EXAMINATIONS COUNCIL OF ESWATINI

JC

EXAMINATION REPORT

FOR

MATHEMATICS

YEAR

2021

Table of Contents

Subject Code:	Name of Subject:	Page No:
309	Mathematics P1	3-19
309	Mathematics P2	20-25

JC Mathematics

Paper 309/01

General comments

The overall performance of the 2021 candidature was generally not good as most of the candidates were failing to obtain the anticipated answers to the majority of the questions. Having said that, the paper proved partially accessible to the candidates because the candidates were responding to the questions even when their responses were incorrect. However, the number of candidates who were leaving questions unanswered increased when compared to previous years.

Candidates appeared to have enough time to finish the paper and any omissions and incorrect responses were due to lack of technical know how in the subject matter rather than shortage of time. Most candidates proved weak in basic arithmetic, which is, performing the four basic mathematical operations with rational numbers. This was apparent in a number of questions where candidates had correct numbers correctly placed for operations but obtained incorrect answers. Some examples of such incidences are shown in the table below.

Question number	Correct formulation	Status of answer
3(c)	$3(-2)^2 + 4(-2) - 1$	Incorrect
4(b)	$\frac{3}{5} \times 60$	Incorrect
6(c)(ii)	$\frac{80}{3}$	Incorrect
14(b)	$\frac{13950}{15.50}$	Incorrect
17(d)	$\frac{5}{30} \times 360$	Incorrect

Some candidates do not read questions carefully before attempting to answer them and hence fail to respond appropriately and accurately. For example, in **Question 11**, candidates were required to complete a figure such that a given line was a line of symmetry. A relatively large proportion of the candidates were drawing a line of symmetry to the figure which was a clear indication that the question was not carefully read.

The most challenging questions in this paper were **Question 15 (c)** (simplifying algebraic fractions) and **Question 21 (b)** (graphing inequalities).

Comments on specific questions

1. (a) The place value of 6 in the number 647.4 is hundreds.

Write the place value of 6 in the following numbers.

(i) 0.0567 [1]

(ii) 0.612 [1]

(b) Arrange the following numbers in order of size, starting with the smallest.

0.33 40% 0.44 $\frac{1}{3}$ [2]

Correct answers

(a) (i) thousandths

(ii) tenths

(b) 0.33, $\frac{1}{3}$, 40%, 0.44

Comments

(a) (i) Performance in this sub-question was below average. Most candidates seemed to be having challenges with place values and thus were failing to obtain the correct answer. Common errors included: thousands, hundredths, ten thousandths.

(ii) This sub-question was fairly done. A moderately large number of candidates were able to get the correct answer. However, there were still those candidates who proved not to have the correct conception of place values. Common errors included: oneth, tens.

(b) Performance in this question was bad. Most of the candidates were failing to arrange the numbers in correct order of size. Seemingly, the candidates considered $\frac{1}{3}$ a number less than 0.33 and as a result they would write $\frac{1}{3}$ before 0.33. Perhaps, their conversion of $\frac{1}{3}$ to decimal form was done to one decimal place. On another note, the 40% was taken as 40 by most of the candidates and so it was put last in their ordered list.

2. Fill in the missing values in the table.

Fraction	Decimal	Percentages
$\frac{2}{5}$	a	b
c	0.09	9%
d		12.5%

[5]

Correct answers

a = 0.4 ***b*** = 40% ***c*** = $\frac{9}{100}$ ***d*** = $\frac{1}{8}$

Comments

Candidates found this question accessible. Most candidates were getting the values of a, b and c correct and missed the value of d. Common errors for the value of c included: 9, $\frac{9}{10}$. For the value of d, candidates were obtaining incorrect answers like, 0.125, $\frac{12.5}{100}$, $\frac{0.125}{1000}$.

3. Given the expression $3x^2 + 4x - 1$,

(a) State the number of terms in the expression, [1]

(b) State the constant term in the expression, [1]

(c) Calculate the value of the expression if $x = -2$. [2]

Correct answers

(a) 3

(b) −1

(c) 3

Comments

(a) Most candidates were getting this one correct. There were few candidates who apparently, did not consider −1 as a term in the expression and hence responded there were two terms in the expression.

(b) Most candidates failed to accurately write the constant term even though they had the correct conception of what a constant is. Those candidates were omitting the negative and had positive 1 as the constant term. Some candidates proved not to have an idea of what a constant term is and had such responses as $3x^2 + 4x - 1$, $4x$.

(c) Performance in this sub-question was not good. Candidates were failing to substitute properly in the expression. Examples of the improper substitution included $3(2)^2 + 4(2) - 1$ (omitting the negative sign), $3 - 2^2 + 4 - 2 - 1$ (with no brackets). Some candidates did the substitution properly but failed to perform the arithmetic correctly. Common wrong answers included: −19, −21.

4. The probability that a school team wins a match is $\frac{3}{5}$.

(a) Find the probability that the team loses a match. [1]

(b) The school term plays 60 matches.

Find the number of times the school team is expected to win a match. [2]

