GCSE Examiners' Report

Mathematics – Numeracy

GCSE

Summer 2024

Introduction

Our Principal Examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each unit.

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.[1]

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	WJEC offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.wjec.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the WJEC subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level. For linear specifications, a single grade is awarded for the subject, rather than for each unit that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results, Grade Boundaries and PRS (wjec.co.uk)

[1] ***Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.***

Exam Results Analysis	WJEC provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
Classroom Resources	Access our extensive range of FREE classroom resources, including blended learning materials, exam walk-throughs and knowledge organisers to support teaching and learning.	https://resources.wjec.co.uk/
Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	Portal by WJEC or on the WJEC subject page.
Become an examiner with WJEC.	We are currently looking to recruit new examiners. These opportunities can provide you with valuable insight into the assessment process, enhance your skill set, increase your understanding of your subject and inform your teaching.	Become an Examiner | WJEC

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Executive Summary

The examination papers in GCSE Mathematics – Numeracy were generally of a similar standard to previous examination series. As is always the case, some questions were more demanding in some topics than in previous series, whereas others were less demanding. It is clear that many candidates in year 11 this year have been impacted by the pandemic, although there are signs that this has improved, compared with Summer 2023. There are gaps in candidates' knowledge and understanding, which then cause problems with more demanding topics and skills. This is especially true of candidates hoping to attain the middle grades in the grade range (E to B). Overall, candidates at higher tier performed better this summer than in recent series.

There are some areas of the subject content that are not well-understood year on year. This year was no exception. Topics such as bearings, converting metric and Imperial units, writing numbers as fractions or percentages of other numbers, and perimeter, area and volume have a great need for improvement. Incidentally, these topics were the ones listed in Summer 2023 and in November 2023, and they remain the topics that require most attention across the tiers. Other topics that are specific to units and/or tiers are listed in the individual unit reports.

There are skills that are lacking across tiers, such as non-calculator methods, e.g. cancelling, and multiplying and dividing large numbers and decimals.

What is evident is how little time many candidates spend learning facts and rules in preparation for these examinations, especially at intermediate tier and foundation tier. These include metric to Imperial conversions and formulae for the perimeter, area and volume of shapes.

There was also evidence of candidates not using calculators to their full potential on the calculator-allowed papers. Non-calculator methods were used when a calculator was available. There is a difference between showing your working and using non-calculator methods to carry out calculations. Candidates should remind themselves of this difference before taking these examinations.

Some good work was seen when calculating with money, in topics such as bills, best buys and income tax (at intermediate tier). Candidates showed a good knowledge and understanding of statistical charts and representations, including, pictograms, cumulative frequency diagrams and box-and-whisker diagrams.

Our digital resources website has many blended learning lessons and knowledge organisers, amongst other things: Mathematics - Educational Resources - WJEC
You can filter to help find what you want. Some examples of blended learning lessons and knowledge organisers are listed below, as they have been indicated as areas for improvement.

Areas for improvement	Classroom resources	Brief description of resource
Fractions, decimals and percentages	Mathematics - Educational Resources - WJEC percentages.pdf (wjec.co.uk)	Number – knowledge organisers Knowledge organiser
	Fraction and percentage of an amount - Blended Learning	Blended learning lessons
Area, perimeter and volume	Mathematics - Educational Resources - WJEC area-perimeter-dimensions-and-volume.pdf (wjec.co.uk)	Geometry and Measures – knowledge organisers Knowledge organiser
	Area and perimeter, dimensions and volume - Blended Learning	Blended learning lessons
Units of measurement	Mathematics - Educational Resources - WJEC units-of-measurement.pdf (wjec.co.uk)	Geometry and Measures – knowledge organisers Knowledge organiser
	Units of Measurement - Blended Learning	Blended learning lessons

MATHEMATICS – NUMERACY

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Summer 2024

UNIT 1 FOUNDATION TIER

Overview of the unit

Most candidates attempted all questions and performance was a little better than expected. Candidates were more successful with the earlier questions than with the later questions in the paper, as is expected.

Key areas for improvement include the following:
- being able to work with a common amount for a comparison in a best buy context and to understand the concept of 'same value for money'
- converting metric units
- applying non-calculator methods for division and multiplication
- understanding the difference between the perimeter and area of a rectangle
- angles and bearings
- adding positive and negative integers.

The following topic areas were generally well-understood or well-answered:
- area by counting squares
- dealing with calendar-based questions.

