

Mental Arithmetic Questions

The first section contains one practice question and 12 mental arithmetic questions.

- The first question is a practice question which will not contribute to your overall mark. All other questions are worth one mark each.
- You are allowed 55 seconds to read and answer each mental arithmetic question. For the actual test, if you do not have any hearing impairments, your test administrator will read out each question twice to you. This takes place **within** the time limit for each mental arithmetic question.
- You should note any instructions given in questions about the format of your answer, e.g. "correct to one decimal place".
- The question text is included in the space for each question.
- You should write your answer in the answer space for that question.
- You are not allowed to return to the mental arithmetic questions once they have been completed. In the actual test, this section will be removed once it has been completed.
- Decimal numbers should be written using a 'full stop' for the decimal point, for example '12.5'.
- Use of a calculator is **not** allowed in this section.

Written Data and Written Arithmetic Questions

The second section contains 16 questions worth one mark each.

You are allowed 36 minutes to complete this section.

- You may answer the questions in any order.
- Some written questions share the same context.
- Decimal numbers should be written using a 'full stop' for the decimal point, for example '12.5'.
- A question may require you to:
 - write your answer in the answer space;
 - indicate the correct area(s) on a table, chart or graph by circling or ticking;
 - tick the correct answer option(s) from a list;
 - copy given value(s) into empty spaces in sentences, tables or charts.
- You are allowed to use a four-function calculator for questions in this section. For your actual test, your test centre will provide the calculator.
- For your actual test, your invigilator will advise you when there are 5 minutes remaining until the end of your test.

Mental Arithmetic

Write your answers in the spaces.

Practice question

A parents' evening was planned to start at 16:30.

There were 20 consecutive appointments of 10 minutes each and a break of 15 minutes during the evening.

At what time was the parents' evening due to finish?

Give your answer using the 24-hour clock.

Answer: : hours

Question 1

Teachers organised activities for
three classes of 24 pupils and four classes of 28 pupils.

What was the total number of pupils involved?

Answer: _____ **pupils**

Question 2

All 30 pupils in a class took part in a sponsored spell to raise money for charity. The pupils were expected to get an average of 18 spellings correct each. The average amount of sponsorship was 20p for each correct spelling.

How many pounds would the class expect to raise for charity?

Answer: £ _____

Question 3

As part of the numeracy work in a lesson, pupils were asked to stretch a spring to extend its length by forty per cent.

The original length of the spring was 45 centimetres.

What should be the length of the extended spring?

Give your answer in centimetres.

Answer: _____ cm

Question 4

For a science experiment a teacher needed 95 cubic centimetres of vinegar for each pupil. There were 20 pupils in the class.

Vinegar comes in 1000 cubic centimetre bottles.

How many bottles of vinegar were needed?

Answer: _____ **bottles**

Question 5

The morning session in a school began at 09:25.

There were three lessons of 50 minutes each and one break of 20 minutes.

At what time did the morning session end?

Give your answer using the 24-hour clock.

Answer: : hours

Question 6

Six out of 25 pupils scored full marks in a test.

What percentage of pupils scored full marks?

Answer: _____ %

Question 7

What is six hundred and forty-three divided by zero point one?

Answer: _____

Question 8

In a class of 24 pupils, three need additional support.

What fraction of the class do not need additional support?

Give your answer in its lowest terms.

Answer: $\frac{\square}{\square}$

Question 9

A teacher took a group of pupils to an aquarium whilst visiting France.

The total entrance cost for the group was 160 euros.

Taking 1.6 euros as equal to one pound, what was the total entrance cost, in pounds, for the group of pupils?

Answer: £ _____

Question 10

A pupil achieved 84 marks out of a possible 120 in a test.

What percentage mark did the pupil achieve for the test?

Answer: _____ %

Question 11

A school trip was planned at a total cost of £120 per pupil.

The accommodation cost two-fifths of the total.

What was the cost of the accommodation per pupil?

Answer: £ _____

Question 12

A school's policy for Key Stage 2 was to set three and a half hours of homework per week.

What was the mean number of minutes to be spent on homework per weekday evening?

Answer: _____ minutes

BLANK PAGE

Written Data and Arithmetic

Question 13

To inform her choice of reading materials, a primary teacher looked at the spread of reading ages in her class. The scatter graph shows the actual age and reading age of 21 pupils in the class.

