Examination Report

Mathematics

309

JC

2025

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Paper 309/01

INTRODUCTION

There were 17 367 candidates who sat for the 2025 Junior Certificate Mathematics Paper 1 examination. The paper consisted of 26 short-answer questions and the total marks for the paper were 100. Most of the marks were independent-of-method marks while a few of the questions required candidates to show the method leading to their answers. In the event a candidate failed to present a required mathematically correct method, they lost all the marks even when the answer space had the anticipated correct response.

GENERAL COMMENTS

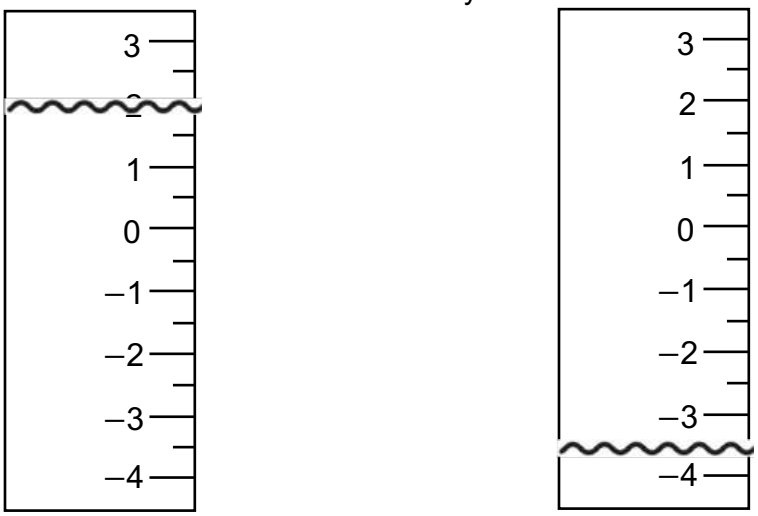
The lowest raw score obtained in this year's examination was 0 and the highest score was 98.

Questions that generally seemed challenging to most of the candidates included Question 1(b); Question 5 (a)(ii); Question 7; Question 10; Question 13 (b); Question 15 (b); Question 19; Question 22 Question 23 (b) and Question 26. On the other hand, questions which most candidates were getting right included: Question 6; Question 11; Question 14 (c); Question 16; and Question 23 (a).

Overall, the paper was accessible to the candidates as the a very high proportion (close to 100%) did attempt to answer all the questions.

COMMENTS ON SPECIFIC QUESTIONS

1. The diagram shows water levels of a dam on a dry season measured in metres.



(a) By how many metres did the water level drop? [2]

(b) On the next day, heavy rains followed and water levels rose by 5.3 metres. Find the water levels after the rains. [1]

Answers

(a) 5.5

(b) 1.8

Comments

Question 1 was generally fairly performed by the candidature. A considerable number of the candidates demonstrated understanding of the requirements of the question. However, some of them lacked the necessary arithmetic skills resulting to them obtaining incorrect final responses.

For instance, in part (a), most candidates realized that they were to subtract the marked water levels in order to obtain the answer, but failed to place the readings correctly or rather perform the subtraction of the directed numbers properly. Common errors included: $-3.5 - 2 = -5.5$; $2 - -3.5 = -5.5$. On the other hand, there were candidates who missed the requirement of the question in part (a) and responded as if the question asked for the final water level after it had dropped. Such candidates just read the water level in the second reading a presented their answer as -3.5 or just 3.5.

Performance in Question 1 part (b) was unsatisfactory. Very few candidates managed to get the correct answer. Some of the candidates were omitting the negative in the minimum water level thus spoiling the result (i.e. 3.5 + 5.3 = 8.8). On another note, there were candidates who presented the correct mathematical sentence in the working space but obtained an incorrect answer. Common incorrect responses included: 2.8; 1.3.

2. (a) Express 0.03 as a fraction. [1]
(b) Arrange in order of size starting with the smallest. [2]

$\frac{2}{3}$, 0.6 , $\frac{5}{6}$, 66%

Answers

(a) $\frac{3}{100}$
(b) 0.6 , 66% , $\frac{2}{3}$, $\frac{5}{6}$

Comments

Performance in Question 2 part (a) was generally average. While a fair number of candidates was able to express 0.03 as a fraction, there were also numerous candidates who could not do it. Common incorrect responses included: $\frac{0.03}{100}$; $\frac{3}{10}$; $\frac{3}{100}$. Moreover, candidates' performance in part (b) was unsatisfactory. A majority of the candidates was failing the write the given numbers in correct ascending order. A major challenge for most candidates was in converting the numbers to the same format. Hence, placement of the numbers was haphazard. On another note, there were other candidates who would convert the numbers to the same format correctly but then write them in descending order instead of ascending order.

3. (a) Given that
$x = 3py - 6y$
Find the value of x when $p = -3$ and $y = 2$. [2]
(b) Factorise $3py - 6y$. [2]

Answers

(a) -30
(b) $3y(p - 2)$

Comments

Question 3 part (a) was performed below average. The main challenge for the majority of candidates was performing the mathematical operations with directed numbers. This was evidenced by the fact that most candidates were substituting the values of p and y correctly in the given expression, but got incorrect responses. Common incorrect responses included: 30; -6; 15. In part (b), most candidates demonstrated mastery of the concept of factorization. However, some of the candidates would only do it partially – leaving some common factors in the original expression, i.e. $3(py - 2y)$ or $y(3p - 6)$.