Correct answers

(a) $\frac{2}{5}$

(b) 36

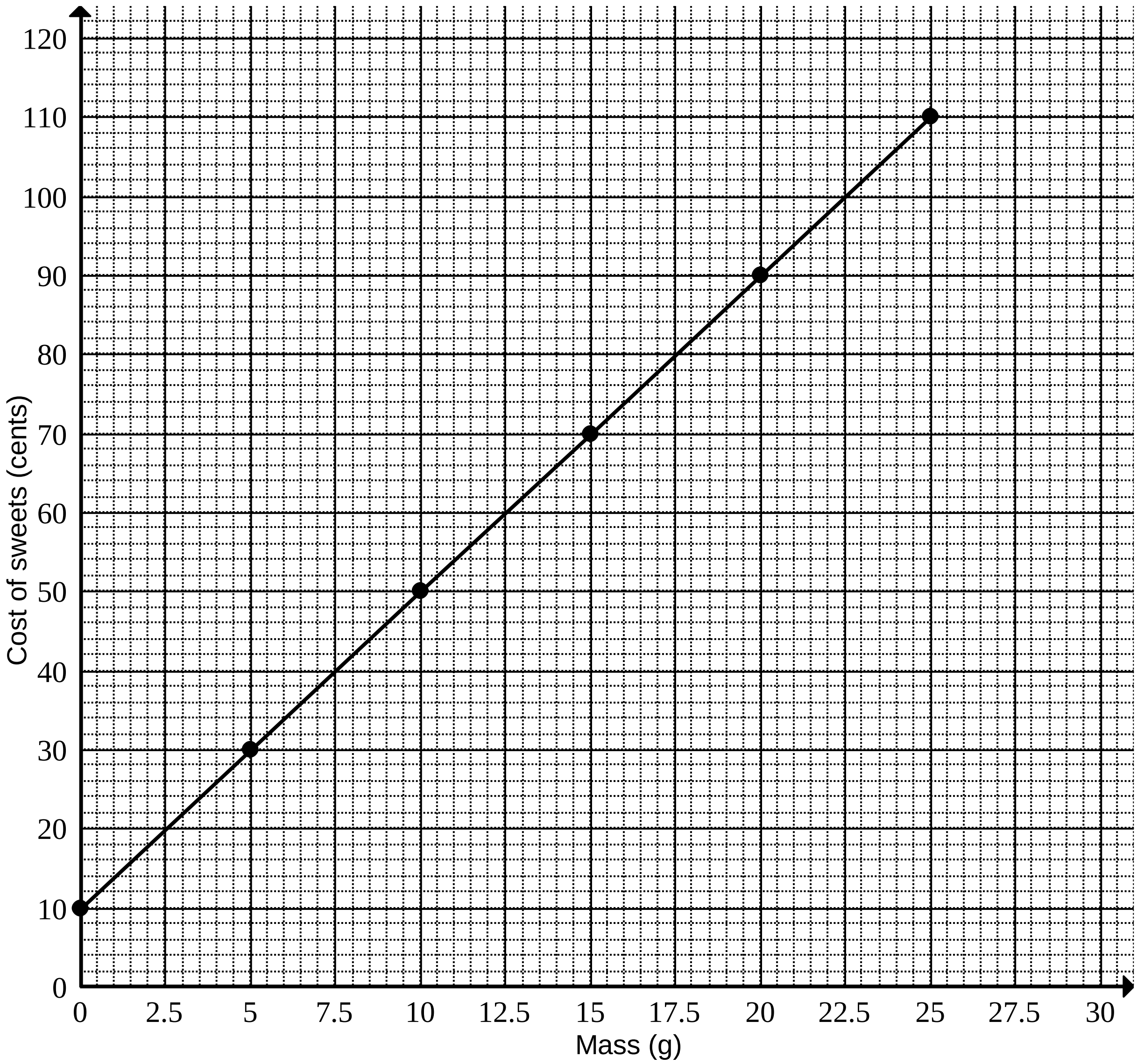
Comments

(a) Candidates fairly responded well to this sub-question. A sizeable number of candidates were getting the correct answer. Common errors included: $\frac{3}{5}$, 36.

(b) Some candidates realized that they were supposed to multiply $\frac{3}{5}$ by 60 but were failing to get the correct answer. There were some candidates who had completely incorrect formulations of the working.

Examples of the incorrect formulations include: $\frac{2}{5} \times 60$, $\frac{3}{5} \times 100$.

5. The graph shows the cost of sweets against their mass in grams.



(a) Use the graph to find the cost of sweets weighing 20 g. [1]

(b) Use the graph to find the mass of sweets costing 56 cents. [1]

Correct answers

(a) 90

(b) 11.5

Comments

(a) Most candidates were able to obtain the correct answer. Few had a challenge with the units and wrote Emalangeni instead of cents.

(b) This sub-question was poorly done. Most candidates had a challenge reading the horizontal scale and hence were getting incorrect responses such as 10.5, 11, 11.3, 12.

6. **(a)** Find the lowest common multiple of 6 and 8. [1]

(b) Express 54 as a product of its prime factors. [1]

(c) Work out

(i) $3 \times 4 - 5 + 8 \div 4$ [2]

(ii) $\frac{43+37}{-4+7}$. Give your answer to 2 decimal places. [2]

Correct answers

(a) 24

(b) 2×3^3

(c) **(i)** 9

(ii) 26.67

Comments

(a) Performance on this sub-question was fair. Candidates seemed to be confusing multiples with factors. The most common incorrect answer on this one was 2.

(b) Most candidates did not realise that their answer was to be given as a product. The responses here were haphazard and there was no apparent evidence of a product of prime factors. There were few candidates who realized that the answer was to be a product of factors of 54 but forgot that the factors must be prime. Examples of the incorrect answers included: $1 \times 2 \times 27$, $2 \times 3 \times 9$. Some candidates simply listed the factors of 54.

(c) (i) Most candidates failed to obtain the correct answer. Some of the candidates performed the operations in the correct order, but incorrectly computed $12 - 5 + 2$ to get 5. There were those candidates who did not realise the correct order of operations but performed them as they came from the left to the right (i.e. $12 - 5 + 8 \div 4 = 7 + 8 \div 4 = 15 \div 4 = 3.75$).

(ii) An alarming number of candidates could not get full credit on this sub-question. There were those who had the correct formulation (i.e $\frac{80}{3}$) but failed to get the accurate answer due to arithmetic challenges or failure to round off to the given level of accuracy. On another note, candidates were incorrectly obtaining -11 or -3 from the denominator $(-4 + 7)$. Common errors included: $\frac{80}{-11}$, $\frac{80}{-3}$, 26.6, 26.66, 27.

7. A mapping multiplies the input by 3 and then subtract 6.

When the input is x, the output is y.

$$\text{Input } (x) \longrightarrow \boxed{\times\ 3} \longrightarrow \boxed{-\ 6} \longrightarrow \text{Output } (y)$$

(a) Write an equation for the mapping. [1]

(b) Work out the value of x when y = 9. [3]

Correct answers

(a) y = 3x – 6

(b) x = 5

Comments

(a) This sub-question was fairly done. Most candidates realized that two expressions had to be equated to form an equation, but not all of them were equating the correct expressions. For example, x = x × 3 – 6 , f(x) = 3x – 6. Fewer candidates were giving expressions or mappings instead of equations. Examples of such are 3x – 6, x × 3 – 6y $x \rightarrow 3x - 6$

(b) Most candidates were failing to get the correct answer either because they had a wrong equation in **(a)** or they failed to solve the equation. Common wrong answers included: 3, 1, 21.

8. Consider the number sequence

–18,   –13,   –8,   –3, …

(a) State the rule for this sequence. [1]

(b) Find the next two terms of the sequence. [2]

Correct answers

(a) Add 5

(b) 2, 7

Comments

(a) Most candidates realized that the common difference in the sequence involved either +5 or −5. So some of the candidates had incorrect answers for the rule of the sequence, like minus 5 (or −5), x + 5.

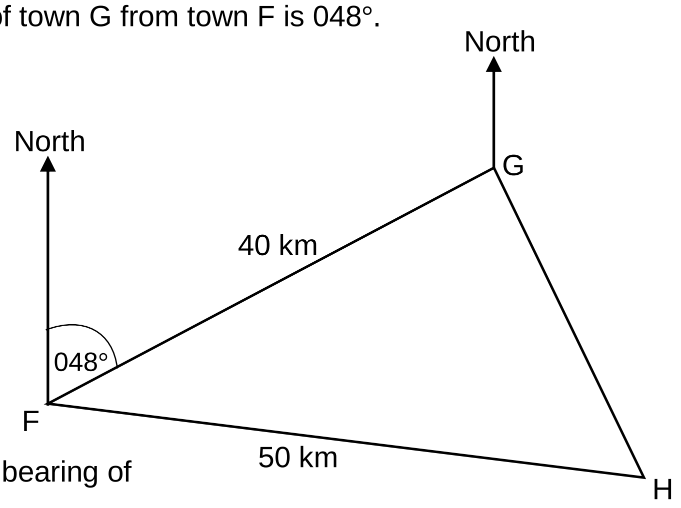
(b) The main challenge for most candidates was adding 5 to the negative numbers. That was a clear indication that adding and subtracting directed numbers was a challenge to the candidates. Common errors included: −2, −7.