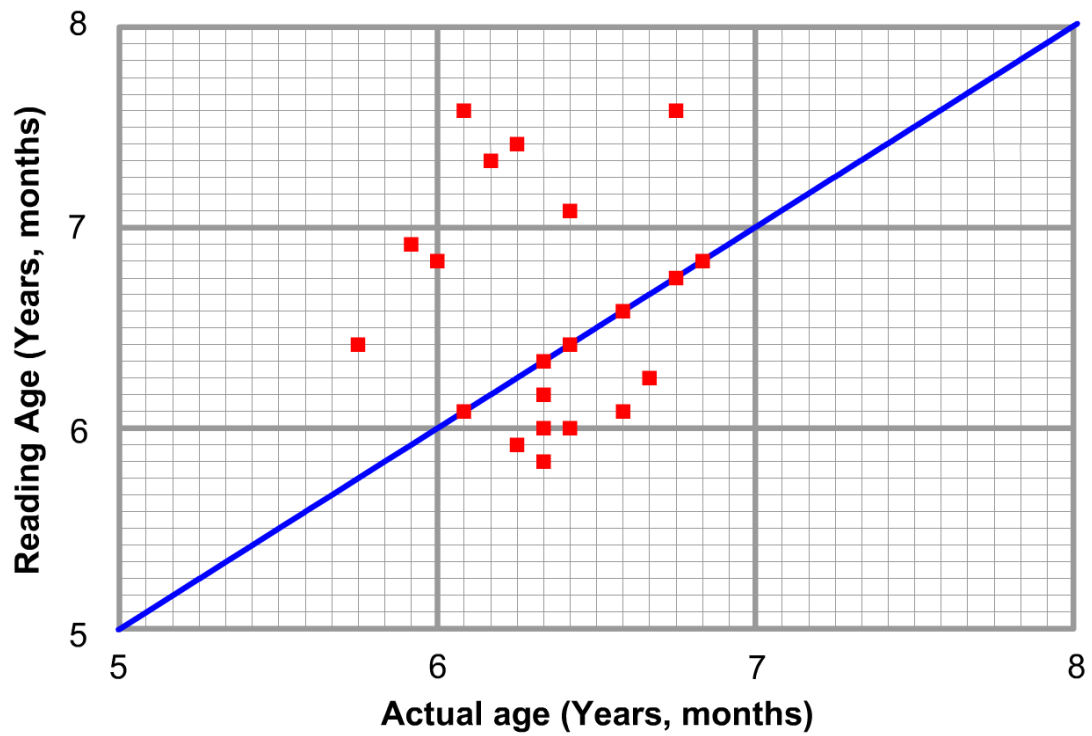


What proportion of the class have the same reading age as their actual age?
Give your answer as a decimal to one decimal place.

Answer: _____

Question 14

To inform her choice of reading materials, a primary teacher looked at the spread of reading ages in her class. The scatter graph shows the actual age and reading age of 21 pupils in the class.



Circle the pupil who has the greatest difference between their reading age and actual age.

Question 16

At a staff meeting, the head teacher presented the following table, showing the number of pupils in each class in a school who are having extra music lessons.

Class	Number of pupils	Number of pupils having extra music lessons
A	25	5
B	30	5
C	30	5
D	28	7
E	26	5
F	29	6
G	18	6
H	24	5

What percentage of pupils in the school are having extra music lessons?
Give your answer to the nearest whole number.

Answer: _____ %

Question 17

A teacher calculated the mean points score achieved by pupils in an end of Key Stage 2 mathematics test.

There were 48 pupils in the year group.

The mean points score is given by the formula:

$$\text{Mean points score} = \frac{\text{total points for the year group}}{\text{total number of pupils in the group}}$$

Level achieved	Number of pupils	Points per level	Total points per level
3	5	21	105
4	29	27	783
5	8	33	
6	6	39	
Total	48		

What was the mean points score for the year group?

Give your answer to the nearest whole number.

The total points for Levels 3 and 4 have been done for you.

Answer: _____

Question 18

A teacher is planning a group outing to see a play in a nearby city.

She has been given details of costs and travel.

There are 25 in the group, including pupils and teachers.

A group booking for 25 theatre tickets costs £185.

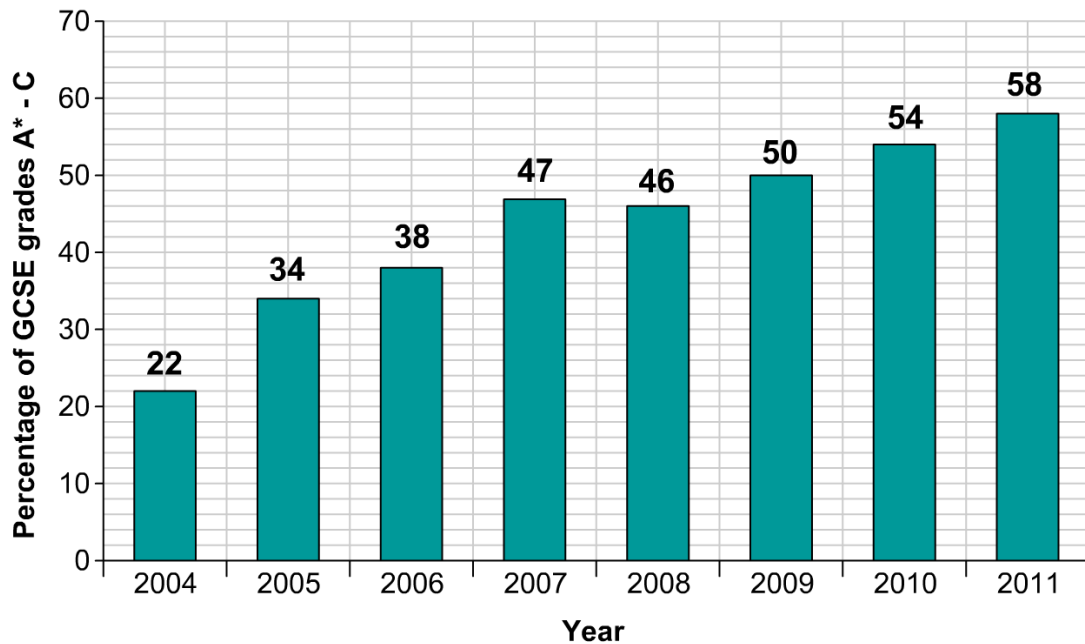
Return train tickets cost £5.65 each.

How much will each person have to pay for the outing to cover the cost of travel and theatre ticket?

Answer: £ _____

Question 19

To set targets for the following year, the mathematics department analysed the percentage of mathematics GCSE grades A* - C achieved by pupils in the school.



Tick all the true statements:

- The mean percentage of GCSE grades A* - C for the last 5 years of the chart was 51%.
- The percentage of GCSE grades A* - C increased each year from 2004 - 2011.
- The percentage of mathematics GCSE grades A* - C more than doubled from 2004 - 2011.

Question 20

A school parents' evening starts at 16:30 on each of two consecutive days.