Some questions were well answered, for example, questions 1(a), 1(b), 1(c), 2(a), 3, 5(a) and 9(a).

Other questions elicited weaknesses in performance, such as in questions 2(c), 4, 9(b) and 9(c).

Comments on individual questions

When a question or part-question is not listed, there are no areas to highlight.

Question 1
In part (a), most candidates knew the method required to work out the difference between the total cost of the individual memberships and the cost of the family membership. Errors occurred in multiplying by 2, adding the individual memberships, or subtracting the cost of the total individual memberships and the cost of the family membership. There were some candidates who did not work out the difference in the costs. A few candidates worked with the alternative method, where they subtracted 3 costs from the family membership and then stated that there was not enough for the remaining membership. It was pleasing to see many candidates using labels and/or showing workings, with correct units in their answers.

In part (b)(i), most candidates knew that they needed to multiply to find the total number of calories. However, basic numerical errors were often made.

In part (b)(ii), some candidates multiplied 360 by 12 instead of dividing. Many candidates also used a counting up in 12s method. However, errors were often made in the addition.

In part (c), it was disappointing to see that many candidates did not know that a 45° angle is an acute angle. A variety of incorrect answers were given.

In part (d), many candidates confused the mode with the median. Some candidates understood the mode as being the one that occurs the most. However, in this question, they did not realise that it meant the activity with the highest frequency.

Many candidates engaged well with part (c). However, errors were made, with some candidates only counting whole squares, so their answer was outside of the range. Errors were also made with basic multiplication skills when multiplying their area by 30.

In part (f), many candidates measured the length of the van correctly and multiplied this by 50. However, some candidates struggled to deal with the change of units from centimetres into metres. Some candidates did not understand which was the length of the van and worked with the height of the van.

Question 2

Many candidates gained at least 1 mark in part (a) by working with one given criterion. The most common error was that candidates did not give the latest dates for the 3-day holiday; either the first dates, 3rd – 5th March, or the first dates in the last month, 2nd – 4th June, were given.

In part (b), the most common error was not working with the cost of 2 nights in the Promenade Hotel. Many candidates only multiplied 110 by 2 so only calculated the cost for one night for the 4 friends or the cost of 2 nights for 2 friends. The other common error was that some candidates did not subtract the 10% discount from the cost of 2 nights for the Pier Apartment. Those candidates that initially worked with 1 night at both places, found the difference in costs for 1 night, not for 2 nights.

In part (c), most candidates worked with perimeter or partial perimeter instead of area of a rectangle. The candidates who did work with area did not always interpret that there would not be enough icing to cover the cake. This meant that they did not gain the 2nd mark.

Question 3

Most candidates were able to gain 1 mark in this question for working with part of the given formula. The most common error was giving the length of cooking time as (30 + 50 + 15 =) 95 minutes, which then meant that the latest time to start cooking was 12:25 p.m. Those candidates who did get the correct cooking time as 195 minutes or 3 hours 15 minutes sometimes made an error in subtracting this time from 2 p.m. Many gave their final answer as 11:45 a.m. rather than 10:45 a.m.

Question 4

Some candidates knew that they needed to find the cost of 1 toothbrush in both packs but errors in division stopped them from gaining the 2nd or 3rd mark in part (a). A few candidates looked at finding the cost of 15 toothbrushes. The most common error was to find the difference in the costs of a 3-pack and 5-pack of toothbrushes and state that the 3-pack was better value.

Part (b) was not well answered by the candidates at foundation tier. Many candidates did not understand the meaning of ‘same value for money’ and took that literally, thus stating that the cost of 100ml was 93p, the same as the cost for 75 ml. Many candidates found the difference in the capacity of toothpaste as 25 ml and then added this to 93p. A common incorrect answer of £1.18 was often seen.

Question 5
A common error in part (b) was to consider only the distance from home and not the return journey, or to add on 4 km.

Many candidates did not understand how to work out the speed from the graph in part (c).

Question 6
Some candidates were able to calculate 20% of 15000 euros; however, very few understood that they then needed to work out 30% of (26000 – 15000). There were many misconceptions seen, including thinking that the overall tax paid should be 50% of 26000 euros or 20% of 15000 euros plus 30% of 26000 euros. There were some candidates who did not know how to find 20% or 30% of a value that is a multiple of 10.