4. Express as a single fraction.
$\frac{5x+4}{2} - \frac{2x+3}{3}$ [3]

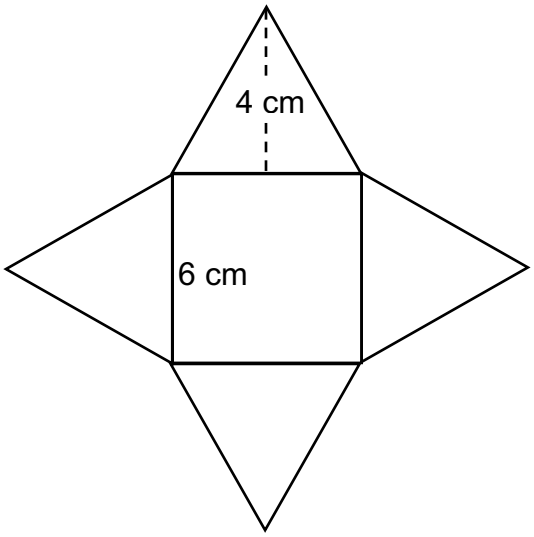
Answer

$\frac{11x+6}{6}$

Comments

The performance in this question was fair. A considerable number of candidates were able to subtract the algebraic fractions. There were also numerous candidates who failed to arrive at the correct answer to this question. Some of the candidates eliminated the denominator completely resulting to loss of marks (i.e. $15x + 12 – 4x – 6 = 11x + 6$). Other candidates retained the correct common denominator but failed to open the second pair of brackets in the numerator – involving multiplying by a negative factor , i.e. $\frac{3(5x+4)-2(2x+3)}{6} = \frac{15x+12-4x+6}{6} = \frac{11x+18}{6}$.

5. The diagram shows a square and four identical isosceles triangles.
The length of the square is 6 cm and the isosceles triangles have a height of 4 cm.



(a) Calculate the area of
  (i) one isosceles triangle, [2]
  (ii) the whole shape. [2]

(b) The diagram is a net of a pyramid.
Write down the name of the pyramid. [1]

Answers

(a) (i) 12
  (iii) 84

(b) Square-based pyramid

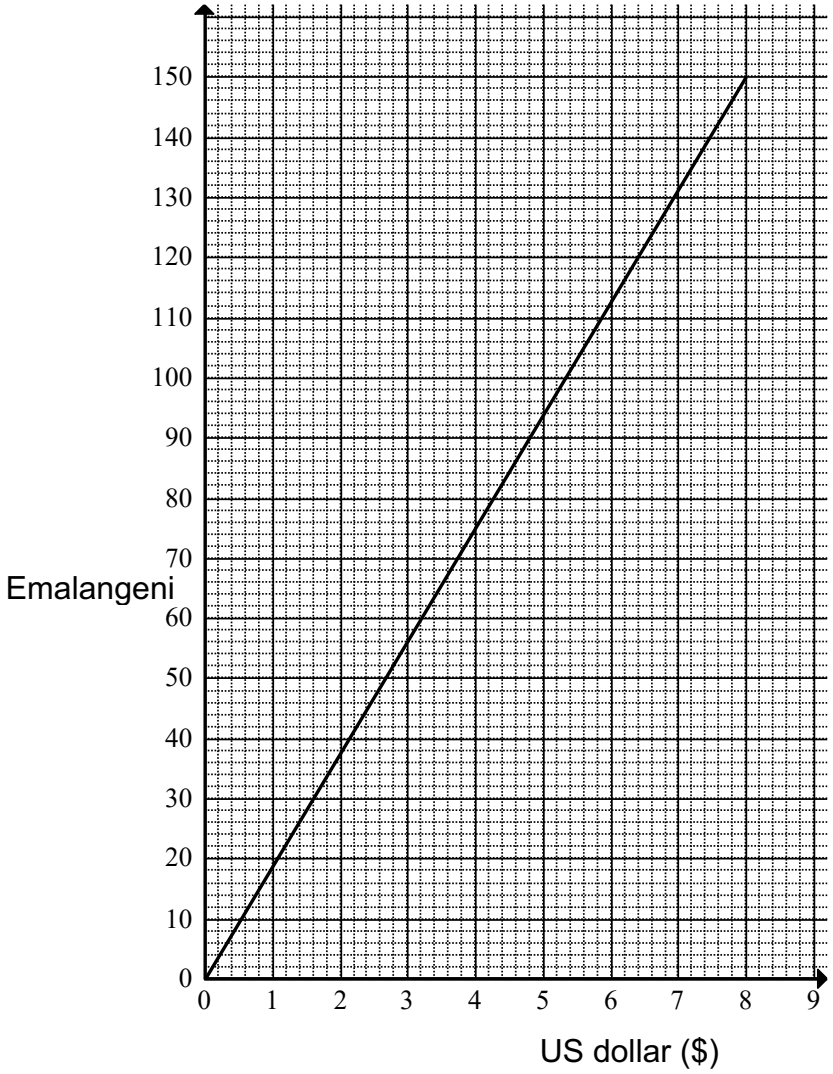
Comments

Question 5 part (a)(i) required candidates to calculate the area of a triangle using the formula: Area = $\frac{1}{2} \times$ base $\times$ height. While a fairly good number of candidates were able to get the correct answer to this part question, there were also numerous candidates who would just multiply the base and the height and never multiply by the half (i.e. $6 \times 4 = 24$). There were also candidates

who had the correct formula in the working space but then multiplied by 2 instead of multiplying by half as per the formula (i.e. $\frac{1}{2} \times 6 \times 4 = 48$).

Performance in Question 5 part (a)(ii) was unsatisfactory. Candidates were expected to add the areas of the four identical isosceles triangle and the area of the square in order to get the area of the whole shape – something which was done by only a minority of the candidates.

6. The diagram shows the conversion of US dollar ($) to Emalangeni (E).



Use the graph to convert,

(a) $2 to E. [1]

(b) E112 to $. [1]

Answers

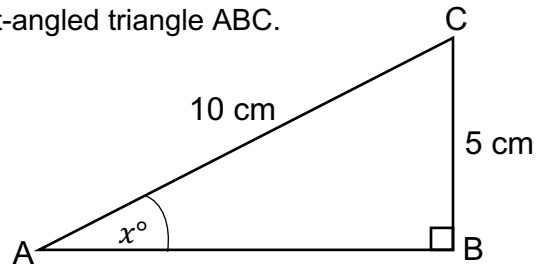
(a) E38

(b) $6

Comments

This question was generally well performed by most of the candidates. Nonetheless, there were some candidates who were failing to read the vertical Emalangeni scale. In part (a) they had their answer as E39 instead of E38 while in part (b) they had $6.10 from a misread of the E112 on the vertical axis.