A teacher has a total of 24 appointments lasting 10 minutes each and takes a 20 minute break each evening. The teacher filled all the available appointment slots on the first evening and finished at 19:00.

What is the earliest time the teacher can expect to finish on the second evening?

Give your answer using the 24-hour clock.

Answer: : hours

Question 21

A teacher produced the following table to show the marks achieved in an end of year geography test by pupils in three Year 7 classes.

Marks (Percentage)			
	Range	Median	Mode
Class A	60	50	72
Class B	28	50	68
Class C	85	60	70

Tick all the true statements:

- Some pupils in Class A achieved less than 12%.
- At least one pupil in Class C achieved less than 20%.
- All pupils in Class B achieved at least 40%.

Question 22

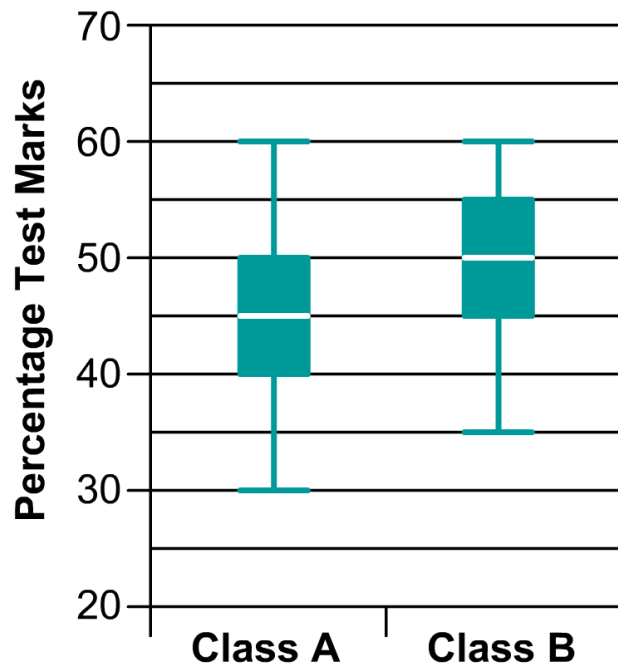
As part of a review programme a teacher compared the marks for 10 pupils in each of two English tests.

Pupils	Pupils' marks out of 50	
	Test 1	Test 2
A	28	30
B	14	18
C	16	15
D	17	22
E	20	24
F	20	29
G	16	18
H	8	13
I	6	6
J	14	24

Circle the letters in the table for the pupils who scored at least 10 percentage points more in Test 2 than in Test 1.

Question 23

A teacher presented the following box-and-whisker diagram as part of a staff discussion on pupils' performance. The diagram shows the percentage test marks in mathematics for a revision test for two class groups.



Tick all the true statements:

- The range of percentage marks was greatest in Class A.
- The median percentage mark in Class A was 15 percentage points less than the median percentage in Class B.
- The interquartile range was the same in both classes.

Question 24

A teacher plans a school trip to Brussels, which involves using a ferry from Ostend. The teacher wants to be in Ostend no later than 18:00.

She expects their coach to travel from Brussels to Ostend, a distance of 120km, at an average of 50 miles per hour.

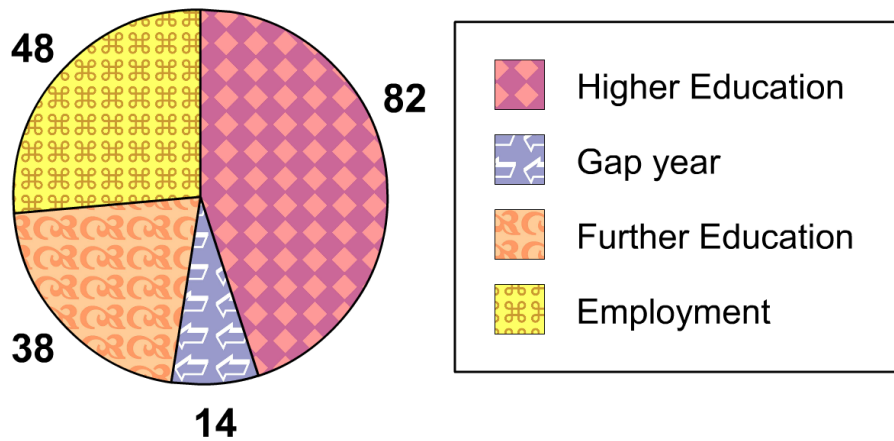
Using the approximation of 5 miles equals 8 kilometres, what is the latest time that the coach should leave Brussels? Give your answer using the 24-hour clock.

Answer: : hours

Question 25

The head of careers supplied the following chart showing the destination of Year 13 leavers.

Number of Year 13 students going to different destinations



Tick all the true statements:

