 25 |
| | Find total sun hours except Dec 2017 | | **1 mark:** Add 47 + 61 + 119 + 128 + 214 + 108 + 144 + 126 + 94 + 56 + 6 (= 1103) | May be implied if 31 seen. | PS | 25 |
| | Subtraction | | **1 mark:** 1134 - 1103 =31 OR<br>Other valid calculation method AND 'Yes, Raheema is correct' | Do **not** award if 31 not seen. | PS | 25 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Question 12b** | Correct year identified by comparing ranges | 1 | **1 mark:** 2017<br>Eg<br>206 - 21 = 185 AND<br>214 - 6 = 208 | Do **not** award if no supporting calculations of range. | PS | 25 |
| **Question 12c** | Correct kWh calculated<br><br>Correct kWh per month<br><br>Correct cost of electricity | 3 | **1 mark**: Correct number of kWh ie.<br>1.225 ÷ 1.09 = 1.123853211009174 | Award for rounding to 2 or 3 dp, ie 1.12 OR 1.124 | PS | 10d |
| | | | **1 mark**: Correct number of kWh in June, ie<br>1.123853211009174 × 108 = 121.376146789 | Allow FT from their number of kWh<br>Allow FT for rounded figures, eg<br>1.124 × 108 = 121.392<br>1.12 x 108 = 120.96 | PS | 10c |
| | | | **1 mark:** Correct cost of electricity, ie<br>121.376146789 × 0.143 = (£)17.35 OR £17.36 | Allow FT for rounded figures to 2 or 3 dp, eg<br>120.96 x 0.143 = (£)17.29 OR 17.30<br>121.392 × 0.143 = (£)17.36<br>121.4 x 0.143 = 17.36<br><br>Allow for rounding.<br><br>Do not award for more or less than 2 dp. | PS | 10c |

| Question 12d | Method to calculate volume | 5 | **1 mark**: Valid method 3.14 × 0.4 × 0.4 × 1 = (0.5024) | Must be consistent units.<br>Do **not** award for use of diameter. | PS | 17a |
| | Correct volume | | **1 mark**: Correct answer = 0.5024<br><br>Accept 0.502 – 0.503<br><br>*Can use range of 3.14 to 3.142 for pi.* | May be implied if 0.5024 seen. | PS | 17a |
| | Method to convert volume to gallons | | **1 mark:** Method to convert volume to gallons, eg = 0.5024 × 219.97 | Allow FT for their volume.<br>May be implied if 110.51 gallons seen. | PS | 14c |
| | Correct number of gallons | | **1 mark:** Correct number of gallons = 110.51 (gallons) | | PS | 14c |
| | Valid explanation given | | **1 mark:** Valid explanation, eg "Yes, she is correct, the container will hold more than 100 gallons". | Accept other valid answers.<br>Do not accept 'yes' without supporting calculations.<br><br>Allow FT for incorrect volume or number of gallons. | PS | 17a |
| **Task 4** | **Process (Task description)** | **Total mark** | **Mark allocation** | **Comments** | **PS or US** | **Subject content** |
| **Question 13** | Plot coordinate on grid | 1 | **1 mark**: Point plotted correctly on graph | | US | 19 |
| **Question 14** | Calculate the decimal | 2 | **1 mark:** correct calculation of decimal, ie (144 ÷ 240 = 0.6) converted to 6/10 | | US | 8 |
| | Convert to fraction in simplest form | | **1 mark**: 3/5 | | US | 8 |

| Question 15a | Correct entry fees and percentage | 4 | **1 mark:** Complete entry fees in table, ie £300 and 25% | May be implied if 1200 or 228 or 384 or 108 or 180 seen. | PS | 11b |
| | Calculate the ratio | | **1 mark:** Find appropriate ratio, ie £:% as 300:25 OR 12:1 or 300 × 4. | May be implied if 1200 or 228 or 384 or 108 or 180 seen. | PS | 11b |
| | Calculate total income | | **1 mark:** Find total income, ie (£) 1200. | Units not required. | PS | 11b |
| | Calculate total profit | | **1 mark:** Calculate total profit, ie 1200 – 175 – 85 = (£) 940 | Allow FT using their total income figure. Units not required. | PS | 11b |
| Question 15b | Correct circumference | 5 | **1 mark:** Correct circumference of a cake, eg 2 × 80 × 3.14 = 502.4mm, accept 502 - 503mm | May be implied if 502-503 seen. May use metres or cm eg 8cm or 0.08m | PS | 16a |
| | Correct ribbon length for 15 cakes | | **1 mark:** Calculate ribbon length for 15 cakes, ie 502.4 × 15 = 7536mm | Alt method 12.5% first then × 15 | PS | 16a |
| | Calculate extra 12.5% | | **1 mark:** Calculate 112.5%, eg 7536 × 1.125 OR equivalent = 8478(mm)<br><br>Accept 8475 – 8481(mm). | Award if correct answer seen | PS | 6 |
| | Rounded length | | **1 mark:** 9(m) required | Units not required.<br><br>Award if correct answer seen | PS | 6 |
| | Calculate cost | | **1 mark:** correct calculation of cost, eg 9(m) × £4.95 = £44.55 | | PS | 6 |