7. The figure shows a right-angled triangle ABC.



AC = 10 cm, BC = 5 cm and angle ABC = 90°.

(a) Use the table to find angle $x°$. [2]

Angle (°)	**cos**	**sin**	**tan**
30	0.866	0.500	0.577
45	0.707	0.707	1.00
60	0.500	0.866	1.73

(b) Given that $\sqrt{0.75}$ = 0.866 and $\sqrt{7.5}$ = 2.74.
Calculate the length of AB. [3]

Answers

(a) 30°
(b) 8.66 cm

Comments

Candidates' performance in question 7 was generally unsatisfactory. A remarkable number of candidates could not show any working in part (a) but presented the correct answer in the answer space thus losing the marks. Other candidates could not identify the correct ratio to use in this part question resulting to working involving cosine and tangent trigonometric ratios. For Question 7 part (b), there were candidates who did not realize that they were supposed to use the rule of Pythagoras to work out the length of AB. However, even most of those that did use Pythagoras' theorem had a challenge using the given information to deduce the value of the resultant $\sqrt{75}$. Common wrong answers in part (b) included: 0.866; 8.7 (from unnecessary rounding); 2.74 and $\sqrt{125}$ (from incorrect use of Pythagoras' theorem i.e. $\sqrt{10^2 + 5^2}$).

8. Work out
$4\frac{1}{3} - 2\frac{1}{4}$. [3]

Answers

$2\frac{1}{12}$

Comments

Performance in this question was average. A majority of the candidates were able to correctly work out the difference of the two mixed numbers. However, most of them then failed to present the answer as a mixed number as per the expectation (i.e. got the improper fraction $\frac{25}{12}$). Common incorrect answers included: $2\frac{1}{2}$ and $1\frac{1}{12}$.

9. Carol buys a bag of oranges for E45.
She sells all the oranges at E2 each.
(a) If the bag contains 30 oranges,
Calculate the profit she makes. [2]
(b) Calculate the percentage profit she makes on the cost price. [2]

Answers

(a) E15
(b) $33\frac{1}{3}\%$

Comments

The candidates' performance was average with respect to Question 9. Most of the candidates would successfully calculate the profit made from selling all the oranges in the bag. However, there were other candidates who missed the requirements of part question 9 (a) and only calculated the total amount got from selling all the oranges (i.e. 30 × E2 = E60). In part (b), a considerable number of the candidates were failing to properly work out percentage profit (i.e. not finding a percentage of the buying price). Common errors included: $\frac{15}{60} \times 100$; $\frac{15}{100} \times 45$; $\frac{45}{60} \times 100$.

10. (a) Simo invests E5 000 in a bank at 5% simple interest per annum.
Calculate Simo's investment after 3 years. [3]
(b) Simplify the ratio. 1.2 : 3. [2]

Answers

(a) E5750
(b) 2 : 5

Comments

Performance in Question 10 part (a) was generally unsatisfactory. Most of the candidates failed to find the total investment after 3 years. Some of them would attempt calculating compound interest instead of simple interest. Others only calculated the annual interest and never considered the duration of the investment while some of them did multiply the annual interest by the 3-year period by never added the principal investment so as to respond to the question accurately. Common incorrect answers included: E250, E750, E5250 (principal plus 1 year interest). In part (b), a majority of the candidates could not simplify the ratio involving a decimal

and a whole number. Some candidates multiplied only the decimal element of the ratio by 10 and left the whole number element as it was (i.e. 12 : 3). Other candidates did multiply both elements by 10 but then never continued with or completed the simplification process (i.e. 12 : 30 ; 6 : 15 ; 4 : 10).

11. (a) A bag contains 3 red balls, 4 blue balls and 1 white ball.
A ball is chosen at random from the bag.
Find the probability that the ball is
(i) red, [1]
(ii) blue or white. [2]

(b) The probability that it rains tomorrow is $\frac{5}{7}$.

State the probability that it does not rain tomorrow. [1]

Answers

(a) (i) $\frac{3}{8}$

(ii) $\frac{5}{8}$

(b) $\frac{2}{7}$

Comments

Question 11 was generally well performed by the candidature. Most of the candidates were able to get the correct probabilities. Nonetheless, there were some candidates who did not write the probabilities as fractions but incorrectly as whole numbers (i.e. 3 instead of $\frac{3}{8}$). In part (a) (ii), some candidates only presented the individual probabilities and did not add them to get the expected answer (i.e. $\frac{4}{8}$ and/or $\frac{1}{8}$).

12. Simplify
(a) $x^3 \times x^{-3}$ [1]
(b) $y^{-4} \div y^2$ [1]
(c) $(m^3)^4$ [1]

Answers

(a) y^0
(b) y^{-6}
(c) m^{12}

Comments

This question was generally not well answered. In part (a), a considerable number of candidates struggled with the addition of the indices (i.e. 3 + −3). Hence, common incorrect responses included: x^{-6} and x^6. Some candidates seemed to be confused by the resultant zero index and resorted to giving answers that were not in index form (i.e. x; 0). For part (b), common incorrect answers included: y^{-2} and y^6. Part (c) was fairly done since a good number of candidates was able to get the correct answer. Common incorrect responses in part (c) included: m^7; $4m^3$.