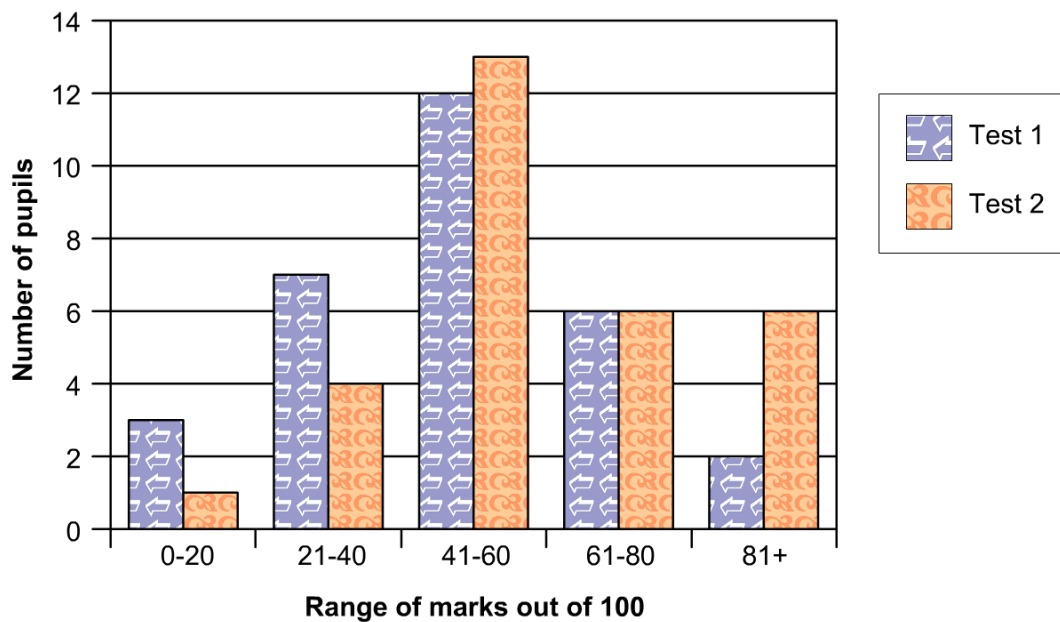
$\frac{3}{7}$ went on to higher education.

$\frac{1}{13}$ took a gap year.

$\frac{2}{7}$ went on to further education.

Question 26

A science class of 30 pupils was given two tests. Test 1 was given at the start of the term and Test 2 at the end of the term. As part of a review of pupil progress, a teacher prepared this bar chart showing pupil achievement in the two tests.



Tick all the true statements:

- The number of pupils achieving 81+ marks increased by 50% from Test 1 to Test 2.
- More than 80% of pupils achieved more than 40 marks in Test 2.
- $\frac{1}{3}$ of pupils achieved fewer than 41 marks in Test 1.

Question 27

In order to predict pupils' achievement in a GCSE subject, a teacher produced the following table.

The table shows the marks achieved by 3 pupils in coursework and in a practice examination. Using the previous year's results, the teacher set a minimum final percentage mark of 55 for a predicted grade C.

$$\text{Final percentage mark} = \frac{\text{coursework percentage mark} + (3 \times \text{practice examination percentage mark})}{4}$$

Pupil	Coursework mark out of 60	Practice examination mark out of 100
X	22	45
Y	21	60
Z	30	58

Which pupil is predicted to achieve a grade C?

- Pupil X
- Pupil Y
- Pupil Z.

Question 28

A teacher looked at past achievements in end of Key Stage 2 assessment for the period 2009 - 2011 in order to predict GCSE achievements for a group of pupils.

Subject	Percentage of pupils achieving Level 4 and above		
	2009	2010	2011
English (teacher assessment)	68	72	75
English (tests/tasks)	60	70	75
Mathematics (teacher assessment)	66	72	76
Mathematics (tests/tasks)	56	66	74
Science (teacher assessment)	76	77	81
Science (tests/tasks)	82	74	81

Tick all the true statements:

- In 2009 the teacher assessment result for each subject was above the corresponding test/task result.
- In 2010 the teacher assessment result was closer to the test/task result in English than it was in science.
- Taking into account both teacher assessments and test/task assessments, the trend in both English and mathematics indicates improved performance.

END OF TEST

Mark Scheme

Mental Arithmetic Section

Question Number	Correct Answer (1 mark)	Also Accept (1 mark)	Do Not Accept (0 marks)
Practice	20:05	• 20:5	• 8:05
1	184	• 184.0	
2	108 or 108.00	• 108.0	• 180.000
3	63	• 63.0	
4	2	• 2.0	
5	12:15		
6	24	• 24.0	
7	6430	• 6430.0	
8	$\frac{7}{8}$	• $\frac{07}{08}$	
9	100 or 100.00	• 100.0	• 100.000
10	70	• 70.0	
11	48 or 48.00	• 48.0	• 48.000
12	42	• 42.0	

Written Data and Arithmetic Section

Question Number	Test Section	Correct Answer (1 mark)	Also Accept (1 mark)	Do Not Accept (0 marks)
13	WD	0.3	<ul style="list-style-type: none"> • .3 • 0.30 	
14	WD	(actual age: 6y 1m, reading age: 7y 7m)		
15	WD	21 months		
16	WA	21	<ul style="list-style-type: none"> • 21.0 	
17	WA	29	<ul style="list-style-type: none"> • 29.0 	
18	WA	13.05		<ul style="list-style-type: none"> • 13.5 • 13.050
19	WD	Options A and C		
20	WA	18:40		<ul style="list-style-type: none"> • 18:4 • 6:30
21	WA	Options B and C		
22	WA	D, F, H and J		
23	WD	Options A and C		
24	WA	16:30		<ul style="list-style-type: none"> • 16.3 • 4:30
25	WD	Option B		
26	WA	Options B and C		
27	WA	Pupil Z		
28	WD	Options B and C		

Guidance for Answering the Questions

Mental Arithmetic Questions

Practice question

The number of consecutive appointments is 20.

The time for each appointment is 10 minutes.

The total time for the appointments is: $20 \times 10 = 200$ minutes.

The time for the break is 15 minutes.

The total time for the appointments and the break is:

$200 + 15 = 215$ minutes = 3 hours 35 minutes.

The parents' evening was due to start at 16:30 (24-hour clock).

The parents' evening was due to finish at $16:30 + 3\text{hours } 35\text{ minutes}$
= 20:05 (24-hour clock).

Further help

A common mistake is to forget to add in the time for the break.

Question 1

The total number of pupils in the three classes is: $3 \times 24 = 72$ pupils.

The total of pupils in the four classes is: $4 \times 28 = 112$ pupils.

The total number of pupils involved is: $72 + 112 = 184$ pupils.