9. The diagram below shows a position of three towns, F, G and H.

Town G is 40 km away from town F.

Town H is 50 km from town F.

The bearing of town G from town F is 048°.



NOT TO SCALE

Calculate the bearing of

(a) town F from town G, [2]

(b) town H from town G. [2]

Correct answers

(a) 228°

(b) 138°

Comments

(a) Most candidates proved to have limited or no understanding of bearings. A larger proportion of the candidates were obtaining wrong answers. Some candidates were writing the wrong answers in the answer spaces with no working in the working space. Common errors included: 180° – 048° = 132°, 90°, πr^2.

(b) This sub-question was also not well done by the candidates. Common incorrect answers included: 228°, 132°, 222°.

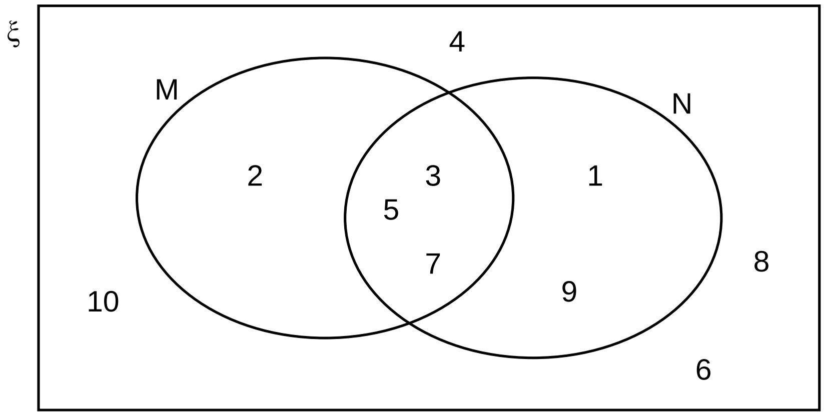
10. Given

ξ = {1, 2, 3, 4, …, 10}

M = {Prime numbers}

N = {Odd numbers}

(a) Complete the Venn diagram to fill the given information.



[4]

(b) Find

(i) M ∩ N, [1]

(ii) n(M ∪N´). [1]

Correct answers

(a) Inscribed in Venn diagram

(b) (i) {3, 5, 7}

(ii) 8

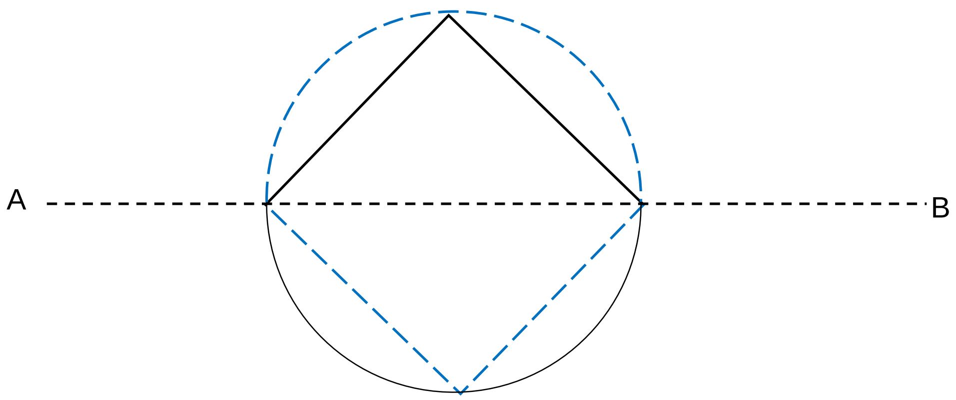
Comments

(a) This question was difficult to the candidates. There was no clear order in the manner at which the candidates put the elements in the Venn diagram. It can be deduced that most candidates had challenges with properties of whole numbers (i.e. odd numbers, prime numbers, even numbers, etc)

(b) (i) Since most of the answers to **(a)** were incorrect, it followed that even this sub-question had inaccurate responses. However, it transpired that most of the candidates had a proper understanding of the intersection of sets. This was apparent in that most candidates listed in the answer space the elements in the intersection of M and N as per their Venn diagram.

(ii) This sub-question was very difficult to the candidates. Candidates proved to be unfamiliar with the notation of the number of elements in a set. The candidates were listing elements haphazardly. It could be ascertained therefore that the idea of set notation involving the complement of a set was strange to the candidates.

11. Complete the figure such that the line AB is a line of symmetry.



[2]

Correct answers

As shown on diagram

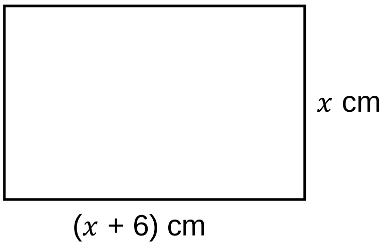
Comments

It was apparent from the candidates' responses that the candidates had not read the question with understanding. Most of them were drawing a line of symmetry to the figure, something which was not required of them. Some of those who attempted reflecting the figure either reflected one part of the figure or they never used any instrument to draw the images.

12. The figure below shows a rectangle.

The length of the rectangle is (x + 6) cm.

The width is x cm.



Given that the perimeter of the rectangle is 32 cm,

Calculate the value of x. [3]

Correct answers

x = 5

Comments

This question was difficult to the candidates. Most candidates failed to formulate the correct expression for the perimeter of the rectangle and hence obtained incorrect answers. Common errors included: $x + 6 = 32$, $x + x + 6 = 32$, $x^2 + (x + 6)^2 = 32$

13. Sihle and Lihle are sisters.

Sihle obtained 60 % and Lihle obtained 80 % in a mathematics test.

(a) Write down the marks obtained by the sisters as a ratio in its simplest form. [2]

(b) Their mother decided to award them E210 according to the ratio of their marks.
Calculate Lihle's share. [2]

Correct answers

(a) 3 : 4

(b) E120

Comments

(a) Most candidates were able to write the ratio but they were not completely simplifying it. Common unsimplified answers included: 60 : 80, 0.6 : 0.8, 6 : 8, $\frac{3}{5} : \frac{4}{5}$.

(b) Most candidates were having the correct method (i.e. $\frac{4}{7} \times 210$ or equivalent) but were obtaining incorrect answers. Then the problem the candidates had was arithmetic. Some candidates mistook Lihle's share for Sihle's share and hence they ended up having $\frac{3}{7} \times 210$ = E90. There were some candidates who worked out the answer as if they were calculating percentage and others were calculating 80% of 210. (i.e. $\frac{4}{5} \times 100$, $\frac{4}{5} \times 210$).

14. (a) Simplify the following, leaving your answer in its simplest form.