13. (a) Write the number 802.398 to 2 decimal places. [1]

(b) Estimate $\frac{30.5 \times 9.63}{0.95 \times 4.02}$ [3]

(c) Express 0.00402 in standard form. [1]

Answers

(a) 802.40
(b) 75
(c) 4.02×10^{-3}

Comments

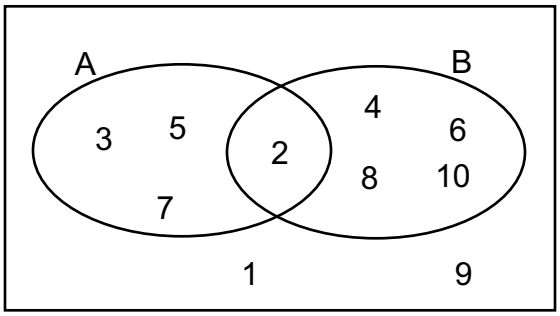
Performance in this question was average. A fairly good number of the candidates were able to round of the number given in part (a) to two decimal places. However, some candidates were unable to do it precisely. Common incorrect answers included: 802.4; 802.400; 802.39. In part (b), most candidates were failing to estimate the value of the given expression. Some candidates were attempting to perform the operations with the numbers as they were while others did notice that they were to round off each of the numbers to one significant figure first. However, rounding off 30.5 to 1 significant figure was a problem to a majority of the candidates (i.e. $\frac{31\times10}{1\times4}$; $\frac{3\times10}{1\times4}$). Performance in part (c) was also unsatisfactory as a majority of the candidates were failing to write the given decimal in standard form. common incorrect answers included: 4.02×10^{3}; 402×10^{-3}; 4.02^{-3}.

14. Given that
ξ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, A = {2, 3, 5, 7} and B = {2, 4, 6, 8, 10}.

(a) Draw a Venn diagram to represent this information. [2]
(b) Write down the $n(A \cup B)$. [1]
(c) State the special name given to the numbers in set A. [1]

Answers

(a)



(b) 8
(c) Prime numbers

Comments

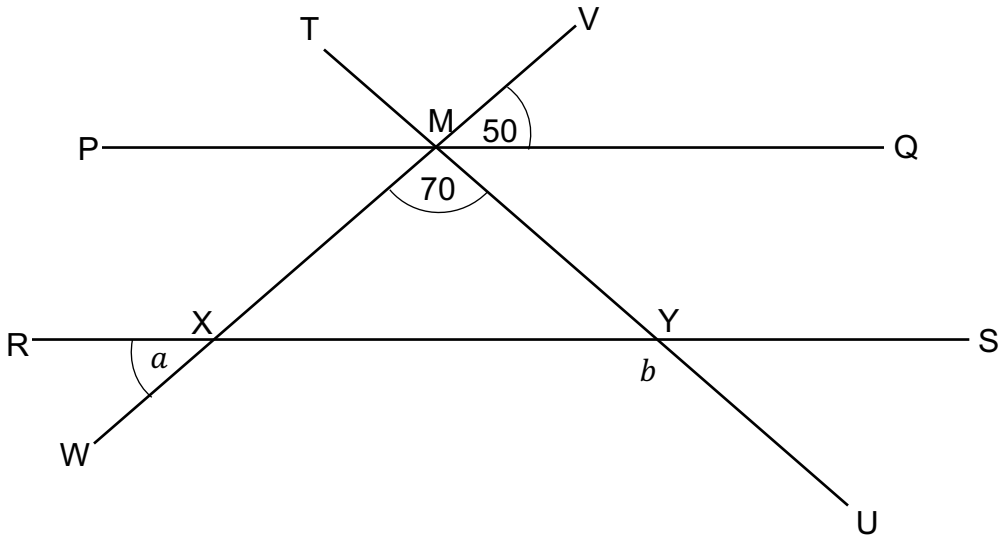
In part (a), most candidates were able to represent the given information in a Venn diagram. Common mistakes by the minority who could not do it included:

- Omission of the elements 1 and 9 (in the universal set but outside the union of set A and B).
- The element 2 repeated in all the regions in the Venn diagram.

- Disjoining the sets A and B inside the universal set.

In part (b), candidates were required to state the number of elements in the union of sets A and B, but a majority of the candidates were listing the elements rather than counting them, resulting to the loss of the mark. Furthermore, most of the candidates were able to give the special name for the numbers in set A – a requirement of part (c) of Question 14. Some common incorrect responses to part (c) included: odd numbers, even numbers, square numbers.

15. Given the diagram below.



VW and TU are straight lines which intersect at M.
PQ and RS are parallel lines.
Angle VMQ = 50° and angle XMY = 70°.

(a) Find the value for,
  (i) Angle a, [1]
  (ii) Angle b. [2]

(b) State the special name given to pairs of angles,
  (i) PMX and RXW, [1]
  (ii) PMX and MXY. [1]

Answers

(a) (i) 50°
(ii) 120°

(b) (i) corresponding
(ii) alternate

Comments

Most of the candidates got part (a) (i) of this question correct. Common incorrect responses included: 55° and 60°. On the other hand, part (a) (ii) was not satisfactory in performance. Candidates were expected to employ the following angle properties in this part question – which they failed to do:

- Directly opposite angles are equal.
- Sum of angles in a triangle is 180°.
- A straight line angle is equal to 180°.

Part (b) of the question required candidates to have knowledge and understanding of angle pairs and parallel lines. However, most of the candidates demonstrated, in their responses, lack of such knowledge and understanding. Common incorrect responses to this part question included: acute, obtuse, reflex, complementary. Other candidates even interchanged the answers to part (b) (i) and (ii) to indicate deficiency of the necessary knowledge.

16. Given the sequence of numbers below,
33, 28, 23, 18, 13, …
(a) Find the next 3 terms of the sequence. [2]
(b) State the rule of the sequence. [1]

Answers

(a) 8, 3, −2
(b) Subtract 5

Comments

Performance in Question 16 was generally good as the majority of the candidates were able to extend the given sequence and also state the rule for the sequence. However, there were those few candidates who could not get it right. In part (a), a challenge was with the third element of the answer where the result of subtracting 5 was a negative number (e.g. −1; 3; 0.2; 5; 0 for the third element). Common errors for part (b) included: add 5; x – 5 or n – 5.

