# Numeracy Professional Skills Practice Test 1 - Answers

## Mark Scheme

### *Mental Arithmetic Section*

| Question Number | Correct Answer (1 mark) | Also Accept (1 mark) | Do Not Accept (0 marks) |
|---|---|---|---|
| 1 | **75** | 75.0 | |
| 2 | **200 or 200. 00** | 200.0 | 200.000 |
| 3 | **6** | 6.0 | |
| 4 | **605** | | |
| 5 | **13: 00** | | 13: 0<br>1: 00 |
| 6 | **39** | 39.0 | |
| 7 | **2590 or 2590. 00** | 2590.0 | 2590.000 |
| 8 | **0. 4** | . 4<br>0.40 | |
| 9 | **200** | 200.0 | |
| 10 | **21** | 21.0 | |
| 11 | **10 years and 9 months** | | |
| 12 | $\dfrac{1}{7}$ | $\dfrac{01}{07}$ | |

### *Written Data and Arithmetic Section*

| Question Number | Test Section | Correct Answer (1 mark) | Also Accept (1 mark) | Do Not Accept (0 marks) |
|---|---|---|---|---|
| 13 | WD | **12** | 12.0 | |
| 14 | WD | **(actual age: $7y\ 6m$, reading age: $8y\ 4m$)** | | |
| 15 | WA | **122. 50** | 122.5 | 122.500 |
| 16 | WA | **16** | 16.0 | |
| 17 | WD | **Options B and C** | | |
| 18 | WA | **Tuesday** | | |
| 19 | WA | **14** | 14.0 | |
| 20 | WD | **Options A, B, and C** | | |
| 21 | WA | **A, E, I, J** | | |
| 22 | WA | $\dfrac{1}{5}$ | $\dfrac{01}{05}$ | |
| 23 | WA | **1080 or 1080. 00** | 1080.0 | 1080.000 |
| 24 | WD | **Option A** | | |
| 25 | WD | **C, F** | | |
| 26 | WA | **12. 48** | | |
| 27 | WA | **Options A and C** | | |
| 28 | WA | **111. 75** | | |

# Guidance for Answering the Questions

*Mental Arithmetic Questions*

*Question 1*

The number of pupils in a class is 28.

The number of pupils who attend the maths club after school is 7.

The number of pupils who do NOT attend the maths club after school is $28 - 7 = 21$.

21 out of 28 is equivalent to: 3 out of 4, which is equivalent to 75 out of 100.

So the answer is 75%.

*Question 2*

The total entrance cost was 260 euros.

The exchange rate is £1 is equal to 1.3 euros.

The total entrance cost in pounds is: $260 \div 1.3 = 200$.

*Alternative method:*

Scale the ratio by multiplying both currencies by the same amount:

Basic exchange rate: 1.3 euros equals 1 pound.

Multiply by 20: 26 euros equals 20 pounds.

Multiply by 10: 260 euros equals 200 pounds.

*Question 3*

The number of pupils in a class is 25.

The amount of milk each pupil drinks is 210 millilitres.

The total amount of milk needed is: $25 \times 210 = 5250$ mililitres.

The amount of milk in each bottle is 1000 millilitres.

The number of bottles of milk needed is: $5250 \div 1000 = 5.25$ bottles.

The number needs to be rounded up to the nearest whole number i.e. 6 as one cannot buy 0.25 of a bottle.

*Further help*

To calculate 25 times 210, think of 210 as $200 + 10$.

Firstly multiply 25 by 200 and then multiply 25 by 10:

$25 \times 200 = 5000$

$25 \times 10 = 250$.

Then add these two results to get the final answer: $5000 + 250 = 5250$.

### *Question 4*

The number to be multiplied is 3.025.

Two hundred is 200.

The answer is: $3.025 \times 200 = 3.025 \times 2 \times 100 = 6.05 \times 100 = 605$.

### *Question 5*

A registration period is 10 minutes.

The number of lessons is 3.

Each lesson is 55 minutes.