(i) $a^7 \div a^9$ [1]

(ii) $m^7n^5 \times \frac{1}{m^3n^7}$ [2]

(b) Simba changes E13 950 to dollars, when the exchange rate is, \$1 = E15.50.

Calculate how much Simba received in dollars. [2]

Correct answers

(a) (i) a^{-2}

(ii) m^4n^{-2}

(b) \$900

Comments

(a) (i) Candidates proved not to have a command of the laws of indices and hence performance in this sub-question was poor. Some candidates seemed to be having a challenge with subtracting 9 from 7, obtaining 2 instead of negative 2. Common errors included: a^2, $-2a$, $\frac{1}{a^{-2}}$.

(ii) This sub-question was poorly done. Very few candidates managed to get it right. Common errors included: m^4n^2, $m^{10}n^{12}$, $\frac{1}{m^4n^2}$, $\frac{m^4}{n^{-2}}$.

(b) Most candidates were failing to get the correct answer. Some candidates were multiplying instead of dividing and thus obtaining an incorrect answer. There were those candidates who attempted to divide as expected but could not get the correct answer. Common errors included: 13950 × 15.50, $\frac{13950}{1550}$, 9, 90.

15. (a) Express as a single fraction.

$\frac{2y}{5} - \frac{y}{10}$ [2]

(b) Solve the inequality.

$2 \ - 3a \leq 8$ [2]

(c) Simplify

$\frac{2x+4}{x+2}$ [2]

Correct answers

(a) $\frac{3y}{10}$

(b) $a \geq -2$

(c) 2

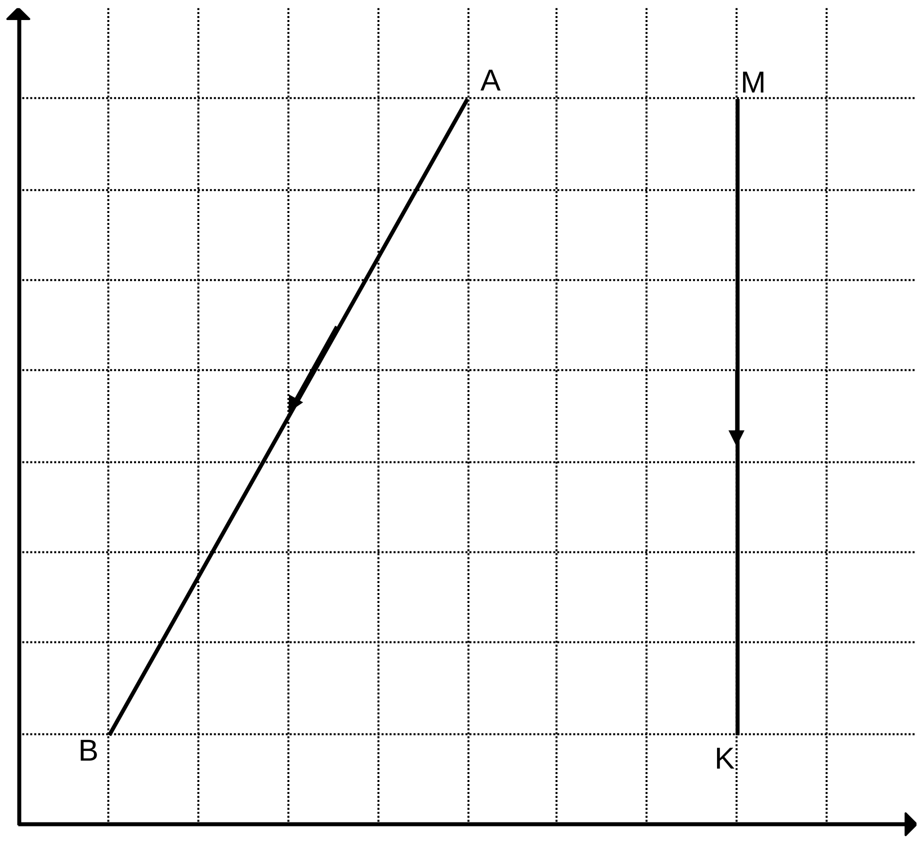
Comments

(a) Performance in this sub-question was fair. A sizeable number of candidates used the correct method but their common denominator was not the LCM of the denominators and therefore their answers were left unsimplified. Some candidates would just subtract numerators and denominators, which was a clear indication that the candidates they did not have the proper understanding of simplifying algebraic fractions. Common errors included: $\frac{3}{10}$, $\frac{15y}{50}$, $\frac{y}{-5}$.

(b) A relatively large proportion of the candidature was failing to get the correct answer. A number of reasons were apparent from the way candidates responded to this sub-question. Firstly, there were candidates who knew how inequalities are solved but had a challenge with dividing directed numbers (i.e. dividing a positive by a negative). Secondly, there were candidates who did not remember to invert the inequality sign after having divided by a negative thus obtaining an incorrect answer. Some candidates replaced the inequality sign by an equality sign resulting to a wrong answer. Common errors included: $a \geq 2$, $a \leq -2$, $a = -2$, $-3a \leq 10$, $3a \leq 6$.

(c) This sub-question was very difficult to the candidates. The candidates did not realise that they were supposed to factorise the numerator before cancelling. Answers to this question were haphazard and wrong with no clear working.

16. The grid shows $\overrightarrow{\mathrm{AB}}$ and $\overrightarrow{\mathrm{KM}}$.



Write down the column vector for,

(a) $\overrightarrow{\mathrm{AB}}$ [1]

(b) $\overrightarrow{\mathrm{KM}}$ [1]

Correct answers

(a) $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$

(b) $\begin{pmatrix} 0 \\ 6 \end{pmatrix}$

Comments

(a) Most candidates were failing to properly write the column vectors. There were candidates who seemed not to have an idea of column vectors which was evidenced by not attempting the question or writing anything that is not a column vector. Some candidates were reversing the directions for the vectors while others were writing the vectors as ordered pairs. Examples of common erros are $\begin{pmatrix} -6 \\ -4 \end{pmatrix}$, $\begin{pmatrix} 4 \\ 6 \end{pmatrix}$, (−4, −6).

(b) The same problems as in (a) were witnessed. Common errors included: $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$, $\begin{pmatrix} 0 \\ -6 \end{pmatrix}$, (0, 6).

17. The data show students' favourite topic in a mathematics class.

Favourite topic	Number of students
Circle Geometry	5
Algebra	3
Trigonometry	8
Probability	4
Percentages	10

(a) State the variable. [1]

(b) Write down the students' most favourite topic. [1]

(c) Find the total number of students in the class. [2]

(d) Calculate the sector angle for the students whose favourite topic is circle geometry. [2]

Correct answers

(a) Favourite topic

(b) Percentages

(c) 30

(d) 60°

Comments

(a) A larger proportion of the candidature proved not to have an idea of what a variable is. A wide variety of incorrect responses were witnessed some of which included: 10, 5, 8, 30, students, percentages and many others.