17. (a) Expand and simplify $3(2c - 5d) - 4c$. [2]
(b) $\frac{3}{5m} - \frac{2}{3m}$ [2]

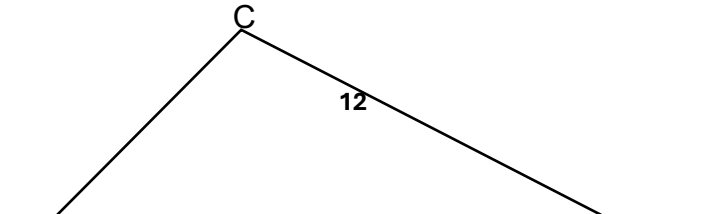
Answers

(a) $2c - 15d$
(b) $\frac{-1}{15m}$

Comments

Part (a) of this question required candidates to remove brackets and collect like terms in the given expression and most of them were able to do it. However, those who failed to do it would multiply even the term outside the brackets by the factor of 3 while attempting to remove the brackets (i.e. 6c – 15d − 12c). There were also other candidates who would remove the brackets correctly but then fail to operate the like terms (i.e. 6c – 15d – 4c = 10c – 15d). Performance in part (b) was average as a fairly good number of candidates would go through the process of writing the two algebraic fractions to a common denominator. The major challenges to some of the candidates was in finding the suitable common denominator and also subtracting the directed numbers in the numerator (i.e. $\frac{9m-10m}{15m^2} = \frac{-m}{15m^2}$; $\frac{9m-10m}{(3m)(5m)} = \frac{-m}{(3m)(5m)}$; $\frac{9-10}{15m} = \frac{1}{15m}$). Another common error candidates were committing was the omission if the symbol (m) in the original question thus obtaining the incorrect answer $\frac{-1}{15}$.

18. The diagram below shows a triangular grazing field.



(a) Draw the locus of points equidistant from AB and AC. [2]

(b) He then ties a goat on a pole at B using a rope that is 5 cm long.

Taking 1 cm to represent 1 m, show the region the goat can graze on. [2]

Answers

(a) Angle bisector with arcs

(b) Arc 5 cm from B inside field shaded or marked

Comments

Question 18 was generally unsatisfactory in terms of performance by the candidates. In part (a), most candidates were bisecting the sides of the triangle while some of those who bisected the correct angle did it without construction arcs and so they lost marks. In part (b), candidates were expected to construct an arc inside the triangle with radius 5 cm and centre B and then mark the region enclosed by the arc and the sides of the triangle from B. The following errors by the candidates were noted:

- An arc with centre B and radius **not** equal to 5 cm.
- The region of interest, as per the question, not shown.
- Showing the correct region by shading but without the arc marking the boundary inside the triangle.

19. Work out, leaving your answer as a decimal.

$\sqrt{0.0081}$ [3]

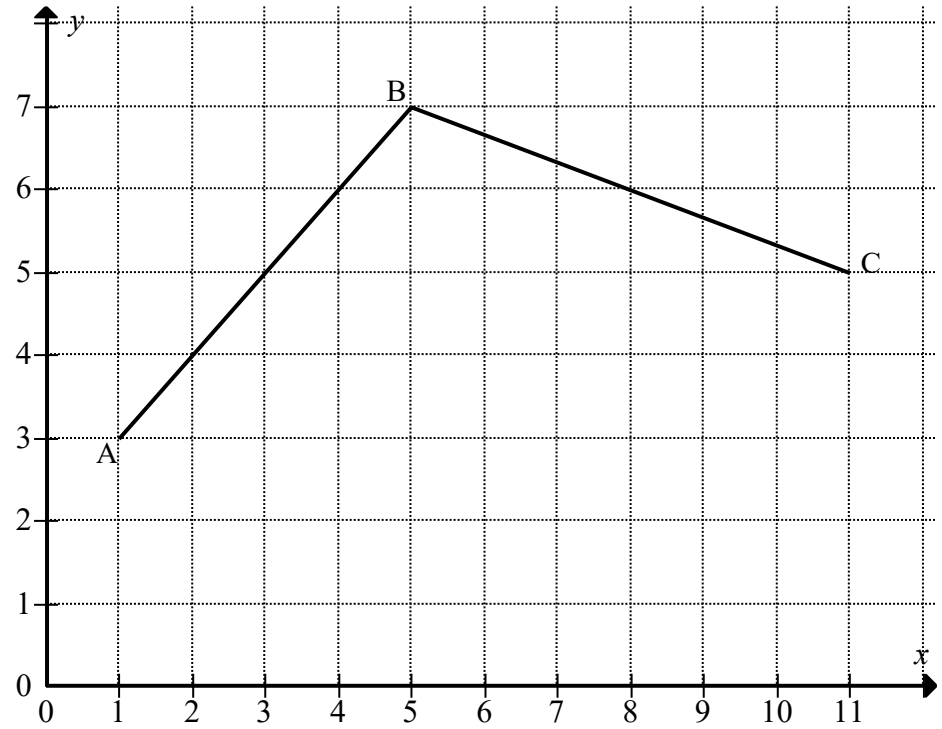
Answer

0.09

Comments

Candidates' performance in this question was unsatisfactory. Most of the candidates did not show any sensible working and presented their answers in the answer space. Common incorrect responses included: 0.009; 0.08, $\frac{81}{100}$.

20. Points, A, B and C are shown on the grid.



(a) Plot the point D on the grid such that ABCD is a parallelogram. [1]

(b) Write the column vector for $\overrightarrow{BC}$. [1]

(c) Given that M is a mid-point of $\overrightarrow{AC}$,

Write the column vector for $\overrightarrow{AM}$. [1]

(d) Given the vectors,

$\mathbf{a} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 8 \\ -3 \end{pmatrix}$

Find 4**a** – 3**b**. [3]

Answers

(a) Point on (7, 1)