The total time for the lessons is: $3 \times 55 = 165$ minutes.

The length of the break is 15 minutes.

The lunch itself is 1 hour (60 minutes) long.

The time spent on registration, lessons, break, and lunch totals:

$10 + 165 + 15 + 60 = 250$ minutes $= 4$ hours and 10 minutes.

A school day starts at $8{:}50$.

The lunch finishes at: 8 hrs 50 mins + 4 hrs 10 mins = $13{:}00$ (24-hour clock).

*Further help*

Think of 250 minutes as $240 + 10$ minutes.

Since 1 hour is 60 minutes, 240 minutes is 4 hours.

4 hours after $8{:}50$ is $12{:}50$.

Adding an extra 10 minutes to $12{:}50$ is $13{:}00$.

### *Question 6*

The total number of apples brought by five pupils: $5 \times 3 = 15$.

The total number of bananas brought by six pupils: $6 \times 2 = 12$.

The total number of nectarines brought by three pupils: $3 \times 4 = 12$.

The total number of pieces of fruit brought by all pupils: $15 + 12 + 12 = 39$.

### Question 7

The number of questions answered is 3700.

The sponsorship for each correctly answered question is $70p = £0.70$.

The number of pounds raised for charity is:

$3700 \times 0.7 = 370 \times 7 = 2590$.

*Further help*

To multiply 3700 by 0.7 first divide the first number by 10 and multiply the second by 10 giving: $370 \times 7$ so there are no decimal places but the result is still equivalent to the original one.

Now think of 370 as $300 + 70$ and multiply both by 7:

$300 \times 7 = 2100$

$70 \times 7 = 490$.

Then add these two results to get the final answer: $2100 + 490 = 2590$.

### Question 8

The number of pupils in Year 5 is 80.

The number of pupils who have at least one sibling in the same school is 32.

The proportion of the year group that has at least one sibling in the school:

32 out of 80 is equivalent to 4 out of 10 (both numbers divided by 8), which as a decimal is 0.4.

*Further help*

To simplify a fraction/proportion, look for a number that divides both numbers (the numerator and the denominator).

In the example, both 32 and 80 can be divided by 16 (divisor) giving 2 and 5 respectively (i.e. the proportion 2 out of 5).

### Question 9

The number of journeys is 2.

The distance of one journey is 160 kilometres.

The total distance travelled is: $160 \times 2 = 320$ kilometres.

1 kilometre is equivalent to $\frac{5}{8}$ of a mile.

The total distance travelled in miles is: $320 \times \frac{5}{8} = \frac{320 \times 5}{8} = 40 \times 5 = 200$.

### *Question 10*

The number of pupils in a class is 30.

The proportion of pupils who have a 100% attendance is 70%.

The number of pupils with a 100% attendance is: $30 \times 70\% = 30 \times \frac{70}{100} = \frac{30 \times 70}{100} = 21$.

### *Question 11*

A reading age in Year 7 is 12 years and 2 months.

A reading age in Year 6 was 17 months (1 year and 5 months) lower.

A reading age in Year 6 was: 12 years and 2 months – 1 year and 5 months = 10 years and 9 months.

*Further help*

Remember that one year has 12 months.

First subtract 1 year to be left with 11 years and 2 months – 5 months.

11 years and 2 months is the same as 10 years and 14 months.

After you subtract 5 months the answer is 10 years and 9 months.

### *Question 12*

The number of pupils in a class is 28.

The fraction of the class who are girls is $\frac{4}{7}$.

The number of girls in the class is: $\frac{4}{7} \times 28 = 16$.

The fraction of girls who have blue eyes is $\frac{1}{4}$.

The number of girls with blue eyes is: $\frac{1}{4} \times 16 = 4$.

The fraction of girls with blue eyes in a class is: $\frac{4}{28} = \frac{1}{7}$.

### Question 13

Each point on the scatter graph represents one of the pupils in the class.

The bolds lines represent years, whereas the thin lines represent months.