Further help

When multiplying 3 by 24, think of the 24 as $20 + 4$.

The calculation becomes $(3 \times 20) + (3 \times 4)$.

This is $60 + 12$ which equals 72.

Likewise, when working out 4×28 think of 28 as $20 + 8$.

The calculation becomes $(4 \times 20) + (4 \times 8)$.

This is $80 + 32$ which equals 112.

Question 2

The number of pupils in the class is 30.

The expected average number of correct spellings for each pupil is 18.

The total of expected correct spellings is: $30 \times 18 = 540$ spellings.

The average sponsorship for each correct spelling is $20\text{p} = \text{£}0.20$.

The number of pounds the class expected to raise for charity is:

$$540 \times 0.20 = \text{£}108.$$

Further help

Another way to work out 540 times 20p in your head is to remember that 20p is one-fifth of a pound.

The answer in pounds will be one-fifth of 540.

One-fifth of 500 is 100.

One-fifth of 40 is 8.

The answer is $\text{£}108$.

Question 3

The original length of the spring was 45 centimetres.

The spring is extended by 40%.

The increase in length will be: $\frac{40 \times 45}{100} = 18$ centimetres.

The length of the extended spring will be: $45 + 18 = 63$ centimetres.

Further help

A common mistake is to calculate the increase in length and not add it to the original length.

Question 4

The number of pupils in the class is 20.

The amount of vinegar needed for each pupil is 95 cubic centimetres.

The total amount of vinegar needed is: $20 \times 95 = 1900$ cubic centimetres.

The amount of vinegar in each bottle is 1000 cubic centimetres.

The number of bottles of vinegar needed is: $1900 \div 1000 = 1.9$ bottles.

This number rounded up to the nearest whole number is 2 bottles.

Further help

To calculate 95 times 20, think of 20 as 10 times 2.

First of all multiply 95 by 10, which comes to 950.

Then multiply 950 by 2.

Think of 950 as 900 plus 50.

900 times 2 is 1800 and 50 times 2 is 100.

The total comes to 1900.

Question 5

The number of lessons is 3.

Each lesson is 50 minutes.

The total time for the lessons is: $50 \times 3 = 150$ minutes.

The length of the break is 20 minutes.

The total time for the lessons and break is: $150 + 20 = 170$ minutes
= 2 hours 50 minutes.

The morning session in a school begins at 09:25 (24-hour clock).

The morning session ends at: $09:25 + 2 \text{ hrs } 50 \text{ mins} = 12:15$ (24-hour clock).

Further help

A common mistake is to forget to add on the break.

Another common mistake is to add 09:25 plus 2 hours 50 minutes incorrectly, giving an answer of 11:75.

Alternative method:

Think of 170 minutes as 3 hours less 10 minutes
(because 3 hours is 180 minutes).

3 hours after 09:25 is 12:25.

10 minutes back from 12:25 is 12:15.

Question 6

The number of pupils who sat the test is 25.

The number of pupils who scored full marks is 6.

6 out of 25 is equivalent to: 24 out of 100.

So the answer is 24%.

Further help

The percentage of the group represented by one pupil is: $\frac{100 \times 1}{25} = \frac{100}{25}$.

This is equal to 4, so a simple way to calculate the percentage of pupils who scored full marks is: $4 \times 6 = 24\%$.

Question 7

The number to be divided is 643.

Zero point one is 0.1

The answer is: $643 \div 0.1 = 643 \times 10 = 6430$.

Further help

0.1 is equivalent to one-tenth.

When you divide a number by 2, you are working out how many 2s there are in that number (e.g. $16 \div 2 = 8$).

Similarly, dividing 643 by one-tenth is the same as working out how many tenths there are in 643. The answer will be 10 times 643 which is 6430.

Question 8

The number of pupils in the class is 24.

The number of pupils who need additional support is 3.

The number of pupils who do not need additional support is: $24 - 3 = 21$

The fraction of the class who do not need additional support is $\frac{21}{24}$.

This fraction in its simplest terms is $\frac{7}{8}$.

Further help

A common mistake is to find the number of pupils who do need support as the fraction of the class.

Another common mistake is to incorrectly simplify fractions.

To simplify a fraction, look for a number that will divide into both the numerator (top number) and the denominator (bottom number).

In the example below, 9 will divide into both 9 and 81.

In its simplest form: $\frac{9}{81} = \frac{9 \div 9}{81 \div 9} = \frac{1}{9}$.

Question 9

The total entrance cost was 160 euros.

The exchange rate is £1 is equal to 1.6 euros.

The total entrance cost in pounds is: $160 \div 1.6 = \text{£}100$.

Further help

A common mistake is to multiply the exchange rate by the total cost in euros.

Alternative method:

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

Basic exchange rate: 1.6 euros equals 1 pound.

Multiply by 10: 16 euros equals 10 pounds.

Multiply by ten again: 160 euros equals 100 pounds.

Question 10

The number of marks achieved by the pupil was 84.

The maximum possible number of marks for the test was 120.

$$\frac{84}{120} = \frac{7}{10} \text{ (dividing both numbers by 12)}$$

$$\frac{7}{10} = \frac{70}{100} \text{ (multiplying both numbers by 10)}$$

$$\frac{70}{100} = 70\%$$

Further help

To write a fraction as a percentage, it is necessary to manipulate the fraction until the denominator (bottom number) is 100. At that stage, the numerator (top number) gives the percentage.

Question 11

The cost of the school trip per pupil was £120.

The accommodation cost was $\frac{2}{5}$ of the total cost.

The cost of the accommodation per pupil was: $\frac{2}{5} \times 120 = £48$.

Further help

To mentally calculate two-fifths of 120, first calculate one-fifth.