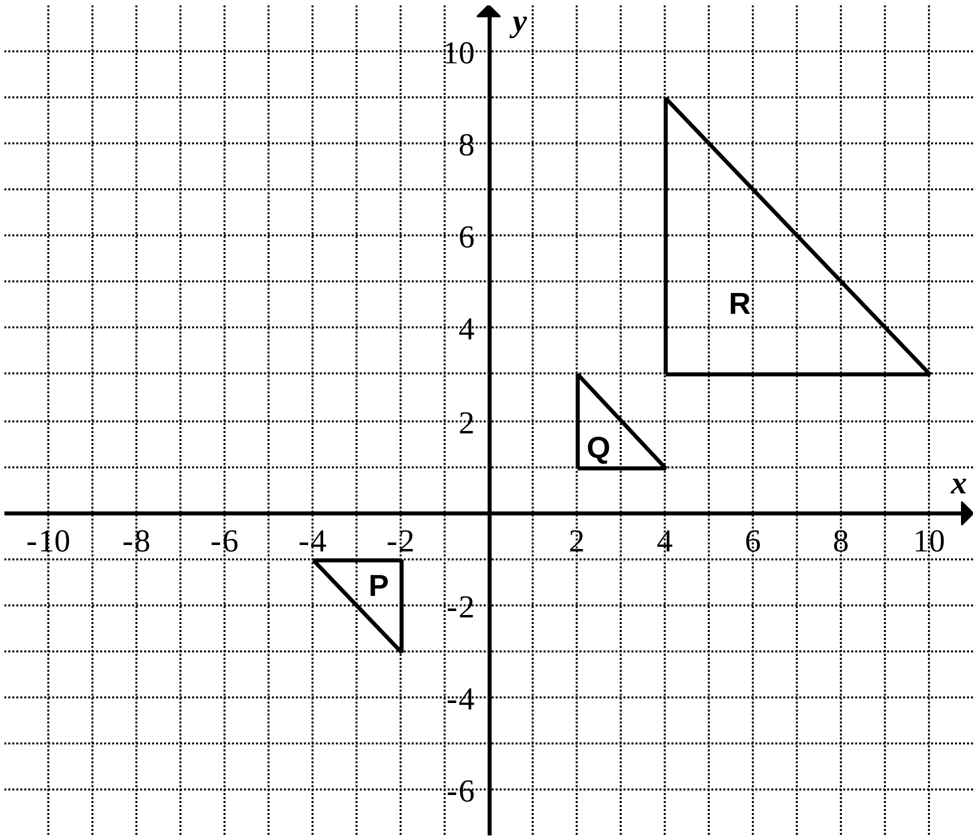
(b) This sub-question proved very easy to the candidates. A large cohort of the candidates were getting full credit.

(c) Candidates were, again, obtaining full marks in this sub-question except for very few who attempted finding the sum of the frequency but got an inaccurate answer.

(d) Most candidates had the correct formulation of the method ($\frac{5}{30}$ × 360) but were failing to come up with the correct answer. Some candidates were using 180 or 100 instead of the 360 to

(e) multiply the fraction of students whose favourite topic was circle geometry. Common errors included: $\frac{5}{30} \times 360$ = incorrect answer, $\frac{5}{30} \times 180$, $\frac{5}{30} \times 100$.

18. The triangle P, Q and R are shown on the grid.



(a) Describe fully the **single** transformation which maps Q onto R. [3]

(b) On the grid, draw the image of Q under a reflection in the line $x = 0$. [2]

(c) Describe fully the **single** transformation which maps Q onto P. [3]

Correct answers

(a) Enlargement, centre (1, 0), scale factor 3

(b) Triangle with vertices (–2, 1), (–4, 1), (–2, 3)

(c) Rotation, centre (0, 0), angle 180°

Comments

(a) This sub-question was poorly done. The majority of the candidates were failing to describe the transformation. Some candidates could identify the kind of transformation and never attempted to mention the centre and scale factor.

(b) Most candidates failed to realise that the line $x = 0$ is the y-axis. So most of them were reflecting on the x-axis.

(c) A relatively large proportion of the candidates were not able to describe the transformation. However, some of them could identify the kind of transformation as a rotation.

19. A school Principal buys 50 bags of rice for her learners' feeding scheme.
In 2019 the school had 100 learners and the rice lasted them 25 weeks.
In 2020 the school had 200 learners.
Calculate the number of weeks the 50 bags of rice lasted in 2020, assuming the learners eat at the same rate. [2]

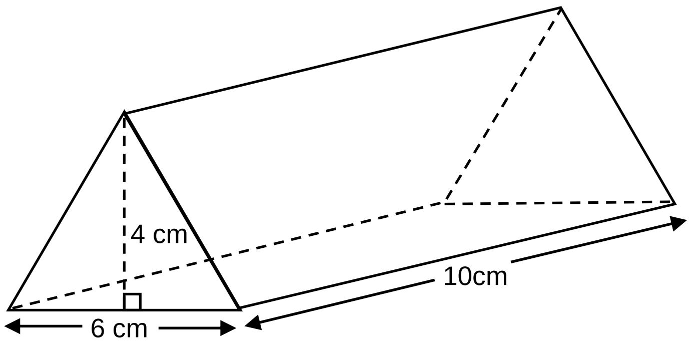
Correct answers

12.5 weeks

Comments

Most candidates did not realise that this was an indirect proportion problem and so they worked as if it was direct proportion. Some of those candidates who could see that the quantities being compared were inversely proportional, did obtain the 12.5 weeks but then subsequently rounded off to 13 weeks resulting to the loss of the accuracy mark. Common wrong answers included: 50 weeks, 12 weeks, 13 weeks, 12 weeks 5 days.

20. The diagram below shows a prism.



NOT TO SCALE

(a) Write down the name of the prism. [1]

(b) Calculate the area of the triangular end. [2]

(c) Calculate the volume of the prism. [2]

Correct answers

(a) Triangular prism

(b) 12 cm^2

(c) 120 cm^3

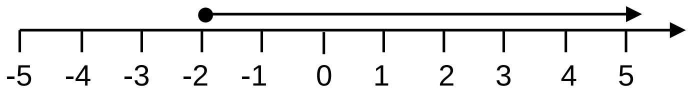
Comments

(a) Most candidates were failing to identify the prism with its correct name. A number of incorrect answers were witnessed in this question, some of which included: triangle, rectangular prism, trapezium, cube, pentagon.

