Numeracy Practice Paper 2

Instructions

Read the instructions carefully before you start the test.

The non-interactive practice material is intended to help you to practise answering questions and become familiar with navigational features used in the live, computer-based tests; they are not necessarily identical in structure to the actual test, nor to the paper-based tests which are available for those candidates requiring special arrangements. Additional commentary notes are provided in each section of this practice test which will not feature in the live test.

In the actual test you will have 48 minutes to complete 2 sections: mental arithmetic and on-screen questions (unless special arrangements have been granted). There are 12 mental arithmetic questions (and one unmarked practice question) and 16 on-screen questions.

Answers should be given as numbers not words. Fractions should be entered using the ‘forward slash’ key, for example ‘one half’ would be 1/2. Some questions already have the unit for the answer specified; do not repeat it in your answer (i.e. £, pupils, %).

In the live test you will be provided with on screen test rules before you start the test and instructions for each section which can be accessed throughout the test. The instruction pages are included within the practice material in order for you to familiarise yourself with them.

Instructions - Mental arithmetic questions

Before you start, put headphones on or connect speakers to your computer.

Each question is worth one mark, with the exception of the practice question. Each question will be read twice; the answer box will appear on the screen after the first reading of the question. After the second reading of the each question you will have 18 seconds to answer.

In the actual test, you cannot move backwards and forwards between mental arithmetic questions, nor will you be able to return to any of the mental arithmetic questions after the time for answering has elapsed.

Use of a calculator in not allowed in this section.

Instructions - On-screen questions

The second section contains 16 on-screen questions worth one mark each; you will have 36 minutes to answer the questions.

As in the actual test, you can move backwards and forwards between questions, using the ‘previous’ and ‘next’ buttons; you may answer the questions in any order.

Some on-screen questions share the same context. This is indicated by an icon in the top right corner of the screen depicting links in a chain.

A question may require you to:

- type in the answer;
- click in a box or circle to select the correct answer(s);
- point and click on the correct position;
- drag and drop a value to a particular place.

The on-screen calculator can be opened by clicking on the ‘calculator’ button.

To move it, click on the top green header section using the left-hand mouse button, hold down the button and drag into position, then release the button.
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: 

Show Me

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 break is $200 + 15 = 215$ mins = 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 + 3hrs 35 mins = 20:05 (24hr).

Further Help

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

Show Me

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

The total number 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 plus 4.

The calculation becomes 3 times 20 plus 3 times 4.

This is 60 plus 12 which equals 72.

Likewise when working out 4 times 28 think of 28 as 20 plus 8.

The calculation becomes 4 times 20 plus 4 times 8.

This is 80 plus 32 which equals 112.
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 20 pence for each correct spelling.

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

Answer: £  

Show Me

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 20p = £0.20.

The number of pounds the class expected to raise for charity is $540 \times 0.20 = £108$.

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 £108.
Q Question 3

As part of the numeracy work in a lesson, pupils were asked to stretch a spring to extend its length by 40 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

Show Me

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

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: 2

Show Me

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.

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

The total comes to 1900.
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: 

Show Me

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 mins.
The total time for the lessons and break is $150 + 20 = 170$ minutes $= 2$ hours 50 minutes.
The morning session in a school began at 9:25 (24-hour clock).
The morning session ends at $09:25 + 2$ hrs 50 mins $= 12:15$ (24-hour clock).

Further Help

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

Another common mistake is to incorrectly add 9:25 plus 2 hours 50 minutes giving an answer of 11:75.

Alternatively:

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

What percentage of pupils scored full marks?

Answer: 24%
What is 643 divided by 0.1?

Answer: 6430

0.1 is the same as one tenth.

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

Similarly, dividing 643 by one tenth is the same as working out how many tenths there are in 643. The answer will be ten times 643 which is 6430.
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: \( \frac{7}{8} \)

Show Me

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 both into the numerator (top number) and the denominator (bottom number). In the following example 9 will divide into both 9 and 81.