A horizontal line at 7 years and 7 months corresponds to the reading age of 7 years and 7 months – you need to draw it.

Count the points above the line to get the answer.

The answer is 12.

### Question 14

The diagonal line shows points where the reading ages and actual ages are the same as each other.

The points above the line represent pupils with the reading age higher than the actual age.

To find the point (pupil) with the reading age higher than the actual age by exactly 10 months you have to find the point which is 10 horizontal lines away from the diagonal line when staying on a single vertical line.

The point that has the reading age higher than the actual age by exactly 10 months is for the actual age of 7 years and 6 months and the reading age of 8 years and 4 months.

### Question 15

The number of pupils/children is 27.

The number of adults/parents/teachers is 5.

Prices for 10 children and 2 adults:

- Group offer: £45.00
- Single tickets: $10 \times 3.50 + 2 \times 8.00 = 35 + 16 = £51.00$

The group offer should be chosen.

At the group offer, 20 tickets for children and 4 tickets for adults can be bought (both numbers cannot exceed the required number of tickets and should be as close to them as possible).

The number of tickets required at a single price:

- Children: $27 - 20 = 7$
- Adults: $5 - 4 = 1$

The total amount for the admission fee:

$(2 \times £45.00) + (7 \times £3.50) + (1 \times £8.00) = £90.00 + £24.50 + £8.00 = £122.50$

**Question 16**

The school day starts at 9: 00.

The school day ends at 15: 15.

The school day is 6 hours and 15 minutes.

The school day is 375 minutes long.

The short break is 20 minutes long.

The lunch break is 40 minutes long.

The total time for breaks is: $20 + 40 = 60$ minutes.

The percentage of a school day allocated to breaks is:

$\frac{60}{375} \times 100\% = 16\%$.

*Alternative method:*

Work could be done in hours instead of minutes.

The school day is 6 hours and 15 minutes. 15 minutes is a quarter of an hour (0.25 as a decimal). Therefore, the school day is 6.25 hours.

The total time for breaks is 60 minutes $=$ 1 hour.

The percentage of a school day allocated to breaks is:

$\frac{1}{6.25} \times 100\% = 16\%$.

**Question 17**

*Statement 1: The median time spent on a journey to school was 9 minutes.*

The number of pupils is 32.

The median journey time is the time for the 16$^{th}$ pupil.

The journey time to school spent by this pupil is 10 minutes.

Statement 1 is False.

*Statement 2: 25% of pupils take 7 minutes or less to get to school.*

The number of pupils is 32.

25% of pupils is 8.

The time recorded by the 8$^{th}$ pupil is 7. Therefore, 8 pupils take 7 minutes or less to get to school.

Statement 2 is True.

*Statement 3: One pupil takes* 17 *minutes to get to school.*

The number of pupils is 32.

The maximum time recorded is 17 minutes.

The time recorded by $32^{nd}$ pupil is 17 minutes.

The time recorded by $31^{st}$ pupil is 16 minutes.

Only one pupil takes 17 minutes to get to school.

Statement 3 is True.

*Further help*

Statement 1: To find the median, locate the point on the vertical axis that is halfway to the maximum number of pupils (in our case it is 16). Then read across to the curve and drop vertically downwards to the horizontal axis. The point reached will be the median value.

Statement 2: To find the time recorded by 25% of pupils (8 pupils), first locate 8 on the vertical axis. Then read across to the curve and drop vertically downwards to the horizontal axis. The point reached will be your answer.

Statement 3: To find the time recorded by the $31^{st}$ and $32^{nd}$ pupil, locate these points on the vertical axis. Then read across to the curve and drop vertically downwards to the horizontal axis. You will see that the $31^{st}$ pupil takes 16 minutes whereas the $32^{nd}$ takes 17 minutes to get to school. Since there are only 32 pupils, only one takes 17 minutes.

### Question 18

The formula to calculate the distance (D) when time (T) and speed (S) are given is:

$D = T \times S$.