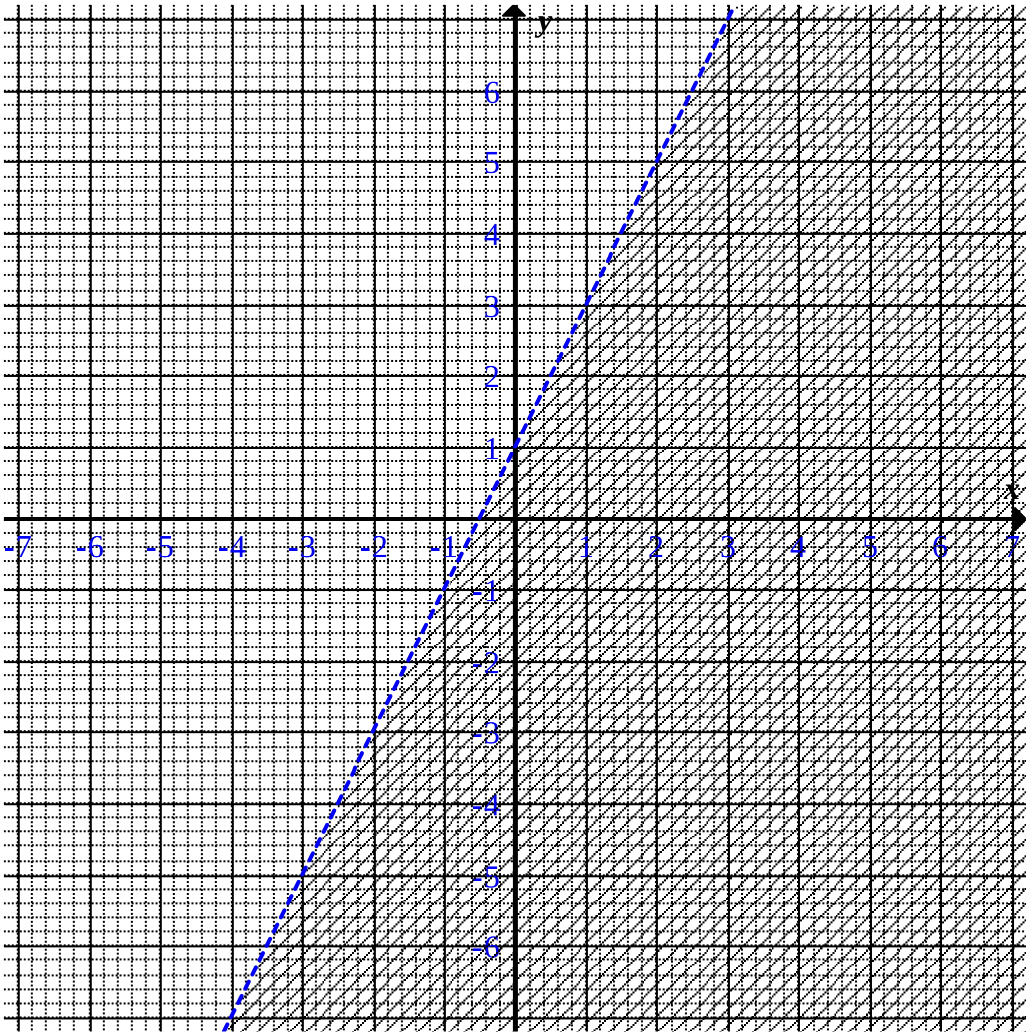
(b) Performance in this sub-question was not good. Most candidates were failing to employ the correct formula for the area of a triangle. Common erros included: $6 \times 4 = 24$, $6 \times 4 \times 10 = 240$.

(c) This sub-question was also not well performed probably because it was dependent on the answer to (b). Those who realized that the volume of the prism would be cross-sectional area × length multiplied their incorrect answer to (b) by 10.

21. (a) Write down the inequality shown on the number line.



(b) Represent the inequality $y < 2x + 1$ on the grid.



[3]

Correct answers

(a) $x \geq -2$

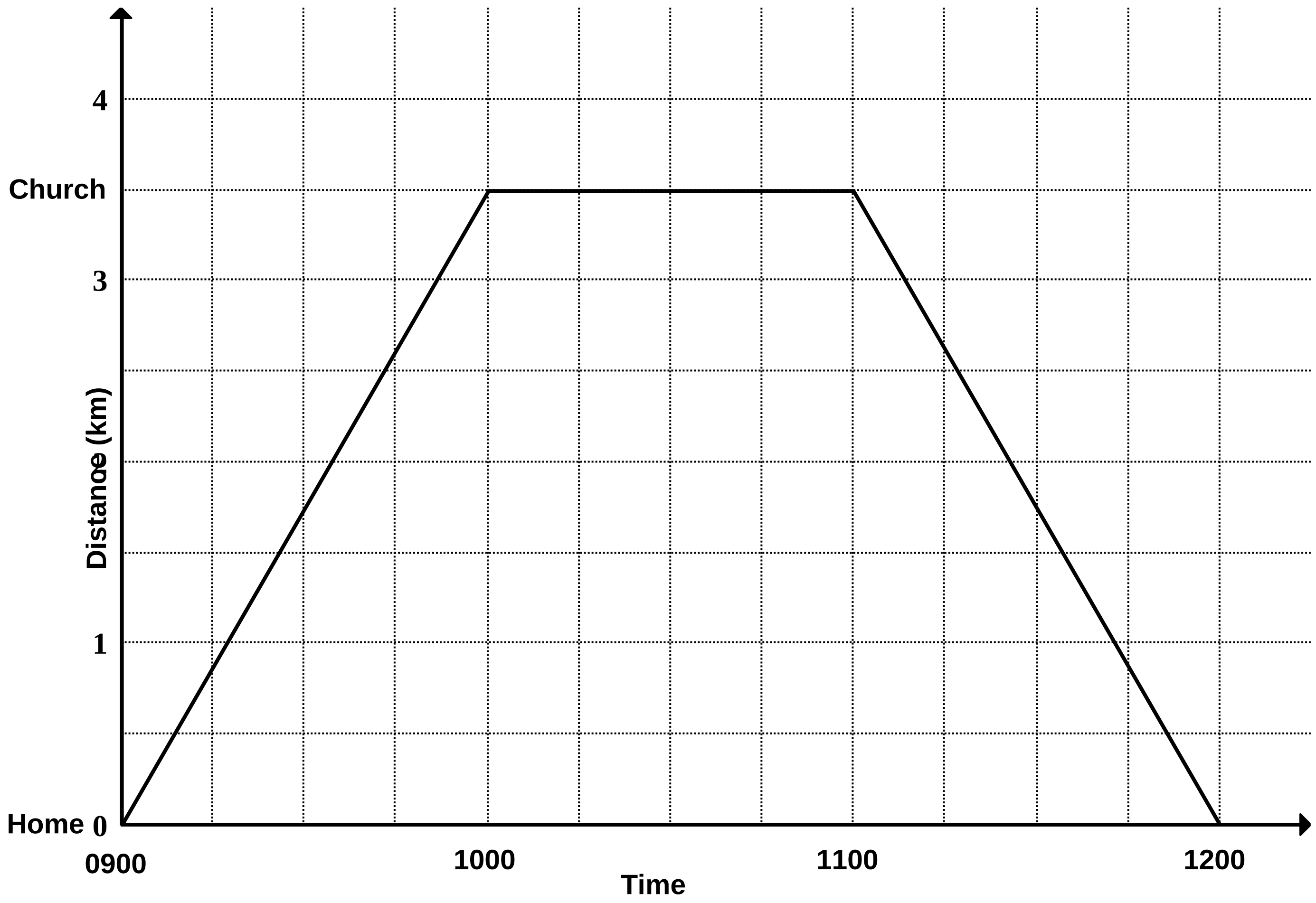
(b) As shown on the grid

Comments

(a) The majority of the candidates apparently did not know how to describe an inequality shown on a number line. Common wrong answers included: $x \leq -2$, $x > -2$, $-2 \leq 5$.