Question 7
Many candidates engaged well with the information given in the table and in the Venn diagram. Errors often occurred in multiplication, with basic times tables errors as well as place value errors. When the 3 products were correct, errors in addition were often made. This was from not using correct place value and aligning the three individual costs incorrectly to find the total amount taken.

Question 8
In part (a), some candidates correctly identified at least one correct cost, but made an error in subtracting. Some did not subtract the values to find the difference.

Question 9
Part (b) was not well answered by candidates at foundation tier.

In part (b)(i), many candidates confused the median with the mean and gave their answer as – 12. Those that understood that they needed to add the 8 values had difficulty with the addition of positive and negative numbers. Minus signs were often ignored leading to a total of 80 and a final answer of either 10 or –10.

For those candidates who attempted part (b)(ii), they often added 16 not –16 to their total in part (i) and then divided by 8 and not by 9.

In part (c), some candidates understood that they needed to measure the distance between the lifeguard station and the ice cream van but often gave this as 9 cm and not 8.5 cm ±2 mm. Some candidates did not show that they needed to then multiply by 20 and so did not gain any marks. Those who did attempt to multiply 8.5 by 20 often gave their answer as 160.5. Bearings are still a difficult concept for candidates at the foundation tier, especially those that involve a bearing that is greater than 180°.

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GCSE

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UNIT 1 INTERMEDIATE TIER

Overview of the unit

Most candidates attempted all questions. In many aspects, performance was slightly better than expected. Candidates were more successful with the earlier questions than with the later questions in the paper, as is expected.

Key areas for improvement include the following:
- expressing a quantity as a fraction or percentage of another quantity, including finding a percentage profit
- applying non-calculator methods of division and multiplication, including using knowledge of multiples or factors to simplify calculations
- calculating the area of a composite shape that includes a trapezium or a triangle
- calculating lengths in similar shapes
- finding the mean of a list of numbers that include positive and negative integers.

The following topic areas were generally well-understood or well-answered:
- interpreting Venn diagrams
- applying unitary methods or finding common multiples in working with a better value problem
- interpreting basic tax bands in order to calculate income tax
- reading scale on graphs.

Some questions were well answered, for example, questions 1(a), 2(a), 2(b), 4(b), 5(a) and 6(a).

Other questions elicited general weaknesses in performance, such as in questions 8(c) and 9(b).

Comments on individual questions

When a question or part-question is not listed, there are no areas to highlight.

Question 1
Part (a) was well answered, with a number of different methods seen. These methods included unitary cost, a cost for a common multiple or a cost for 3 or 5 toothbrushes.

In part (b), a number of candidates did not simplify the problem before starting with calculations, although many did consider the cost for 25ml as a common factor of both 75ml and 100ml.

Question 2
A common error in part (b) was to consider only the distance from home and not the return journey, or to add on 4km.

Question 3
In part (a), many candidates did calculate the increase of 700 bottles sold in 2017 but did not then add this to 2000 to get the total number of bottles for 2017. Similarly for 2018, the decrease was calculated, but the total number of bottles was not given. However, many candidates did work accurately to find the increased number in 2018, but a number of candidates made an error in subtracting 567 from 2700 to find the number at the end of the 2019.

In part (b), there seems to be an improvement in the stages of calculating income tax, with some candidates drawing a number line showing the tax bands and the income. This is good practice and helps the candidates understand the nature of income tax. However, there were many misconceptions seen, including thinking that the overall income should be 50% of 26000 euros, 20% of 15000 euros plus 30% of 26000 euros. Although there has been some improvement, this is still a topic where misconceptions are commonly seen.

Question 4
Some candidates find the interpretation of pie charts quite demanding.
In part (a), performance in part (i) was better than in part (ii). In part (a)(ii), there were two stages to consider, the interpretation of the 110° representing the Welsh spectators and the ratio of adults to children. Some candidates were unable to separate the problem into these two stages in order to solve the problem.

In part (b), most candidates engaged well with the information given in the table and the Venn diagram. Where errors occurred, they were in multiplication, with basic times tables errors as well as place value errors, and also in aligning the three individual costs to find the total amount taken.

Question 5
In part (b), there were many errors in finding the sum of the 8 given temperatures. Quite often, negative signs were ignored, leading to an incorrect total of 80, so sometimes candidates 'replaced' the negative symbol and wrote –80. As a consequence, –10°C was a common incorrect response. Addition of a number of positive and negative integers is an area for improvement.

Question 6
In part (a)(i), many candidates correctly identified the correct costs, but made an error in subtracting.