One-fifth of 120 is 24.

Two-fifths of 120 is 2×24 , or 48.

If you need help working out one-fifth of 120, try dividing it by 10 and then doubling the result.

120 divided by 10 is 12.

12 doubled is 24.

Question 12

The amount of homework set per week is 3 hours 30 minutes = 210 minutes.

The number of weekday evenings spent on homework is 5.

The mean number of minutes spent on homework per weekday evening is:

$210 \div 5 = 42$ minutes.

Further help

To help with the mental calculations:

1 hour = 60 minutes

3 hours = 180 minutes

3 hours and 30 minutes = 210 minutes

To divide a number by 5, you can divide it by 10 and then double the result.

To work out 210 divided by 5:

210 divided by 10 equals 21.

Double 21 equals 42.

Written Questions

Question 13

The number of pupils in the class is given in the first paragraph of the question.

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

The number of pupils in the class is 21.

The diagonal line shows points where the reading ages and actual ages are the same as each other. The number of pupils whose reading age and actual age are the same is 6.

The proportion of pupils in the class whose reading age and actual age is the same is:

$$\begin{array}{rcccccc} \text{pupils with matching} & \div & \text{number of pupils in} & = & \text{proportion} \\ \text{reading and actual age} & & \text{class} & & \\ \\ 6 & \div & 21 & = & 0.286 \text{ (to 3 d.p.)} \end{array}$$

This number, rounded to one decimal place, is 0.3

Further help

A common mistake is not to realise that the number of pupils in the class is given in the question and to count the points on the scatter graph incorrectly. Another common mistake is an incorrect count of the points on the diagonal line.

Where rounding is required, it is important to do this correctly.

For more information on scatter graphs, visit the Skills Test website pages - Numeracy Glossary.

Question 14

The diagonal line shows points where the reading ages and the actual ages are the same as each other. The further away points are from this line the greater the difference between reading age and actual age. This distance could be either above or below the diagonal line.

The point that is furthest away from the line is:

Actual age: 6 years 1 month

Reading age: 7 years 7 months

Difference: 1 year 6 months

No other point has a greater difference between the reading age and the actual age.

Further help

You can answer this question by checking all the points, one by one, to see which shows the greatest difference between reading age and actual age. This process takes a long time and also carries the risk of mistakes in reading the values.

For more information on scatter graphs, visit the Skills Test website pages - Numeracy Glossary.

Question 15

The range of reading ages for the class is the difference in months between the reading age of the pupil with the highest reading age and the reading age of the pupil with the lowest reading age.

There are two pupils with the highest reading age.

Their reading age is 7 years 7 months.

There is one pupil with the lowest reading age.

This pupil's reading age is 5 years 10 months.

The range of reading ages is: 7 years 7 months – 5 years 10 months
= 21 months.

Further help

A common mistake is to find the range for the actual ages (along the x-axis) rather than for the reading ages. This would give a range of:
6 years 10 months – 5 years 9 months, that is 13 months.

Another common mistake is to read the ages as if there are 10 months in a year rather than 12 (i.e. as if the scales on the graph's axes showed decimal numbers with 10 divisions between each number shown on the scale).
This would give a range of 19 months.

For more information on scatter graphs, visit the Skills Test website pages -
Numeracy Glossary.

Question 16

The total number of pupils in the classes is 210.

The total of pupils having extra music lessons is 44.

The percentage of pupils having extra music lessons is:

$$\frac{100 \times 44}{210} = 20.952\% \text{ (to 3 d.p.)}$$

This percentage rounded to the nearest whole number is 21%.

Further help

There are many numbers to add up in the table; this is often when errors can occur. One way to ensure a correct total is to add the numbers from top to bottom and then check by adding from bottom to top.

A common mistake is to round the percentage incorrectly.

Question 17

The number of pupils in the year group is 48.

The total of points for Level 5 is: $33 \times 8 = 264$.

The total of points for Level 6 is: $6 \times 39 = 234$.

The total points for all levels is: $105 + 783 + 264 + 234 = 1386$.

The mean points score is: $1386 \div 48 = 28.875$ (to 3 d.p.).

This number rounded to nearest whole number is 29.

Further help

Several calculations are needed before you can use the formula. You are advised to keep a careful note of these calculations and your answers to them, in order to ensure that you input the correct data into the formula.

A common mistake is to add up the total points per level for the four levels and divide the result by 4.

Another common mistake is to round the percentage incorrectly.

Question 18

The number of people in the group is 25.

The total cost of the theatre tickets is 185.

The cost of each theatre ticket is:

Total cost of tickets	÷	number of people in the group	=	individual ticket price
185	÷	25	=	£7.40

The cost of each return train ticket is £5.65.

The amount each person will have to pay for the outing is:

$$7.40 + 5.65 = £13.05.$$

Further help

The cost you are given for the theatre tickets (£185) is for all 25 tickets, so you have to divide this amount by 25. However, the cost you are given for the train tickets (£5.65) is for one person, so do not divide this by 25.

Question 19

Statement 1: The mean percentage of GCSE grades A–C for the last 5 years of the chart was 51%.*

The mean is the result obtained by adding two or more amounts together and dividing the total by the number of amounts.

The mean percentage of GCSE grades A*–C for the past 5 years is given by the formula: mean percentage = total of percentages ÷ number of years.

$$\frac{47 + 46 + 50 + 54 + 58}{5} = \frac{255}{5} = 51$$

Statement 1 is *True*.

Statement 2: The percentage of GCSE grades A–C increased each year from 2004 to 2011.*

Look at the chart: The percentage of GCSE grades A*–C decreases from 2007 to 2008.

Statement 2 is *False*.