(b) $\begin{pmatrix} 6 \\ -2 \end{pmatrix}$

(c) $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$

(d) $\begin{pmatrix} -36 \\ 25 \end{pmatrix}$

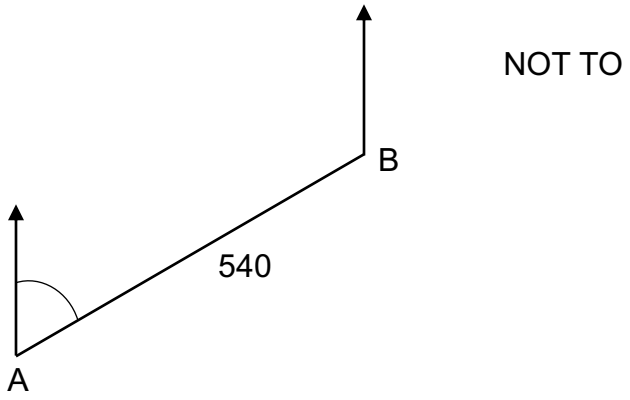
Comments

Performance in Question 20 was average. A fairly good number of candidates obtained most of the marks in the question. Part (a) required candidates to plot a point D to make a parallelogram which most of them did well. Part (b) was fairly performed as a substantial number of the candidates did write the correct column vector for BC. However, there were some candidates who demonstrated deficiency in as far as column vectors are concerned. Common incorrect answers

to this part question included: $\begin{pmatrix} 6 \\ 2 \end{pmatrix}$; : $\begin{pmatrix} -6 \\ 2 \end{pmatrix}$; (6, −2). Likewise, common incorrect answers to part (c) included: : $\begin{pmatrix} 5 \\ -1 \end{pmatrix}$; $\begin{pmatrix} 1 \\ 5 \end{pmatrix}$; (5, 1).

In part (d), most candidates were able to substitute in the given vector expression but had a challenge with manipulating the directed numbers. Otherwise, this part question was fairly done. Common incorrect answers included: $\begin{pmatrix} 36 \\ 25 \end{pmatrix}$; $\begin{pmatrix} -36 \\ 7 \end{pmatrix}$.

21. The diagram shows the distance between two towns A and B.



(a) Find the bearing of town A from town B. [2]

(b) Ian drove $\frac{5}{9}$ of the distance from town A to town B to a petrol station.
Calculate how far the petrol station is. [2]

Answers

(a) 245°
(b) 300 km

Comments

Part (a) of this question required candidates to find the bearing of a journey backward given the bearing of the journey forward. The responses of most of the candidates indicated a lack of full understanding of the concept of bearing – especially that bearings are always in the clockwise direction. Candidates were expected to first find the interior angle to the 65° (which is 115°) and then subtract the 115° from 360° to get the clockwise angle. However, most of the candidates just gave the answer as 115°. Others even failed to notice that the starting point of the required bearing was not A but B, and so worked out the reflex angle at A – which is not a bearing. Part (b) of this question was fairly done as a good number of the candidature was able to work out $\frac{5}{9}$ of 540 km. Some of those candidates who got incorrect answers were making mistakes during the multiplication process.

22. Given the information about 5 numbers.

- The largest number is 15.
- The range is 10.

- The mode is 8.
- The other number is a triangular number.

Find the other four numbers. [3]

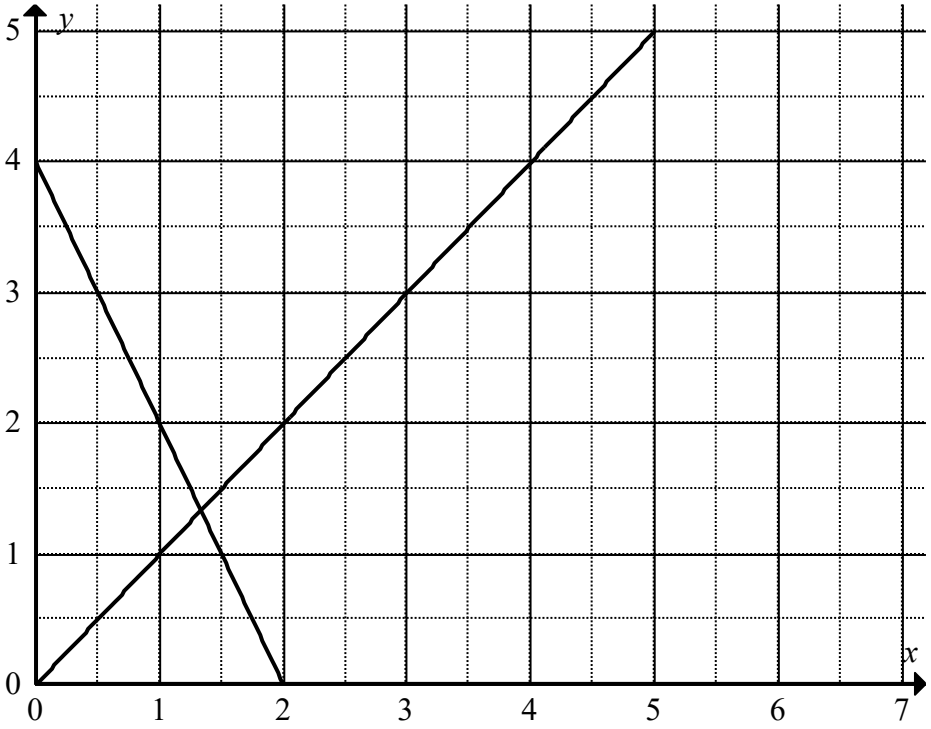
Answer

5, 6, 8, 8 or 5, 8, 8, 10

Comments

This question was unsatisfactory in terms of performance. Very few candidates were able to get full credit in this question. Some of the candidates would only notice two of the numbers are 8 and 8 since the mode is given. Thus their responses would have only two correct numbers.

23. The grid shows the line $y = x$ and the line $y = -2x + 4$.



(a) Draw the line y = 3. [1]

(b) Shade the regions defined by the 3 inequalities.

$y \leq x$, $y \leq -2x + 4$, $y \geq 3$. [3]

Answers

(a) Line parallel to the x- axis with y-intercept 3.

(b) Shading above $y = 3$, below $y = -2x + 4$ and below $y = x$.