In its simplest form \( \frac{9}{81} = \frac{9 + 9}{81 + 9} = \frac{1}{9} \).
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 1 pound, what was the total entrance cost, in pounds, for the group of pupils?

Answer: £

Show Me

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 $160 \div 1.6 = £100$.

Further Help

Alternatively scale the ratio up by multiplying both currencies by the same amount:

Basic exchange rate: 1.6 euros equals 1 pound

Multiply by ten: 16 euros equals 10 pounds

Multiply by ten again: 160 euros equals 100 pounds

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

Show Me

The number of marks achieved by the pupil was 84.

The maximum possible mark for the test was 120.

\[
\frac{84}{120} = \frac{7}{10} \quad \text{(dividing both numbers by 12)}
\]
\[
\frac{7}{10} = \frac{70}{100} \quad \text{(multiplying both numbers by 10)}
\]
\[
\frac{70}{100} = 70\%
\]

Further Help

To write a fraction as a percentage it is necessary to manipulate the fraction until the bottom number is 100. At that point the top number is the percentage.
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: £

Show Me

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 \(\frac{2}{5}\) of 120 first of all calculate \(\frac{1}{5}\).

\(\frac{1}{5}\) of 120 is 24.

\(\frac{2}{5}\) of 120 is 2 x 24 or 48.

If you need help working out \(\frac{1}{5}\) of 120 try dividing it by 10 and then doubling it.

120 divided by 10 is 12.

12 doubled is 24.
A school’s policy for Key Stage 2 was to set $3 \frac{1}{2}$ hours of homework per week.

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

Answer: minutes

Show Me

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

The number of evenings spent on the homework is 5.

The mean number of minutes spent on homework per evening is $210 \div 5 = 42$ minutes.

Further Help

To help with the mental calculations:

1 hour contains 60 minutes;

3 hours contain 180 minutes;

3 hours and 30 minutes contains 210 minutes.

To divide a number by 5 you can divide it by ten and then double the answer.

To work out 210 divided by 5:

210 divided by 10 equals 21;

21 times 2 equals 42.
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: 

Show Me

The number of pupils in the class is given in the stem 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 links points where the reading 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 =
Pupils with matching reading and actual age / numbers of pupils in class = 6 ÷ 21 = 0.285714.
This number, rounded to one decimal place, is 0.3.
Further Help

A common mistake is to not realise that the number of pupils in the class is given in the stem and 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 DfE website.
Question 2

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.

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

Show Me

The diagonal line links points where the reading and actual ages are the same as each other. The point that is furthest away from the line is highlighted on the diagram:

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 actual age and the reading age.

The point that is furthest away from the diagonal line has coordinates:

(6 yrs 1 mths, 7 yrs 7 mths).

[x-value, y-value].

Further Help

You can answer this question by checking all the points, one by one, to see which shows the greatest difference between reading and actual age. This process takes a long time and also gives the risk of mistakes in reading the values. For more information on scatter-graphs visit the DfE website.
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 is the range of reading ages for the pupils in the class?

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. The pupil’s reading age is 5 years 10 months.

The range of reading ages 7 years 7 months - 5 years 10 months = 21 months.

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 ten months in a year rather than 12 – that is as if the scales were like normal decimal numbers. This would give a range of 19 months.

For more information on scatter-graphs visit the DfE website.
Question 4

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

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

<table>
<thead>
<tr>
<th>Class</th>
<th>Number of pupils</th>
<th>Number of pupils having extra music lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>E</td>
<td>26</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>29</td>
<td>6</td>
</tr>
<tr>
<td>G</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>H</td>
<td>24</td>
<td>5</td>
</tr>
</tbody>
</table>

The total 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 $\frac{100 \times 44}{210} = 20.952381\%$.

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

Show Me

The total 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 $\frac{100 \times 44}{210} = 20.952381\%$.

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

Further Help

There are a lot of numbers to add up in the table, this is often a place where errors can occur. One way to ensure a correct total is to count the numbers from top to bottom and then check by counting from bottom to top.

A common mistake is to round the percentage incorrectly.
Question 5

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:

\[
\text{mean points score} = \frac{\text{total points for the year group}}{\text{total number of pupils in the group}}
\]

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.