(b) This question seemed very difficult to the candidates. Very few candidates were able to draw the correct boundary line in the first place, let alone the shading. Most of the candidates were leaving this sub-question unattended.

22. The graph shows Musa's journey from home to church on a Sunday.



(a) State how far the church is from Musa's home. [1]

(b) State how long was Musa's journey from home to church, give your answer in hours and minutes. [2]

(c) Explain what the graph represents after 1100 hours. [1]

Correct answers

(a) 3.5 km

(b) 1 hour 0 minutes

(c) Return journey from church back home

Comments

(a) This sub-question proved easy to the candidates. Most of them were getting full credit.

(b) Most candidates were failing to accurately present their answer in hours and minutes. Seemingly, the candidates were confused by the fact that the number of minutes was zero. Most of the candidates were having 1 hour 60 minutes as their answer.

(c) Apparently, most candidates could not comprehend the requirement of the question. Some of the incorrect responses included: resting, after church, preaching time.

23. (a) Construct triangle UVW using a ruler, a protractor and compasses.

UV = 8 cm, UW = 5 cm and VW = 9 cm. [3]

(b) On your diagram, construct the locus of points which are

(i) equidistant from U and V, [1]

(ii) equidistant from UV and UW, [1]

(iii) Mark and label with letter T the point of intersection of **(i)** and **(ii)**. [2]

Correct answers

(a) A correctly constructed triangle with accurate lengths and construction arcs.

(b) (i) a perpendicular bisector of UV.

(ii) an angle bisector of angle VUW.

(iii) intersection of the bisectors marked T.

Comments

(a) This sub-question was fairly done. A considerable number of candidates were able to draw the triangle well. Evidenced by the absence of construction arcs in the diagram, some candidates were not using compasses and hence their triangle were not accurate.

(b) (i) Most candidates were able to bisect the line UV. However, some candidates did attempt but failed to bisect the line as they made arcs on one side of the line.

(ii) Most candidates did not realise that the question required the angle bisector of $V\hat{U}W$ and they were bisecting any other line or angle.

(iii) This sub-question was generally not well done. Probably, the reason is that **part (iv)** was dependent on **part (i)** and **part (ii)**. However, those candidates who had their incorrect loci intersecting somewhere would label their intersection point.

JC Mathematics

Paper 309/02

General comments

The paper was the most poorly done in a long time. The time available seemed to have been enough though, as most candidates had written a lot and even had time to cancel and rewrite.

The paper looked accessible to candidates but it was not so for most candidates. There were many candidates with low scores. The scores ranged from 0 to 98.

Like in other years, there were questions that appeared easy yet candidates found them very difficult to answer. One such question was **Q8** on statistics. Candidates could not complete a simple frequency table by first using tally marks. They were not able to draw a bar chart properly.

There were also questions where a correct answer could result from wrong working. Question **10(a)** had an answer of 10cm from manipulating $V=\pi r^2h$, but candidates simply added the radius to itself to get 10cm, which was wrong working. Another question where the answer could be correct from wrong working was **Q9(a)**. Candidates just divided 75 by 2 instead of first converting 75cm and 2m to the same units and expressing 75cm as a percentage of 2m.

Question 1

(a) A challenge for the candidates was the use of a decimal point, it was either completely removed or some zeros after the decimal point were made significant, rendering the affected number to be wrong.

- **(i)** Most candidates were able to get 1 but did not leave the answer as 1.0.
- **(ii)** This question was well done. The few wrong answers were 0.07.
- **(iii)** Candidates simply truncated at the third significant figure to get mostly 274 as the most common wrong answer.

(b) This question was very difficult for the candidates as they could not find the maximum and minimum values. Common wrong answers were 25000, 25000.5, 2400.5 and 25494.

(c) (i) Common errors were that candidates could not leave the answer in standard form, most candidates could get the 500 and left it as that.

(ii) Candidates tried to change each term to ordinary numbers but they could not change back to standard form hence they left the answer as 168 800.

Solutions: (a)(i) 1.0 **(ii)** 0.1 **(iii)** 24700

(b) 24 000 and 25 500

(c)(i) 5×10^2 **(ii)** 1.688×10^5

Question 2

The main challenge for the candidates was failure to differentiate between time interval and the exact time on the clock. Another recurring challenge was to take an hour as having 100 minutes.

(a) (i) Fairly done although candidates did not display their answers correctly whether in 24 hour clock or 12 hour clock. They wrote 740. Common wrong answer was 7.20 am

(ii) This question was poorly done, only a few candidates got a correct answer. Most candidates could not change the 45 minutes to hours correctly. There were many different wrong answers, and some were not about the time taken.

(b) This question was poorly done, substitution into speed equation s = d/t was done wrongly by most candidates. Candidates continue to equate 1 hour to 100 minnutes.

(c) Most candidates did not understand what it meant to say that London was 2 hours behind Durban.

(i) this question was fairly done though candidates did not write the time correctly. They gave 1320hrs, 920hrs, 9.20hrs as common wrong answers.

(ii) Most candidates did not get this question correct, they did not add the 2hrs in their calculations since London time is 2hrs behind. The most common wrong answers were 10 hrs 45 minutes, and 13hrs15 mins (from19 20 – 6 05).

Solutions

(a) (i) 7.40am **(ii)** 4km/h

(b) 9 minutes

(c) (i) 0920hrs **(ii)** 12 hours 45 mins

Question 3

It was fairly done. Candidates showed lack of knowledge of mathematical terms.

(a) Most candidates got it correct as hexagon but most candidates struggled with the spelling. They would write sixagon, sexagon and also called it a pentagon or heptagon

(b) This question was fairly performed though some candidates were lacking the concept of interior angles especially using the formula (n – 2) ×180 . Common answers were 1080°, 540° and 360°.

(c) The whole of this question was poorly performed.

(i) Candidates would not add all the exterior angles

(ii) Candidates did not equate the expression in (i) to 360°. They mostly used 180° or rearranged expression to 5x = 160°

(iii) Some candidates also included the 50° in the value of *a.*

Solutions

(a) Hexagon

(b) 720°

(c) (i) $x + (x + 40) + (x + 60) + (x + 40) + (x + 20) = 5x + 160$

(ii) $x = 40$

(iii) $a = 30°$

Question 4

(a) The challenge for candidates was factorizing completely, there were mostly partial factorizations, e.g. $3x(9x - x)$, $x(27x^2 - 9x)$.

(b) (i) In this question, candidates failed to collect like terms, they would lift the term as it is with its sign: $3x - x = 8 - 4$ giving $x = 2$

(ii) Candidates could not remove the fraction, they were multiplying by the 7 term by term to get $28m - 2 = 15$, 28m -14m = 21 or anything

(c) The negative sign outside the second bracket was a challenge for the candidates. They would present the removed brackets as $12x+12-10x-15$ leading to incorrect solutions.