| Question 15c | Probability of winning a prize and of spin made by a girl | 3 | **1 mark:** Correct probability of a spin winning a prize given, eg<br>1/3 OR 4/12<br>**AND** Correct probability of a spin being made by a girl, ie<br>½ or 0.5 | May be implied if 1/6<sup>th</sup> seen. | PS | 27a |
|---|---|---|---|---|---|---|
| | Method to calculate probability of 2 events | | **1 mark:** Method to calculate probability of a person being a girl and winning a prize, ie<br>1/3 × ½ = OR 0.5 × 0.33 = | Allow FT for their two individual probabilities.<br>May be implied if 1/6<sup>th</sup> seen. | PS | 26 |
| | Correct probability of 2 events | | **1 mark** - Correct probability of 2 events, ie<br>1/6 OR 0.166 OR 16.6% | Allow FT for their two individual probabilities. | PS | 26 |

**Annotation notes:**

| Annotation | Meaning |
|---|---|
| US | Underpinning skills |
| PS | Problem solving skills |
| FT | Follow through |
| (…) | Information that is not required for the mark point |

**Functional Skills in Mathematics Level 2 – Mapping matrix**

| Paper number (Sample Assessment Material) | | | RFSML2SAM01 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Task number | | | **T1** | | **T2** | | **T3** | | **T4** | Total | % |
| Total number of marks per task | | | **15** | | **15** | | **15** | | **15** | | |
| Problem Solving (PS) maximum marks <br> Underpinning skills (US) maximum marks | | | **9** <br> **6** | | **12** <br> **3** | | **12** <br> **3** | | **12** <br> **3** | **Total no of sub-elements mapped = 28** | |
| Tick the boxes to confirm that T2, T3 and T4 contain a 5-8 mark question reflecting a multi-step calculation. | | | | | ✓ | | ✓ | | ✓ | | |
| Level 2 Subject Content | | | PS | US | PS | US | PS | US | PS | US | |
| 1a. Write positive and negative numbers of any size | | | | | | | | | | | |
| 1b. Order and compare positive and negative numbers of any size | | | | | | | | | | | |
| 2. Carry out calculations with numbers up to one million including strategies to check answers including estimation and approximation | | | | 1(Q3) | 1(Q6) | | | | | | 2 |
| 3. Evaluate expressions and make substitutions in given formulae in words and symbols | | | | | | | | 1(Q11) | | | 1 |
| 4. Identify the equivalence between fractions, decimals and percentages | | | | | | | | | | | |
| 5a. Work out percentages of amounts | | | | | | | | | | | |
| 5b. Express one amount as a percentage of another | | | | | | | | | | | |
| 6. Calculate percentage change (any size increase and decrease), and original value after percentage change | | | | | | | | | 3(Q15b) | | 3 |
| 7a. Order and compare amounts or quantities using proper and improper fractions and mixed numbers | | | | 1(Q2) | | | | | | | 1 |
| 7b. Add amounts or quantities using proper and improper fractions and mixed numbers | | | | 2(Q1) | | | | | | | 2 |
| 7c. Subtract amounts or quantities using proper and improper fractions and mixed numbers | | | | | | | | | | | |
| 8. Express one number as a fraction of another | | | | | | | | | | 2 (Q14) | 2 |
| 9a. Order and compare decimals | | | | | | | | | | | |
| 9b. Approximate decimals | | | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 10a. Add decimals up to three decimal places | | | | | | | | | |
| 10b. Subtract decimals up to three decimal places | | | | | | | | | |
| 10c. Multiply decimals up to three decimal places | | | | | 2(Q12c) | | | 2 | |
| 10d. Divide decimals up to three decimal places | | | | | 1(Q12c) | | | 1 | |
| 11a. Calculate using ratios | 4(Q5c) | | | | | | | 4 | |
| 11b. Calculate using direct proportion | | | | | | | 4(Q15a) | 4 | |
| 11c. Calculate using inverse proportion | | | | | | | | | |
| 12.  Follow the order of precedence of operators, including indices | | | | | | 2(Q11) | | 2 | |
| **Total: Number and number system** | | | | | | | | **24** | **40** |
| 13a. Calculate compound interest | | | 4(Q10) | | | | | 4 | |
| 13b. Calculate percentage increases, decreases and discounts including tax and simple budgeting | | | 1(Q10) | | | | | 1 | |
| 14a. Convert between metric and imperial units of length, using<br>i) a conversion factor<br>ii) a conversion graph | | | 1(Q6) | | | | | 1 | |
| 14b. Convert between metric and imperial units of weight using<br>i) a conversion factor<br>ii) a conversion graph | | | | | | | | | |
| 14c. Convert between metric and imperial units of capacity using<br>i) a conversion factor<br>ii) a conversion graph | | | | | 2(Q12d) | | | 2 | |
| 15a. Calculate using compound measures including speed | | | 2(Q9) | | | | | 2 | |
| 15b. Calculate using compound measures including density | | | | | | | | | |
| 15c. Calculate using compound measures including rates of pay | | | | | | | | | |
| 16a. Calculate perimeters including triangles and circles and composite shapes including non-rectangular shapes (formulae given except for triangles and circles) | | | | | | | 2(Q15b) | 2 | |
| 16b. Calculate areas of 2-D shapes including triangles and circles and composite shapes including non-rectangular shapes (formulae given except for triangles and circles) | 3(Q5b) | | | | | | | 3 | |
| 17a. Use formulae to find volumes of 3-D shapes including cylinders (formulae to be given for 3-D shapes other than cylinders) | | | | | 3(Q12d) | | | 3 | |