<table>
<thead>
<tr>
<th>Level achieved</th>
<th>Number of pupils</th>
<th>Points per level</th>
<th>Total points per level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
<td>21</td>
<td>105</td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>27</td>
<td>783</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td></td>
<td>1386</td>
</tr>
</tbody>
</table>

Answer: 29

Show Me

The number of pupils in the year group is 48.

The total of points for Level 5 is \( 8 \times 33 = 264 \).

The total of points for Level 6 is \( 6 \times 39 = 234 \).

The total of points for all levels is \( 105 + 783 + 264 + 234 = 1386 \).

The mean points score is \( 1386 \div 48 = 28.875 \).

This number rounded to the nearest whole number is 29.

Further Help

There are a number of calculations needed before you can use the formula. You are advised to keep a careful note of these numbers as you are calculating them in order to 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 that number by 4. Another common mistake is to round the percentage incorrectly.
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 a theatre ticket?

Answer: £

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

\[ \frac{185}{25} = £7.40 \]

The cost of each return train ticket is £5.65.

The amount each person will have to pay for the outing to cover the cost of travel and a theatre ticket is £7.40 + £5.65 = £13.05.

The cost of the theatre tickets you are given is for all 25 tickets, so you have to divide this by 25, while the rail cost is for one person, so do not divide this by 25.
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.

Indicate 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 to 2011.
- The percentage of mathematics GCSE grades A* - C more than doubled from 2004 to 2011.

Show Me

The mean percentage of GCSE grades A* - C for the last 5 years 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:

\[
\text{Mean percentage} = \frac{\text{total percentages}}{\text{number of years}}
\]

\[
\frac{(47+46+50+54+58)}{5} = \frac{255}{5} = 51.
\]

So the first statement is True.

The percentage of GCSE grades A* - C increased each year from 2004 to 2011.

Look at the chart.

Does the percentage of GCSE grades A*-C increase from 2007 to 2008? No.

So the second statement is Not True.
The percentage of mathematics GCSE grades A* - C more than doubled from 2004 to 2011.

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

Double the percentage of GCSE grades in 2004 is 44.

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

Is the percentage for 2011 more than double the percentage for 2004? Yes.

So the third statement 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, therefore assume that each year increases.
Question 8

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 in the 24 hour clock.

Answer: 

Show Me

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

This time includes a break of 20 minutes.

The time available for appointments is 2 hrs 30 mins – 20 minutes = 2 hrs 10 mins.

This time expressed in minutes is 130 minutes.

Each appointment takes 10 minutes.

The number of appointments on the first day is 130 ÷ 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 x 10 = 20 minutes before the end time on the first day.

This time is 19:00 (24hr clock) – 20 minutes = 18:40 (24hr 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 ie.100 minutes in the hour.
Question 9

A teacher produced the following table to show the marks achieved in an end of year geography test by pupils in 3 Year 7 classes.

Indicate all the true statements:

<table>
<thead>
<tr>
<th>Marks (percentage)</th>
<th>Range</th>
<th>Median</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>60</td>
<td>50</td>
<td>72</td>
</tr>
<tr>
<td>Class B</td>
<td>28</td>
<td>50</td>
<td>68</td>
</tr>
<tr>
<td>Class C</td>
<td>85</td>
<td>60</td>
<td>70</td>
</tr>
</tbody>
</table>

- 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%.

Show Me

The highest mark possible is 100%.

The range 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 scores for the class, the lowest mark will be less than 20%.

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 the median is the mid point of the range. For more information on mean, median and mode visit the DfE website.
Q **Question 10**

As part of a review programme a teacher compared the marks for 10 pupils in each of two English tests. Click on the letters in the table for the pupils who scored at least 10 percentage points more in Test 2 than in Test 1.