Distance cycled on each day:

- Monday: $5 \times 16 = 80$ kilometres
- Tuesday: $6 \times 14 = 84$ kilometres
- Wednesday: $4.5 \times 18 = 81$ kilometres

The longest distance was cycled on Tuesday.

***Question 19***

Mean number of lengths $= \dfrac{\text{total number of lengths}}{\text{total number of pupils}}$

The total number of pupils is 32.

Missing figures for the total number of lengths (third column in the table) are:

$10 \times 15 = 150$

$6 \times 18 = 108$

The total number of lengths is $80 + 96 + 150 + 108 = 434$.

The mean number of lengths is $\dfrac{434}{32} = 13.5625$ rounded to the whole number is 14.

***Question 20***

*Statement 1: The average result for the Chemistry mock exam was the best predictor of the final GCSE exam result for that subject.*

The differences between the mock and final GCSE exams were as follows:

- Maths: $68 - 45 = 23$
- English: $80 - 50 = 30$
- Geography: $82 - 73 = 9$
- Physics: $70 - 55 = 15$
- Chemistry: $72 - 64 = 8$

The subject for which the average mock exam result was the best predictor of the final GCSE exam for that subject was the subject with the smallest difference, i.e. Chemistry.

Statement 1 is True.

*Statement 2: The final English GCSE exam score was $60\%$ better than the mock for that subject.*

The mock English GCSE exam result is 50.

The final English GCSE exam result was 80.

60% of 50 is 30 which is equivalent to the difference between the final and mock English GCSE exam results.

Statement 2 is True.

*Alternative method*

The percentage change between final and mock results is: $\dfrac{80-50}{50} \times 100 = 60\%$.

*Statement 3: The average score for all five subjects in the mock GCSE exams was greater than 55%.*

$$\text{Average score} = \frac{\text{Sum of all the scores}}{\text{Total number of scores}} = \frac{45 + 50 + 73 + 55 + 64}{5} = \frac{287}{5} = 57.4 > 55$$

Statement 3 is True.

### *Question 21*

The tests are marked out of 50.

10% of 50 is 5.

The table below shows the difference between English and Maths results.

| | Pupils' marks out of 50 | | |
|---|---|---|---|
| **Pupil** | **Maths** | **English** | **Difference** |
| **A** | 32 | 22 | 10 |
| **B** | 43 | 48 | 5 |
| **C** | 31 | 27 | 4 |
| **D** | 27 | 29 | 2 |
| **E** | 23 | 17 | 6 |
| **F** | 35 | 33 | 2 |
| **G** | 15 | 11 | 4 |
| **H** | 13 | 13 | 0 |
| **I** | 37 | 25 | 12 |
| **J** | 9 | 4 | 5 |

Pupils who scored at least 10 percentage points (5 marks in the table) less in English than they did in Maths are pupils A, E, I, and J.

*Further help*

Only pupils with an English mark lower than the mark for Maths should be considered.

Out of these, pupils with a difference of at least 5 marks should be counted to give the correct answer.

### *Question 22*

The number of pupils is 10.

The number of pupils who did better in English than they did in Maths is: 2.

The fraction of pupils who did better in English than they did in Maths is: $\frac{1}{5}$.

*Further help*

Only pupils B and D did better in English than they did in Maths.

2 out of 10 pupils did better in English than they did in Maths which as a fraction is $\frac{2}{10}$.

To simplify a fraction, look for a number that divides both numerator (top number) and denominator (bottom number). In the example, 2 and 10 can be divided by 2.

In its lowest terms: $\frac{2}{10} = \frac{2 \div 2}{10 \div 2} = \frac{1}{5}$.

### *Question 23*

The ratio of children to adults is $3 : 2$.

The number of children is 120.

The number of portions for children is 3.

One portion is $120 \div 3 = 40$.

The number of portions for adults is 2.

The number of adults is: $40 \times 2 = 80$.

The price of an adult ticket is: £9.00.

The price of a child ticked is: £3.00.