Statement 3: The percentage of mathematics GCSE grades A–C more than doubled from 2004 to 2011.*

In 2004, the percentage of GCSE grades A*–C was 22.

Double the percentage of GCSE grades in 2004 is 44.

In 2011, the percentage of GCSE grades A*–C was 58.

The percentage for 2011 is more than double the percentage for 2004.

So Statement 3 is: *True*.

Further help

A common mistake for the first statement is to calculate the mean percentage of all the years instead of the last 5 years.

A common mistake for the second statement is to see the trend is improving, and therefore assume that each year the percentage increases.

Question 20

The total time on the first day is: 16:30 to 19:00 = 2 hours 30 minutes.

This time includes a break time of 20 minutes.

The time available for appointments is:

2 hours 30 minutes – 20 minutes = 2 hours 10 minutes.

This time expressed in minutes is 130 minutes.

Each appointment takes 10 minutes.

The number of appointments on the first day was: $130 \div 10 = 13$.

The total number of appointments is 24.

The number of appointments on the second day is: $24 - 13 = 11$.

The appointments on the second day will end (2×10).

= 20 minutes before the end time on the first day.

This time is: 19:00 (24-hour clock) – 20 minutes = 18:40 (24-hour clock).

Further help

A common mistake is to forget there is a break of 20 minutes on each day.

Another common mistake is to use the 24-hour clock as a decimal number, i.e. 100 minutes in the hour.

Question 21

Statement 1: Some pupils in Class A achieved less than 12%.

The value for the mode indicates that at least one pupil achieved a percentage mark of 72%.

The range of marks is 60%.

So the lowest mark in Class A cannot be lower than $72 - 60 = 12\%$.

Statement 1 is *False*.

Statement 2: At least one pupil in Class C achieved less than 20%.

The highest mark possible is 100%.

The range of marks is 85%.

If someone obtained 100% then the lowest mark in the class would be 15%.

If the highest score in the class was below 100% then the lowest mark would be lower than 15%.

So, whatever the score for the class, the lowest mark will be less than 20%.

Statement 2 is *True*.

Statement 3: All pupils in Class B achieved at least 40%.

The value for the mode indicates that at least one pupil achieved a percentage mark of 68%.

The range of marks is 28%.

So the lowest mark in Class B cannot be lower than: $68 - 28 = 40\%$.

Statement 3 is *True*.

Further help

In each of the statements you need to consider the lowest percentage mark possible for the top mark in the class. Then, using the given range, you can ascertain what the minimum possible mark is for the lowest performing pupil in each class.

A common mistake is to assume that all values are evenly distributed and therefore that the median is the midpoint of the range.

For more information on mean, median and mode, visit the Skills Test website pages - Numeracy Glossary.

Question 22

The tests are marked out of 50. 10% of 50 is 5.

The following table shows the differences:

Pupil	Pupils' marks out of 50		
	Test 1	Test 2	Difference
A	28	30	2
B	14	18	4
C	16	15	1
D	17	22	5
E	20	24	4
F	20	29	9
G	16	18	2
H	8	13	5
I	8	6	0
J	14	24	10

Pupils who scored at least 10 percentage points higher in Test 2 are pupils D, F, H and J.

Further help

A common mistake is to read the table as percentage marks and only indicate pupils who scored at least 10 marks more in Test 2 than in Test 1 (Pupil J).

Question 23

Statement 1: The range of percentage marks was greatest in Class A.

The box-and-whisker consists of five main parts. The box indicates the marks achieved by the middle half of the pupils. The vertical lines, or whiskers, (above and below the box) each indicate the range of marks achieved by one-quarter of the pupils. The range is the difference between the highest and lowest score.

For the two classes, the range of marks for one of them can be visually seen as greater than the other. The class with the greater range is Class A.

Statement 1 is: *True*.

Statement 2: The median percentage mark in Class A was 15 percentage points less than the median percentage mark in Class B.

The median mark is shown on the diagrams by the white line inside the box.

The median for Class A is 45.

The median for Class B is 50.

The difference is 5 percentage marks.

Statement 2 is: *False*.

Statement 3: The interquartile range was the same in both classes.

The interquartile range for a box-and-whisker diagram is the length of the box.

Look at the boxes for each of the classes; they are the same.

Statement 3 is: *True*.

Further help

A common mistake for the first statement is to read the range as the highest mark shown by the vertical line of the box-and-whisker diagram.

A common mistake for the third statement is to see the interquartile ranges as different because they show different quartiles.

For more information on box-and-whisker diagrams, visit the Skills Test website pages - Numeracy Glossary.

Question 24

According to the information in the question, 5 miles equals 8 kilometres.

The distance from Brussels to Ostend is: $\frac{20 \times 5}{8} = 75$ miles.

The time for the journey from Brussels to Ostend is: $\frac{75}{50} = 1.5$ hours

This time is 1 hour 30 minutes.

The coach must be at Ostend by 18:00 (24-hr clock).

The coach must leave Brussels by: 18:00 (24-hr clock) – 1 hour 30 minutes

This is 16:30 (24-hr clock).

Further help

A common mistake is to interpret the 1.5 hour journey from Brussels to Ostend as 1 hour 50 minutes.

Another common mistake is to convert the distance from Brussels to Ostend the wrong way round i.e. $\frac{120 \times 8}{8}$.

Question 25

Total: The total number of Year 13 leavers is : $82 + 14 + 38 + 48 = 182$.

Statement 1: $\frac{3}{7}$ went on to higher education.

The number of Year 13 leavers going on to higher education is 82.

The fraction of the total of Year 13 leavers who

go on to higher education is $\frac{82}{182}$.

This fraction in its simplest form is $\frac{41}{91}$.

Statement 1 is: *False*.

Statement 2: $\frac{1}{13}$ took a gap year.