Comments

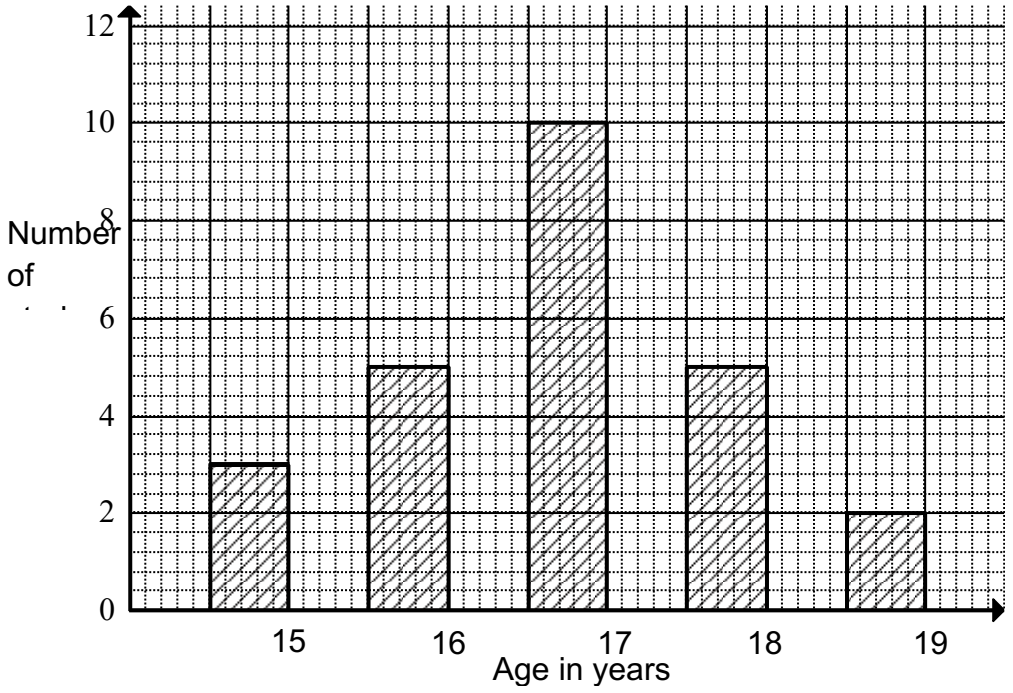
In part (a), most candidates were able to draw the line y = 3. Some of those who got it wrong mistakenly drew the line x = 3 instead of y = 3. Part (b) was unsatisfactory in performance. Most

candidates demonstrated lack of understanding for shading regions to show inequalities. Some were shading wrong regions while others resorted to shading everything indicating that they did not have an idea of what was expected.

24. Construct triangle LMN.
LM = 10 cm, LN = 7 cm and angle LMN = 40°. [3]

Comments
Performance in Question 24 was average. Most candidates were getting at least 2 out of the 3 marks. The main challenges for some of the candidates in this question was accurately locating point N and accurately measuring the 40° angle.

25. The bar chart below shows the age of 25 students in a class.



(a) Find the modal age. [1]
(b) Find the median age. [2]

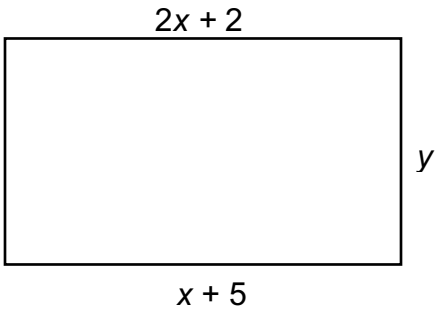
Answers

(a) 17
(b) 17

Comments

This question was well answered by the candidates. A majority of the candidates were able to find the mode and median from the data presented in the bar chart.

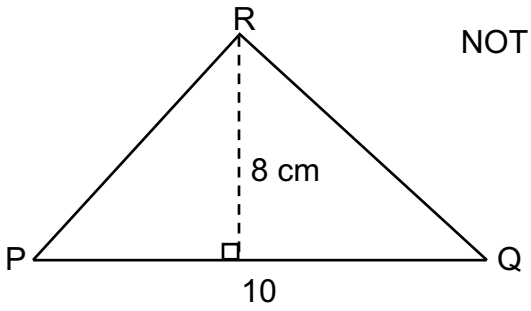
26. Given the rectangle below.



NOT TO

(a) Find the value of x. [2]

(b) The area of the rectangle is equal to the area of triangle PQR.



NOT TO

PQ = 10 cm and the height is 8 cm.

Find the value of y. [3]

Answers

(a) $x = 3$

(b) $y = 5$

Comments

Performance in Question 26 was unsatisfactory. In part (a) most of the candidates could not realize that they were supposed to equate the expressions on the two equal sides of the rectangle and so finding the value of x became difficult. Again, in part (b), most candidates seemed not to have noticed the relatedness of the given rectangle and the triangle. Hence, it became awkward for the candidates to think of a way of finding the value of y. A common incorrect answer for part (b) was 40 cm from calculating of the area of the triangle.

Paper 309/02

General Comments

The paper was accessible to most of the candidates when compared to previous year's cohort, even though no candidate scored the maximum marks. Marks for this paper ranged from 0 to 99. The number of candidates who scored the zero-mark decreased significantly. There were very few candidates who were leaving questions unanswered. Most candidates were showing their working. There were a few cases where candidates would write correct answers without working, or with cancelled or erased working.

Operations with directed numbers was a problem in this cohort. Most learners lost marks because of errors in operating with directed numbers. This was most common in questions involving algebra. These were questions **3**, **4** and **9(a).**

It was common for candidates to leave answers in the working space, not transferring them to the answer space. Several candidates drew diagrams using pens which disadvantaged them for cases where they needed to make changes here and there.

Word problems was a challenge to most candidates. Likewise, questions involving algebra were a great challenge. This year's cohort had a challenge with opening brackets. The candidates were multiplying the number outside the brackets with only the first term inside the bracket, for example, $5(2x+3)$ was gen as $10x+3$ instead of $10x+15$.

Question 1(a)(ii) was an accessible question, but candidates did not understand the command phrase 'Work out'. They were giving incomplete answers. All the candidates who got 99 in this paper lost a mark in this question.