(d) (i) Most candidates had $\frac{6a}{12}$ or $\frac{1}{2}$ as the final answer. Other candidates worked out the common denominator and used it to get $\frac{9a \times 8a}{12}$.

(ii) Candidates left denominator as 21 not 21*x*. *x* was commonly found on the numerator. Most candidates added numerators together as well as denominators thus getting ${}^{7}\!/_{10x}$ instead of ${}^{29}\!/_{21x}$ or $1\frac{8}{21x}$.

Solutions

(a) $9x^2(3x-1)$

(b) $x = 3$

(c) m ≤ 6

(d) (i) $\frac{a^2}{2}$

(ii) $\frac{29}{21x}$

Question 5

(a) (i) Common wrong answers were 3 x 1, 1 row 3 column matrices

(ii) This was challenging due to directed numbers. Most candidates could find the 2C but could not manipulate the directed numbers such that the common wrong answer was $\begin{pmatrix} -5 & -11 \\ \pm 5 & \pm 2 \end{pmatrix}$

(b) (i),(ii) These questions were well done. Some candidates listed the possible outcomes as sets, or wrote the number of possible outcomes without the total outcomes e.g 3 even numbers, 3 primes.

(iii) Well done, but some still wrote the probability as $\frac{0}{7}$ which was incorrect.

(iv) Well done. Some candidates wrote 6, just like they did for (i) and (ii), which was not correct.

Solutions

(a) (i) 1 by 3 **(ii)** $\begin{pmatrix} -5 & 11 \\ 5 & -2 \end{pmatrix}$

(b) (i) $\frac{3}{6}$ **(ii)** $\frac{3}{6}$ **(iii)** 0 **(iv)** 1

Question 6

(a) Most learners knew the sound of the word they had to give, but the spelling was wrong, Common errors were hypothenuses, hypothesis, hypertenors, hypothenurse, and also straight line, adjacent, obtuse.

(b) In this question, using the rule of Pythagoras was a challenge, especially evaluating the squares of 6 and 8, which were given mostly as 12 and 62 respectively. Some candidates just gave BC as 6 + 8 = 14cm.

(c) For this question, candidates could not use their three-figure tables. They could work out up to tan$x$ = 0.75 then stopped there. Others tried to work out the value of x using sin$x$ and cos$x$. Other candidates used information given in (d) to find x= 37°

(d) Bearings were poorly done.

(i) Candidates tried to work out this bearing and the most common wrong answer was 53°.

(ii) Most candidates could get 53° but did not know how to proceed from there. The most common

wrong answers were 53° and 233°. Blank answer spaces were also common after some working.

Solutions

(a) Hypotenuse

(b) 10cm

(c) 36.9°

(d) (i) 270°

(ii) 307°

Question 7

(a) This question was poorly done. Candidates had an idea of how to calculate a gradient but could not manipulate the directed numbers. Candidates could also not read the y-intercept from the given (0,2) but tried to calculate and mostly failed. There was also the use of a formula $\frac{x_2 - x_1}{y_2 - y_1}$ instead of $\frac{y_2 - y_1}{x_2 - x_1}$ to evaluate gradient so $\frac{1}{3}$ was common.

(b) It was difficult for candidates to form equations.

(i) The candidates could not link the variables with the points, such that the most common wrong answers came from 10x +3 = y

(ii) Most candidates simply multiplied the given equation by 2 using direct proportion linking 16 and 32.

(iii) Graphing was the most difficult part in this question. Most candidates shaded a region that was defined by -1 ≤ x ≤ 5, which was the range of x values prescribed to the candidate for values of x to be used for each line. Most candidates could not draw any line.

(iv) Any number was given for values of x and y. Even if there were lines drawn in (iii) there was no link to the values of x and y given as they were supposed to be values at point of intersection.

Solutions

(a) $y = 3x + 2$

(b) (i) $3x + y = 10$

(ii) $10x + 2y = 32$ reducing to $5x + y = 16$

(iii) Lines drawn for $3x + y = 10$ and $5x + y = 16$

(iv) $x = 3$ and $y = 1$

Question 8

This question required candidates to first know the relationship between tally marks and frequency.

(a) (i) Tally marks were challenging, first in making them and secondly in interpreting them into frequency. The most common error was to write the correct frequencies under Tally marks column then write cumulative frequencies under Frequency column. Others would simply show the tally marks that represented the numbers on the shoe sizes, that is tally marks representing 4 against shoe size 4 and so on. These candidates would then give the correct frequencies.

(ii) Some candidates just wrote 7 without any working. Wrong answers would result from arranging the shoe sizes to give 6 as median.

(iii) This question was poorly done. The candidates worked out the wrong sums for the numerator by adding shoe sizes or adding cumulative frequencies. They also had a wrong denominator of 5 or any according to their total frequencies.

(b) This question was fairly done. Wrong answers came mostly from wrong frequencies in (a)(i) but there were cases where the candidates reversed axes, leading to wrong bar charts. Some bar charts had uneven scale used on each axis. Some candidates gave pie charts.

Solutions

(a) (i) Frequencies 3, 4, 2, 6, 5

(ii) 7

(iii) 6.3

(b) Bar chart with shoe sizes on horizontal axis and frequencies on vertical axis.

Question 9

(a) This part was fairly done. In this question, candidates had a challenge writing the correct formulation $\frac{75}{200} \times 100$ and just gave $\frac{75}{2}$ = 37.5% which was wrong working since there was no conversion of units to be the same. Sometimes candidates divided by 100 and multiplied by 2 or 200.

(b) (i) Candidates would find E3 000 as the total interest and could not add to the E10 000.

(ii) Candidates confused simple and compound interest. Most candidates did not apply the concept of compound interest at all, instead they multiplied the E3000 by 3 thus getting wrong answer.

(iii) It was fairly performed even though their working in (i) and (ii) were wrong but the conclusion was correct. They showed that simple interest is cheaper than compound interest.

Solutions

(a) 37.5%

(b) (i) E13 000

(ii) 13310

(iii) Option 1

Question 10

The whole question was poorly done, most candidates had no idea of what to do.

(a) Candidates did not use the formula for calculating volume for cylinders $V = \pi r^2 h$, those who did, did not equate it to 785 ($785 = \pi r^2 h$). Some candidates simply added the radius to itself to get the 10cm. The most common formula written was πdh without equating it to anything. Wrong answers that appeared frequently were 15.7, 3.14×5^2 and $3.14 \times 5 = A$.

(b) Most candidates did not read the question with understanding. They did not find anything useful in the information given, they just gave the dimensions as 2,3,2.

(c) (i) This question was poorly performed, since candidates had not understood the given information, candidates did not understand what it wanted at all.

(ii) Most candidates had no idea how to use the given volume. The volume was given as 12cm^3.

Solutions

(a) h = 10cm

(b) length = 30cm; width = 20 cm and height = 20cm

(c) (i) $V = 12\ 000\text{cm}^3$

(ii) $2580\ \text{cm}^3$