The number of Year 13 leavers going on a gap year is 14.

The fraction of the number of Year 13 leavers who go on a gap year is: $\frac{14}{182}$.

This fraction in its simplest terms is $\frac{1}{13}$.

Statement 2 is: *True*.

Statement 3: $\frac{2}{7}$ went on to further education.

The number of Year 13 leavers going on to further education is 38.

The fraction of the total of Year 13 leavers who

go on to further education is $\frac{38}{182}$.

This fraction in its simplest form is $\frac{19}{91}$.

Statement 3 is: *False*.

Further help

A common mistake is to simplify the fractions and ratio value incorrectly.

To simplify a fraction, look for a number that will divide both into the numerator (top number) and the denominator (bottom number).

In the example below, 9 will divide into both 9 and 81.

In its simplest form: $\frac{9}{81} = \frac{9 \div 9}{81 \div 9} = \frac{1}{9}$.

For more information on pie charts visit the Skills Test website pages - Numeracy Glossary.

Question 26

Statement 1: The number of pupils achieving 81+ marks increased by 50% from Test 1 to Test 2.

The answer to this statement can be seen visually by noting that the number of pupils achieving 81+ marks in Test 2 is 3 times the number of pupils achieving 81+ marks in Test 1.

OR

The number of pupils who achieved 81+ in Test 1 is 2.

The number of pupils who achieved 81+ in Test 2 is 6.

The percentage increase from Test 1 to Test 2 is: $\frac{6-2}{2} \times 100 = 200\%$.

Statement 1 is: *False*.

Statement 2: More than 80% of pupils achieved more than 40 marks in Test 2.

The number of pupils who achieved more than 40 marks in Test 2 is:

$$13 + 6 + 6 = 25$$

The total of pupils in the science class is 30.

The percentage of pupils who achieved more than 40 marks in Test 2 is:

$$\frac{100 \times 25}{30} = 83.33\% \text{ (to 2 d.p.)}$$

Statement 2 is: *True*.

Statement 3: $\frac{1}{3}$ of pupils achieved fewer than 41 marks in Test 1.

The number of pupils who achieved fewer than 41 marks in Test 1 is:

$$3 + 7 = 10.$$

The total of pupils in the science class is 30.

The fraction of pupils who achieved fewer than 41 marks in Test 1 is $\frac{10}{30}$.

This fraction in its simplest form is $\frac{1}{3}$.

Statement 3 is *True*.

Further help

A common mistake is to simplify fractions incorrectly. To simplify a fraction, look for a number that will divide both into the numerator (top number) and the denominator (bottom number). In the example below, 9 will divide into both 9 and 81.

In its simplest form: $\frac{9}{81} = \frac{9 \div 9}{81 \div 9} = \frac{1}{9}$.

There is a lot of information in the question, bar chart and statements.

A frequent mistake is to misread this information.

For more information on bar charts visit the Skills Tests website pages - Numeracy Glossary.

Question 27

For each pupil the coursework mark needs to be converted to a percentage mark and then the formula used to calculate the final coursework percentage mark.

Pupil X

Coursework mark as a percentage mark is: $\frac{100 \times 22}{60} = 36.7\%$ (to 1 d.p.).

The final percentage mark is: $\frac{36.7 + (3 \times 45)}{4} = 42.9\%$ (to 1 d.p.).

Pupil Y

Coursework mark as a percentage is: $\frac{100 \times 21}{60} = 35.0\%$ (to 1 d.p.).

The final percentage mark is: $\frac{35 + (3 \times 60)}{4} = 53.8\%$ (to 1 d.p.).

Pupil Z

Coursework mark as a percentage is: $\frac{100 \times 30}{60} = 50.0\%$ (to 1 d.p.).

The final percentage mark is: $\frac{50 + (3 \times 58)}{4} = 56.0\%$ (to 1 d.p.).

The minimum percentage mark to achieve a grade C is 55%.

The pupil whose predicted final percentage mark is 55% or more is: *Pupil Z*.

Further help

A common mistake is to input the coursework mark and the practice examination mark into the formula.

As there is only one correct answer to this question, a good strategy in this case would be to start with the pupil who appears to have gained most marks. That would be Pupil Z, and you would find the correct pupil at the first attempt. However, it is advisable to calculate the final percentage marks for all three pupils in order to check that you have the correct answer.

Another frequent mistake is to simplify fractions incorrectly. To simplify a fraction, look for a number that will divide both into the numerator (top number) and the denominator (bottom number). In the example below, 9 will divide into both 9 and 81.

In its simplest form: $\frac{9}{81} = \frac{9 \div 9}{81 \div 9} = \frac{1}{9}$

Question 28

Statement 1: In 2009 the teacher assessment result for each subject was above the corresponding test/task result.

In 2009 the English teacher assessment result was above the test/task result.

In 2009 the mathematics teacher assessment result was above the test/task result.

In 2009 the science teacher assessment result was below the test/task result.

Statement 1 is: *False*.

Statement 2: In 2010 the teacher assessment result was closer to the test/task result in English than it was in science.

In 2010 the difference between the teacher assessment result and the test/task result for English was 2 percentage points.

In 2010 the difference between the teacher assessment result and test/task result for science was 3 percentage points.

The difference for English was less than the difference for science.

Statement 2 is: *True*.

Statement 3: Taking into account both teacher assessments and test/task assessments, the trend in both English and mathematics indicates improved performance.

For English (teacher assessment) the result improved each year.

For English (test/task) the result improved each year.

For mathematics (teacher assessment) the result improved each year.

For mathematics (test/task) the result improved each year.

Statement 3 is: *True*.

Further help

There is a lot of information in the table and statements. Take time to read it carefully to reduce the likelihood that you misread some information.