Part (b) was not well answered. Many candidates added the lengths given and incorrectly considered this as an area. Other candidates, when working with area, did not know how to find the area of a triangle or a trapezium. Calculating an area of a composite shape that includes a triangle or a trapezium is an area for improvement. A number of candidates did calculate the area correctly, but omitted to give an estimate of how much the driveway would cost.

Question 7
In part (b)(i) and part (b)(ii), it was clear that many candidates did not know how to express one quantity as a percentage of another. Many candidates only calculated the profit and did not attempt to calculate the percentage profit. Other candidates decided to then work backwards by finding percentages of the original amount in order to find the percentage increase.

Question 9

In part (a)(ii), many candidates did not know the calculation that was required to answer the question. The units for the answer were given in the answer space. That can be used as a clue to the division required, people/km^2.

Part (b) was not well answered, with many candidates finding 20% of the 2018 population and subtracting this, rather than thinking of the 2018 populations as 120%.

In part I, a number of candidates did not consider scale factors or enlargements, instead they incorrectly subtracted lengths. Hence 3.3 cm was a common incorrect answer for the length of the smallest flag. Another common error was thinking the height of the largest flag was 3 times the height of the medium flag.

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UNIT 1 HIGHER TIER

Overview of the unit

Candidates appeared to have sufficient time to complete the paper. Accuracy marks were lost by many candidates due to arithmetical errors in performing basic calculations early on in the paper, and then when working with fractions involving large numbers towards the end of the paper.

Key areas for improvement include the following:
- how to calculate frequencies from a pie chart using the sector angle
- how to calculate a percentage profit / loss
- calculating the volume of a sphere / hemisphere using the given formula
- simplifying expressions for the length of an arc of a sector of a circle using a cancelling method
- calculating an estimate for the median of a histogram
- how to calculate the volume of an object, given its mass and density.

The following topic areas were generally well-understood or well-answered.
- analysing a cumulative frequency diagram
- analysing a box-and whisker diagram
- drawing a histogram
- how to estimate the area under a curve.

Comments on individual questions

When a question or part-question is not listed, there are no areas to highlight.

Question 1
Many candidates were able to calculate the number of Welsh supporters from the pie chart. A variety of methods were seen, including many that used the fact that 90° represented ¼ of 7200 (=1800), and then used proportions to find how many supporters 110° represented. Most candidates subsequently knew how to share the number of Welsh supporters in the ratio 6 : 5. However, it was evident that a number of candidates did not know a suitable method of interpreting the pie chart.
This was the OCW question for this paper. Those who did not know a suitable method struggled to show suitable work that would gain either of the marks, whereas those that knew a suitable method generally gained both marks.

Question 2
In part 2(a), many fully correct responses were seen. A number of different errors were seen, from miscalculating the dimensions of any triangles or trapeziums they used, to using an incorrect formula for the area of a triangle, and to thinking that adding the lengths of the sides of the shape resulted in its area.

Part 2(b) was generally answered well, with most candidates showing a correct method of calculating 40% of an amount of money. Some chose a cost that was outside the appropriate range, resulting in no marks, while some incorrectly based their decision on comparing 60% of the amount with Tanya's budget.

Question 3
Parts 3(b)(i) and 3(b)(ii) both assessed calculating a percentage profit.

Part 3(b)(i) was a straightforward calculation, and more success was seen in this part.

The most common error in 3(b)(ii) was where candidates did not realise the percentage profit was based on the cost of 10 trees i.e. £300.
A number of candidates did not know how to calculate a percentage profit.

Question 4
In part 4(a)(iii), errors included a failure to simplify the fraction fully, and giving the fraction of customers who waited up to 40 seconds for their change.

Part 4(c) was not answered well with some candidates incorrectly giving values for the upper quartile, some incorrectly basing their decision of 'No' on the fact that the greatest times of 50 seconds for both years was unchanged, whilst others incorrectly based their decision on comparing the medians.

Question 5
Part 5(a)(ii) was generally not answered well. Some candidates did not approximate one or both numbers, resulting in a difficult calculation to evaluate correctly, whilst others did not know how to calculate a population density even though the units given in the answer space showed them what was needed.

Part 5(b) assessed reverse percentages, and the usual error of reducing 360 000 by 20% was often seen.