The total money collected from the ticket sale is:

$(120 \times £3.00) + (80 \times £9.00) = £360.00 + £720.00 = £1080.00$

### *Question 24*

*Statement 1: The median mark in Test B was approximately 5 percentage points lower than the median mark in Test A.*

The median mark in Test A is $46\%$.

The median mark in Test B is $41\%$.

The median mark in Test B is 5 percentage points lower than the median mark in Test A.

Statement 1 is True.

Statement 2: The range of percentage marks was greater in Test A.

The maximum value in Test A is $65\%$.

The minimum value in Test A is $35\%$.

The range of percentage marks in Test A is $30\%$.

The maximum value in Test B is 57%.

The minimum value in Test B is 25%.

The range of percentage marks in Test B is 32%.

Statement 2 is False.


*Statement 3:* 75% *of pupils achieved* 52% *or more in Test A.*

52% in Test A is the upper quartile.

The values from the upper quartile to the maximum values represent 25% of the marks, not 75%.

Statement 3 is False.


*Further help*

The box-and-whisker diagram consists of five main parts. The box indicates the marks achieved by the middle half of the pupils. The upper and lower quartiles are the top and bottom of the box. The vertical lines above and below the box are the extreme values (maximum and minimum value) and the difference between them is called the range. The horizontal line inside the box is the median mark.


***Question 25***

| Pupil | Does the time achieved go down in every training? | Is there a continual trend of improvement? |
|-------|--------------------------------------------------|--------------------------------------------|
| A | No | No |
| B | No | No |
| C | Yes | Yes |
| D | No | No |
| E | No | No |
| F | Yes | Yes |


*Further help*

To have a trend of continual improvement in time achieved when running, the time achieved should be decreasing from one training to the next one throughout the 5 training sessions.


***Question 26***

Each of 15 pupils on average collected £12.40.

The total amount of money collected by 15 pupils is $15 \times £12.40 = £186$.

The sixteenth pupil collected £13.68.

The total amount of money collected by 16 pupils is £186 + £13.68 = £199.68.

The new mean amount of money collected by one pupil is £199.68 ÷ 16 = £12.48.

### Question 27

*Statement 1: All pupils achieved at least 13% in Mathematics.*

The value for the mode indicates that at least one pupil achieved a percentage mark of 53%.

The range of marks is 40%.

So the lowest mark in Mathematics cannot be lower than: $53 - 40 = 13\%$.

Statement 1 is True.

*Statement 2: Some pupils achieved at least 90% in English.*

The value for the mode indicates that at least one pupil achieved a percentage mark of 25%.

The range of marks is 63%.

So the highest mark in English cannot be greater than: $25 + 63 = 88\%$.

Statement 2 is False.

*Statement 3: At least one pupil achieved less than 10% in Science.*

The highest mark possible is 100%.

The range of marks is 91%.

If someone obtained 100% then the lowest mark in the class would be 9%.

If the highest score in the class was below 100% then the lowest mark would

be lower than 9%.

So, whatever the highest score for the class, the lowest mark will be less than 10%.

Statement 3 is True.

### Question 28

The area of a triangle is given by $\frac{1}{2} \times$ base $\times$ height.

The base of triangle A is $10 \ cm$.

The height of triangle A is $15.5 \ cm$.

The area of triangle A is $\frac{1}{2} \times 10 \times 15.5 = 77.5\ cm^2$.

The base of triangle B is $3.5\ cm$.

The height of triangle B is $7\ cm$.

The area of triangle B is $\frac{1}{2} \times 3.5 \times 7 = 12.25\ cm^2$.

The base of triangle C is $8\ cm$.

The height of triangle C is $5.5\ cm$.

The area of triangle C is $\frac{1}{2} \times 8 \times 5.5 = 22\ cm^2$.

The total area of three triangles is $77.5 + 12.25 + 22 = 111.75\ cm^2$.

This resource was produced by the **sigma** Network Employability Special Interest Group whose members are:

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