<table>
<thead>
<tr>
<th>Pupils</th>
<th>Pupils' marks out of 50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test 1</td>
</tr>
<tr>
<td>A</td>
<td>28</td>
</tr>
<tr>
<td>B</td>
<td>14</td>
</tr>
<tr>
<td>C</td>
<td>16</td>
</tr>
<tr>
<td>D</td>
<td>17</td>
</tr>
<tr>
<td>E</td>
<td>20</td>
</tr>
<tr>
<td>F</td>
<td>20</td>
</tr>
<tr>
<td>G</td>
<td>16</td>
</tr>
<tr>
<td>H</td>
<td>8</td>
</tr>
<tr>
<td>I</td>
<td>6</td>
</tr>
<tr>
<td>J</td>
<td>14</td>
</tr>
</tbody>
</table>

**Show Me**

The tests are marked out of 50.

10% of 50 is **5**.

Pupils who scored at least 10 percentage points higher in Test 2

<table>
<thead>
<tr>
<th>Pupils</th>
<th>Pupils marks out of 50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test 1</td>
</tr>
<tr>
<td>A</td>
<td>28</td>
</tr>
<tr>
<td>B</td>
<td>14</td>
</tr>
<tr>
<td>C</td>
<td>16</td>
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<tr>
<td>D</td>
<td>17</td>
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<tr>
<td>E</td>
<td>20</td>
</tr>
<tr>
<td>F</td>
<td>20</td>
</tr>
<tr>
<td>G</td>
<td>16</td>
</tr>
<tr>
<td>H</td>
<td>8</td>
</tr>
<tr>
<td>I</td>
<td>6</td>
</tr>
<tr>
<td>J</td>
<td>14</td>
</tr>
</tbody>
</table>

**Further Help**

A common mistake is to read the table as percentage marks and only indicate pupils who scored 10 more in Test 2 than in Test 1 (Pupil J).
Question 11

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

Indicate 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 inter-quartile range was the same in both classes.

Show Me

The range of percentage marks was greatest in Class A.

The box and whisker consists of 5 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) 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.

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

The median mark is shown on the diagrams with 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 Not True.

The inter-quartile range was the same in both classes.

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

Look at the boxes for each of the classes.

The lengths 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 diagrams. A common mistake for the third statement is to see the inter-quartile ranges as different because they show different quartiles. For more information on Box and Whisker diagrams visit the DfE website.
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 120 km, 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: __________

According to the instructions 5 miles equals 8 kilometres.

The distance from Brussels to Ostend is 120 \times 5 \div 8 = 75 \text{ miles}.

The time for the journey from Brussels to Ostend is 75 \div 50 = 1.5 \text{ hours}.

The time is 1 hour 30 minutes.

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

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

This is 16:30 (24hr clock).

A common mistake is to interpret the 1.5 hour journey time 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. \(120 \times \frac{8}{5}\). 
Question 13

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

Indicate all the true statements:

Numbers of Year 13 students going to different destinations

- □ \( \frac{3}{7} \) went on to higher education.
- □ 1 in 13 took a gap year.
- □ \( \frac{2}{7} \) went on to further education.

Show Me

The total of Year 13 leavers is \( 48 + 38 + 14 + 82 = 182 \).

\( \frac{3}{7} \) 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 that go on to higher education is \( \frac{82}{182} \).

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

Statement 1 is Not True.

1 in 13 took a gap year.

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

The ratio of the number of Year 13 leavers that go on a gap year to the total of Year 13 leavers is 14:182.

This ratio in its simplest terms is 1:13.

Statement 2 is True.
The number of Year 13 leavers going on to further education is 38.

The fraction of the total of Year 13 leavers that go on to further education is \( \frac{38}{182} \).

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

Statement 3 is **Not True**.

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

In its simplest form \( \frac{9}{81} = \frac{9 + 9}{81 + 9} = \frac{1}{9} \).

For more information on Pie Charts visit the DfE website.
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 the bar chart (shown below) showing pupil achievement in the two tests.

Indicate 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.

Show Me

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 Not True.

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 \( \frac{100 \times 25}{30} = 83.33\% \).

Statement 2 is True.
Question 14 Show Me continued

\[ \frac{1}{3} \] of pupils achieved fewer than 41 marks in Test 1.