Part 5(c) assessed similar shapes. It was good to see many fully-correct responses. A common error was that many candidates thought that the scale factor of the heights of the small and medium flags was needed to calculate the height of the larger flag, and similarly the scale factor of the widths of the medium and large flags was needed to calculate the width of the smaller flag.

Question 6
Both parts of question 6(a) were not answered well.

In part 6(a)(i), it was disappointing to note that many candidates did not use the correct formula for the volume of a hemisphere, even though the formula for a sphere is given on page 2 of the question paper, and some did not know how to calculate the volume of the cylinder. For those that used a correct formula for the hemisphere, arithmetic errors were often seen in the calculation of 6^3 and then with 2/3 of 216.

In part 6(a)(ii), many candidates either gave the fractional reduction in the length of the cylinder (1/9) or the new length as a fraction of the original length (8/9), rather than work with volumes. Candidates who did work with volumes incorrectly gave the new volume as a fraction of the original volume.

Part (b) was answered quite well, although some candidates did not know the method required, and others did not simplify their answer fully.

Question 7
In part 7(a)(i), the division by 15 to calculate the frequency densities for the 3rd and 4th groups caused the most difficulties. Generally, both parts of 7(a) were answered well though.

In part 7(b), a number of candidates were able to calculate how far into the 2nd group the median was, but less success was seen in using this to estimate where the median was in the 2nd group.

Question 8
Candidates were generally quite successful at estimating the area under the curve for the first 8 seconds of the race. However, many thought that this area was the time taken by Sian to finish the race rather than the distance travelled by Sian during the first 8 seconds. These candidates therefore failed to engage in the 2nd part of the question.

Question 9
In part 9(a), a substantial number of candidates incorrectly thought that mass × density gave the volume of the cog. For those who did use mass/density, some thought that the upper bounds of both measurements were needed to calculate the greatest possible volume.

In part 9(b)(i), most candidates were unable to choose the correct right-angled triangle to use to calculate the length of AD. Most of the candidates who chose the correct triangle were successful in gaining all the marks in the question.

In part 9(b)(ii), a number of candidates were able to give correct expressions for both arc lengths, but arithmetic errors were often seen in the calculations of 150/360 × 4 (×π) and 210/360 × 24 (×π). To calculate these efficiently, a cancelling method is best used, but not many instances of cancelling were seen. Some candidates also incorrectly thought that adding these arc lengths gave 360/360 × 28 (×π).

Question 10
This question was different to the usual proportionality question. The question could be easily answered by multiplying the 9 hours that would normally be left to fill the pool by 7/5 (the change in the number of pumps and then adding on the initial 3 hours). Very few candidates were able to see that this was all that was required.

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UNIT 2 FOUNDATION TIER

Overview of the unit

Most candidates attempted all questions and performance was a little better than expected. Candidates were more successful with the earlier questions than with the later questions in the paper, as is expected.

Key areas for improvement include the following:
- working with time
- changing metric units
- finding volume
- angle properties, including ones in parallel lines
- writing one value as a fraction of another and simplifying fractions.

The following topic areas were generally well-understood or well-answered:
- representing data in a pictogram
- calculating change from a bill.

Some questions were well-answered, for example questions 1(b), 2 and 4.

Other question elicited weaknesses in performance, such as in questions 7(b), 7(c), 9 and 10.

Comments on individual questions

When a question or part-question is not listed, there are no areas to highlight.

Question 1
In part (a), many candidates did not answer the question that was asked. They did not explain what Morgan had done wrong. Many candidates just calculated the total bill correctly or said that Morgan either added incorrectly or even multiplied to get his answer.

Question 2
In part (b), many candidates gained at least 1 mark. A very common incorrect answer was 3 buses. Some candidates showed $121 \div 37 = 3.27$ but then gave the answer as 3. Some candidates only showed multiples of 37 up to 111 and then stated 3 buses. They did not consider that the extra people needed a bus too. Those who stated 4 buses often showed multiples of 37 as 37, 74, 111 and 148, thus showing that 4 buses were needed.

In part (c)(i), many candidates were able to complete the first 3 entries in the table but did not know how to find the number who took part in sailing. They did not refer back to the stem of the question to find out that the total number of pupils was 24. Some candidates wrote the number of pupils who took part in sailing as zero, others left the box blank.

Question 3
Many candidates gained at least 1 mark, although some candidates just put programmes in incorrectly and wrote the times every half hour. For candidates who did not work out which 2 programmes could fit into the time gaps, 1 mark was often awarded for a start and end time for the programme. Time is still an area that needs improving.