| Skill | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 17b. Use formulae to find surface areas of 3-D shapes including cylinders (formulae to be given for 3-D shapes other than cylinders) | | 2(Q4) | | | | | | | 2 | |
| 18a. Calculate actual dimensions from scale drawings | 2(Q5a) | | | | | | | | 2 | |
| 18b. Create a scale diagram given actual measurements | | | | | | | | | | |
| 19. Use coordinates in 2-D, positive and negative, to specify the positions of points | | | | | | | | 1(Q13) | 1 | |
| 20. Understand and use common 2-D representations of 3-D objects | | | | | | | | | | |
| 21. Draw 3-D shapes to include plans and elevations | | | | | | | | | | |
| 22. Calculate values of angles and/or coordinates with 2-D and 3-D shapes | | | | | | | | | | |
| **Total: Measure, shape and space** | | | | | | | | | **23** | **38** |
| 23a. Calculate the median of a set of quantities | | | | 2(Q8) | | | | | 2 | |
| 23b. Calculate the mode of a set of quantities | | | | 1(Q7) | | | | | 1 | |
| 24. Estimate the mean of a grouped frequency distribution from discrete data | | | | | | | | | | |
| 25. Use the mean, median, mode and range to compare two sets of data | | | | | 3(Q12a) 1(Q12b) | | | | 4 | |
| 26. Work out the probability of combined events, including using diagrams and two-way tables | | | | | | | 2(Q15c) | | 2 | |
| 27a. Express probabilities as fractions | | | | | | | 1(Q15c) | | 1 | |
| 27b. Express probabilities as decimals | | | | | | | | | | |
| 27c. Express probabilities as percentages | | | | | | | | | | |
| 28a. Draw scatter diagrams | | | | | | | | | | |
| 28b. Interpret scatter diagrams | | | 3 (Q6) | | | | | | 3 | |
| 28c. Recognise positive and negative correlation | | | | | | | | | | |
| **Total: Handling data** | | | | | | | | | **13** | **22** |
| **Total Mark   PS/US        Total %** | 9 | 6 | 12 | 3 | 12 | 3 | 12 | 3 | 60 | 100 |

| Problem solving and decision making requirements: Indicate the question numbers where this is required | Task 1 | | Task 2 | | Task 3 | | Task 4 | |
|---|---|---|---|---|---|---|---|---|
| Read, understand, and use mathematical information and mathematical terms | Q5a, 5b, 5c | | Q6, 10 | | Q12a, 12b, 12c, 12d | | Q15a, 15b, 15c | |
| Address individual problems based on a combination of the knowledge and/or skills from the mathematical content areas (number and the number system; measures, shape and space; information and data). Some problems draw upon a combination of all three mathematical areas and require learners to make connections between those content areas. | Q5c | | Q6, 10 | | Q12c, 12d | | Q15a, 15b | |
| Use mathematical information and terms in a problem | Q5a, 5b | | Q6, 10 | | Q12a, 12b, 12c, 12d | | Q15a, 15b, 15c | |
| Use knowledge and understanding to a required level of accuracy | Q5a, 5b, 5c | | Q6, 10 | | Q12c, 12d | | Q15a, 15b | |
| Identify suitable operations and calculations to generate results | Q5a, 5b, 5c | | Q6, 10 | | Q12a, 12b, 12c, 12d | | Q15a, 15b, 15c | |
| Analyse and interpret answers in the context of the original problem | | | Q6, 10 | | Q12a, 12c, 12d | | Q15a, 15b, 15c | |
| Check the sense and reasonableness of answers | Q5a, 5b, 5c | | Q6, 10 | | Q12d, 12e | | Q15a, 15b | |
| Present and explain results clearly and accurately demonstrating reasoning to support the process and show consistency with the evidence presented. | | | Q6 | | Q12d | | | |