The number of pupils who achieved less 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 less 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 incorrectly simplify fractions. To simplify a fraction, look for a number that will divide both into the numerator (top number) and the denominator (bottom number). In the following example 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 stem, bar chart and statements. A frequent mistake is to misread this information.

For more information on Bar Charts visit the DfE website.
Question 15

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.

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

Click on the letter of the pupil (X, Y or Z) who is predicted to achieve a grade C.

<table>
<thead>
<tr>
<th>Pupil</th>
<th>Coursework mark out of 60</th>
<th>Practice examination mark out of 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>22</td>
<td>45</td>
</tr>
<tr>
<td>Y</td>
<td>21</td>
<td>60</td>
</tr>
<tr>
<td>Z</td>
<td>30</td>
<td>58</td>
</tr>
</tbody>
</table>

Show Me

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

**Pupil X**
Coursework mark as a percentage is \( \frac{100 \times 22}{60} = 36.7\% \) (rounded to one decimal place).

The final percentage mark is \( \frac{36.7 + (3 \times 45)}{4} = 42.9\% \) (rounded to one decimal place).

**Pupil Y**
Coursework mark as a percentage is \( \frac{100 \times 21}{60} = 35.0\% \) (rounded to one decimal place).

The final percentage mark is \( \frac{35 + (3 \times 60)}{4} = 53.8\% \) (rounded to one decimal place).

**Pupil Z**
Coursework mark as a percentage is \( \frac{100 \times 30}{60} = 50\% \) (rounded to one decimal place).

The final percentage mark is \( \frac{50 + (3 \times 58)}{4} = 56\% \) (rounded to one decimal place).

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**.
A common mistake is to input the coursework mark and the practice examination mark into the formula. As there is only one correct answer, a good strategy in this case would be to start with the pupil that appears to have gained most marks. That would be pupil Z, and this would result in finding 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 incorrectly simplify fractions. To simplify a fraction look for a number that will divide both into the numerator (top number) and the denominator (bottom number). In the following example 9 will divide into both 9 and 81.

\[
\frac{9}{81} = \frac{9 \div 9}{81 \div 9} = \frac{1}{9}.
\]
Question 16

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.

Indicate all the true statements:

<table>
<thead>
<tr>
<th>Subject</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>English (teacher assessment)</td>
<td>60</td>
<td>72</td>
<td>75</td>
</tr>
<tr>
<td>English (tests/tasks)</td>
<td>70</td>
<td>70</td>
<td>75</td>
</tr>
<tr>
<td>Mathematics (teacher assessment)</td>
<td>66</td>
<td>72</td>
<td>75</td>
</tr>
<tr>
<td>Mathematics (tests/tasks)</td>
<td>66</td>
<td>76</td>
<td>74</td>
</tr>
<tr>
<td>Science (teacher assessment)</td>
<td>78</td>
<td>77</td>
<td>81</td>
</tr>
<tr>
<td>Science (tests/tasks)</td>
<td>82</td>
<td>74</td>
<td>81</td>
</tr>
</tbody>
</table>

- 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.

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 Not True.

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%.

In 2010 the difference between the teacher assessment result and the test/task result for science was 3%.
The difference for English was \textit{less} than the difference for science.

Statement 2 is \textbf{True}.

\textbf{Further Help}

There is a lot of information in the table and statements. A common mistake is to misread this information.
Practice Question: 20:05

Mental Arithmetic
1. 184 pupils
2. £108
3. 63 centimetres
4. 2 bottles
5. 12:15
6. 24%
7. 6430
8. \(\frac{7}{8}\)
9. £100
10. 70%
11. £48
12. 42 minutes

On-screen
1. 0.3

[Graph image]
On-screen continued

3  21 months
4  21%
5  29
6  £13.05
7  Statements 1 & 2
8  18:40
9  Statements 2 & 3
10 Pupils D,F,H and J
11 Statements 1 & 3
12 16:30
13 Statement 2
14 Statements 2 & 3
15 Pupil Z
16 Statements 2 & 3