Question 4
Although many candidates gained at least 1 mark in part (a), errors were made with not adding on the initial payments for each deal. Another common error was that candidates stated what the cheapest deal was but did not state how much cheaper it was. A few candidates decided to round the £28.99 to £29 and work with that amount. Some also used £20 for £19.99. As this was the OCW question, many candidates used labels and units in their answers. There was more evidence of '=' being misused when working out the total cost for each deal.

In part (b), those candidates who gained marks for drawing the height correctly sometimes gave the perimeter or area as the screen size. Some candidates measured the screen size but rounded their answer to 14 cm or 14.5 cm, which sometimes meant that they were outside the tolerance allowed.

Question 5
Most candidates gained 2 marks in this question. This was for the correct length of the posts needed. Many candidates did not draw a diagram to help decide the number panels and so thought that 4 panels were needed for 6 posts, with 762 cm being a common incorrect answer. A few candidates worked incorrectly with 1 post and 1 panel being 187 cm and then multiplied by 6. There was some evidence of candidates working with 6 panels and 7 posts.

Question 6
Many candidates did subtract both £95 and £70 from £510 but did not always then share by the number of weeks. Some candidates engaged with the idea of subtracting either £95 or £70 from £510. Some candidates avoided division and used trials to find an amount. This method did not lead to the exact amount needed per week. Some candidates incorrectly divided by 11 weeks or 13 weeks rather than the 12 remaining weeks. At foundation tier, some candidates misinterpreted the question and thought that they needed to save £70 per week once the £95 had been subtracted, and then worked out the number of weeks that this would take.

Question 7
In part (a)(i), some candidates divided 133 by 8 and in part (a)(ii) some did not know what method to use, although it was pleasing to see some candidates at foundation tier gaining all marks in part (a).

Part (b) was not well answered. Most candidates added the measurements to find the volume. This is an area that needs improving. Those candidates that did multiply the dimensions correctly did not always give a reason for their decision as they could not work with the change of units.

For part (c), angles is a topic that is not answered well at foundation tier. Some candidates gained the first mark for angle a. The remaining angles proved difficult for most candidates.

Question 8
Many candidates were able to gain the mark for finding the cost for Camera Fox. Very few candidates decided to compare the costs in dollars rather than pounds. A common error in calculating the cost of the camera from US Camera Geek was to multiply by 1.25 rather than divide. Many candidates did not know how to use their calculator appropriately to work out 14% of £75 and then subtract this discount. Many attempted to use a non-calculator method to find 14% of £75 but errors were often made and many who did find the discount correctly did not always subtract it from £75.

Question 9
There were many errors made in answering this question, with many foundation tier candidates not going any further than substituting into the given formula, although some did attempt to calculate the standing charge. Many candidates substituted 138^3 not 138 into the formula. Those candidates who attempted further working sometimes divided by 12p or had place value errors when working with pounds or pence. Some left out the standing charge and did not find the VAT.

Question 10
Question 10 was not well answered.

Candidates did not always give a fraction answer in part (a). Those who did, did not always simplify their answer, and a common incorrect answer was the fraction inverted.

Most candidates in part (b) did not know how many kilometres there are in a mile.

In part (c), most candidates did not consider that the cost was based on the volume of tarmac. A few candidates worked with area and multiplied by £250, others worked with a linear strip with depth and multiplied by £250. Most candidates just multiplied 1600 and 250.

MATHEMATICS – NUMERACY

GCSE

Summer 2024

UNIT 2 INTERMEDIATE TIER

Overview of the unit

Most candidates attempted all questions. In many aspects, performance was slightly better than expected. Candidates were more successful with the earlier questions than with the later questions in the paper, as is expected.

Key areas for improvement include the following:
- expressing a quantity as a fraction or percentage of another quantity in a context
- using calculator methods to calculate a percentage
- calculating volumes of cuboids, triangular prisms or of 3D shapes with a trapezium as the uniform cross-section
- calculating the circumference of a circle in a given context.

The following topic areas were generally well-understood or well-answered:
- interpreting 'best buy' comparison questions, including the need to convert currency
- solving problems involving money.

Some questions were very well answered, for example questions 1, 2(a)(i) and 3.

Other question elicited general weaknesses in performance, such as in questions 5(d) and 9(b)(i).

Comments on individual questions

When a question or part-question is not listed, there are no areas to highlight.

Question 1
Generally, many candidates engaged with the idea of subtracting at least one of £95 and £70 from £510 and then considered the need for sharing. Some candidates avoided division and used trials to find an amount. This method often did not lead to the exact amount needed per week. Some candidates incorrectly divided by 11 weeks or 13 weeks rather than the 12 remaining weeks.

Question 2
In part (a)(ii), many candidates correctly decided to multiply 8 miles per minute by 60, leading to 480 miles per hour. Other candidates used their answer from part (a)(i), usually 1064 miles, to work with distance divided by time. Candidates using this less efficient method often made errors, including using 133 minutes or 2.13 hours (as 2 hours 13 minutes).

In part (b), many candidates added the measurements given instead of finding the product to find the volume. A number of candidates did not show all working to give a reason for their decision, whilst other candidates did write 50 600 cm^3 as 50.6 litres.

In part (c), candidates found finding the size of angle c more demanding than angle a or angle d.

Question 3
This question was generally well answered. More candidates decided to compare the costs in pounds, than in dollars. Common errors in calculating the cost of the camera from US Camera Geek included sometimes multiplying by 1.25 instead of dividing and writing the answer down incorrectly from division as £64.95 instead of £65.96. Candidates using non-calculator methods to find £75 less 14% of £75 often made errors, but did not show working, so a method mark for the calculation of the Sure Camera discounted cost could not be awarded.
Generally, for the award of marks from organisation, communication and writing, candidates showed and labelled their working, and gave units. However, a number of candidates misused equal signs and did not use appropriate notation for money. £64.50 was often written as '64.5'.

Question 4
There were many errors in answering this question. These included substituting 138^3 not 138 into the formula, place value errors in working with pounds or pence, omitting the standing charge, and subtracting the VAT.

Question 5
In part (c), many candidates did not consider the cost was based on the volume of tarmac. Some candidates worked with area and multiplied by £250, others worked with a linear strip with depth and multiplied by £250.

Part (d) was not well answered. An area for improvement is to express one quantity as a fraction or percentage of another quantity. Many candidates only worked out the price increases. Other candidates did not use the original cost as their denominator.

Question 6
In part (a), candidates found part (a)(i) the least demanding. 34 was a common incorrect response in part (a)(ii), and 24 a common incorrect response in part (a)(iii). Candidates had little understanding of groups to answer part (a)(iv).

In part (b), many candidates did not consider greatest possible measurements, and of those candidates who did, the increased measure was not +0.5. Candidates used +0.4 or 0.49.

Question 7
Many candidates engaged with part (a), showing embedded partial calculations. Very few candidates worked with the saving as 2 hours less. Some candidates miscounted the number of hours the street lights were originally on for; 13 hours rather than 12 hours, and the reduced hours as 11 rather than 10. Errors were made when working with pence or converting to pounds. Quite often, some part of the required full calculation was omitted. The majority of candidates worked in stages.

Question 8
Part (c) was not well answered, as many candidates did not have a strategy to find the height of the cross-section. Instead, candidates often used 7.6 m or 12.6 m, which could not be correct as the hypotenuse was 7.6 m.

Question 9

In part (b)(i), which was not well answered, most candidates divided 1.08×10^8 (the radius) by 224.7 days, ignoring the need to calculate the circumference. Generally, there was no sight of the use of pi.

MATHEMATICS – NUMERACY

GCSE

Summer 2024

UNIT 2 HIGHER TIER

Overview of the unit

Candidates appeared to have sufficient time to complete the paper. Candidates, in general, picked up marks throughout the paper, although some topics did prove challenging for some.

Key areas for improvement include the following:
- understanding of the data being shown in a frequency polygon
- fuel consumption calculations
- converting pints to litres
- stratified sampling method
- estimating speed from a distance-time graph
- working back from an AER to find the nominal annual rate.

The following topic areas were generally well-understood or well-answered.
- using bounds in calculations
- trigonometry
- estimating the mean
- writing a number in standard form
- sharing in a ratio
- using the sine rule to find the length of a side.

Comments on individual questions

When a question or part-question is not listed, there are no areas to highlight.

Question 1
Part (a)(i) was quite well answered, but some candidates chose the middle group of 12 to 18 and others chose an answer of 21, the midpoint of the group.

Part (a)(iii) was not that well answered. The most common incorrect answer was 24, taking a reading from the graph at 24 hours.

Part (a)(iv) was also not well answered. Some candidates said, ‘yes’, thinking the line between the points meant something, whilst others said, ‘can’t tell’, usually giving the reason ‘because it is grouped data’.

Question 2
In part (a), many candidates did not work with all the information given. Some only gave the saving per day, and some used incorrect operations. The accuracy mark was lost by some candidates also, as they did not keep accuracy throughout their calculations. This was the OCW question in this paper which meant that many candidates structured their work, and gave units to the answers they were calculating as they worked in stages.

Part (b) was well answered on the whole. Most candidates used the tangent ratio, but some used the sine rule.

Question 3
Part (b) was well answered, although some gave an answer of 6:53 which is not correct in either time format, but this was allowed. Some candidates added on 1 hr 10 min instead of subtracting.

Part (c) was answered quite well. The majority of candidates who successfully used Pythagoras's theorem to find the height of the prism went on to gain full marks. Some attempted to use Pythagoras's theorem, but did so incorrectly, resulting in a height greater than 7.6, meaning they could not access the marks for the volume of the prism. When calculating the volume of the prism, some candidates did not use the correct formula for the area of a triangle to find the area of the cross-section. Others used 7.6 cm, the hypotenuse of the triangle, instead of the base of 6.2 in their area calculation.

Question 4
Part (a)(ii) was quite well answered. Most candidates did the calculation in stages. However, those who started with a division sometimes lost accuracy by the end. Errors were also seen multiplying 140 by 10^9. Candidates were asked to round their answer to 3 significant figures, and this was done quite well on the whole, although some did not round their answer at all. It should be stressed to candidates they need to read the question again once they've answered it to ensure they've done what is required.

Part (b)(i) was not answered well. Common errors were that some used the formula for the area of a circle in their calculation, whilst some just divided the radius by 224.7. Also, some candidates did not convert their answer to standard form at the end.

Part (b)(ii) was answered well. Some candidates only gave 7 parts as their answer, and others weren't sure what the question was asking for so gave all 3 parts individually.

Question 5
Part (a) was not answered that well, with many candidates not knowing what method was needed. Quite a few incorrectly thought that the speed used in the 1st part of the journey was needed in their calculation . The number of gallons used in the 1st part of the journey was correctly calculated by many, but for the 2nd part of the journey, a number of candidates incorrectly converted 1 hour 24 minutes into 1.24 hours.

In part (b), many candidates did not know the correct conversion from pints to litres, but most gained a mark for their number of gallons × 8 × 1.49.

Question 6
In part (a), few fully correct answers were seen. Some candidates only calculated the area of one of the sectors involved. Many candidates incorrectly used the formula for arc lengths in their calculations. There is a way of arriving at the correct volume using the arc lengths, but very few fully correct responses were seen using this method.

In part (b), most candidates used a correct method to find the numbers in the sample, but accuracy was lost by some when they did their calculations in stages starting with a division. Many candidates who kept accuracy lost the final mark as they believed the number of Screws needed to be reduced by one (this was the clip with the largest number in the sample) rather than the C-clips.

Question 7
Part (a) was answered quite well. However, some candidates did not show a correct rearrangement of the sine rule to give the calculation that gave the distance to be 7.7km correct to 1 decimal place.

In part (b), far less success was seen. Some candidates correctly used the cosine rule to find the angle at A or the angle at the Last marker which was given credit. Of those who found the correct angle inside the triangle at A, only some were able to use the properties of angles with parallel lines to find the bearing needed. It was disappointing to note that a number of candidates did not give a 3-figure bearing as their answer.

Part (c) was not answered well. Many candidates thought 0.81 was the scale factor rather than the area factor. Those who did realise this usually went on to gain full marks.

Part (d) was also not answered well. Very few appropriate tangents were seen. Many candidates thought that they needed to use the coordinate of the point of 20 mins and 1.5km as a speed i.e.1.5 km per 20 mins. Also, a number of candidates estimated the area under the curve rather than the gradient of the curve.

Question 8
Part (a) was not well answered, with errors generally coming from the use of an incorrect multiplier e.g. 1.06 and 1.024. Also, some candidates used an incorrect power with their multiplier, with 4.5 and 54 used often.

Very few correct responses were seen in part (b). Many candidates incorrectly used 0.04 as the nominal annual rate in the AER formula rather than realising that this was the unknown in the question. For those who started with a correct equation, a number did not rearrange it correctly, and for those who did successfully rearrange, many gave the nominal annual rate as their answer rather than half of it.

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