Comments on specific questions

Question 1

(a) (i) Candidates were expected to work out 9.07 + 2.55.

Most candidates were getting the correct answer but went on to round it to 3 significant figures if not misplacing the decimal point. Common wrong answers were 11.6, 0.1162, 1162.

Expected answer: 11.62

(ii) Candidates were expected to work out $3^2 \times 3^3$

This question was fairly done.

The most common wrong answer was 3^5. This was an indication that some candidates did not understand the instructional term “work out”. Another common wrong answer was 9^5, where candidates were multiplying the bases and adding the indices. Some candidates were unable to evaluate 9 x 27.

Worth noting is that all the candidates who got 99 in this paper failed to get maximum marks in this question.

Expected answer: 243

(iii) Candidates were expected to work out $\frac{3}{4}$ of 100.

This question was well done by most candidates.

The most common wrong answer was 75%. Other candidates got $\frac{75}{100}$ while others had 0.75 as their final answers.

Expected answer: 75

(b) Candidates were expected to write down the first four integers greater than -3.

This question was fairly done.

Candidates who failed this question were giving any integers greater than -3. Some candidates had more than 4 integers while others had less than 4. It was common to present the answer as -2, -1, 0, 1 > -3 or -3 < -2, -3 < -1, -3 < 0, -3 < 1. Negative 0 was seen in some candidates' responses.

Expected answer: $-2, -1$, 0, 1

(c) Candidates were expected to write the square number between 60 and 70.

This question was well done even though some candidates were giving 8^2 or 8 x 8 as their final answer. Other common wrong answers were 65 and 68.

Expected answer: 64

(d) Candidates were expected to find the highest common factor (HCF) of 12 and 36.

This question was fairly done.

The most common wrong answer was 6 which was a result of failing to list all factors of 36. Other common wrong answers were 36 and 72 which resulted from attempting to find the LCM instead of the HCF of 12 and 36.

Expected answer: 12

Question 2

(a) From the table, candidates were expected to find the cost of sending a 245g parcel to South Africa.

This question was fairly done. Most candidates were able to write down the correct answer. A common wrong answers were E3.40 and E5.00

Expected answer: E3.20

(b) Candidates were expected to find the cost of sending a 637g parcel to Russia.

This question was fairly done. Most candidates were able to write down the correct answer for this question. A common wrong answer was E7.00.

Expected answer: E12.70

(c)(i) Based of the 40 parcels sent to Botswana, the candidates were expected to use the ratio 3 : 2 : 5 to find the number of parcels for Eswatini and Japan.

This question was poorly done. Most candidates were using the 400g to find the number of parcels. Common wrong workings were $\frac{3}{10} \times 400$ and $\frac{5}{10} \times 400$. Some candidates used this wrong working to find 120g : 80g : 200g for Eswatini, Botswana and Japan respectively, to coincidentally find the correct ratio 60:40:100. There were very few candidates who found the correct answers from correct working.

Expected answer: Eswatini: 60 parcels Japan: 100 parcels

(ii) Candidates were expected to use their answers to part (c)(i) to find the total cost of sending the parcels to the three countries.

This question was poorly done. Most candidates did not understand what was required by this question. A common answer was found by adding all the costs in the row of 251 – 500g, that is E3.40 + E5.00 + E7.00 = E15.40.

Expected answer: E1104

Question 3

(a) Candidates were expected to state the number of terms in the expression $3xy - 2x(5z + 3) + \frac{5yz}{x}$.

This was one of the easy questions which did not give the expected result. Most candidates were opening the brackets and count the number of terms in the resultant expression. Some common wrong answers were 4 and 5. Some candidates were writing the expression on the answer space.

Expected answer: 4

(b) Candidates were expected to solve the equation $4(2x + 9) = 4$.

This question was poorly done.

Candidates correctly opened the brackets to get $8x + 36 = 4$. Their most challenge was collecting like terms, some had $8x = 4 + 36$ while others had the correct $8x = 4 - 36$ but this resulted to $8x = 32$. The common wrong answers in this question were 4 and 5. Some of the candidates who divided by 4 both sides as their first step in this question, removed the 9 by division and this resulted to a most confusing solution even to the candidates.

Expected answer: x = - 4

(c)(i) Candidates were expected to simplify the expression $3t - 7s - 5t + 11s$ by first collecting like terms.

This question was poorly done. Some candidates failed to collect like terms correctly. They were moving the terms without their signs. Some candidates who collected like terms correctly failed to do correct operations on directed numbers. The most common wrong answers were $-2t - 18s$, $2t + 4s$ and $8t + 18s$.

Expected Answer: $-2t + 4s$

(c)(ii) Candidates were expected to simplify the algebraic fraction $2y + \frac{5y}{3}$.

This question was poorly done.

It was common for candidates to add 2y and 5y resulting to $\frac{7y}{3}$ as one of the common wrong answers. Some candidates were getting rid of the denominator hence their final answer was 11y.

Expected answer: $\frac{11y}{3}$

(c)(iii) Candidates were expected to simplify the algebraic fraction $\frac{3p^2}{4q} \times \frac{2q}{15p^3}$ by cancelling out common factors in both the numerator and denominator.

This question was poorly done.

Most candidates failed to simplify the fraction fully. Some candidates did not notice that after cancelling common factors the number 1 was left in the numerator. This resulted to most of them giving a common wrong answer of $10p$ or $2 \times 5p$. Some candidates were leaving their final answers as $\frac{1}{2(5p)}$.

Some candidates were simplifying the numbers only leaving out the letters as they are or simplifying the letters without simplifying the numbers.

Expected answer: $\frac{1}{10p}$

Question 4

(a) Candidates were expected to work out $2\begin{pmatrix} -3 & 4 \\ 0 & 1 \end{pmatrix}$.

This question was generally well done.

Most candidates who failed this question were not multiplying all entries in the matrix. This was shown by the common wrong answer of $\begin{pmatrix} -6 & 8 \\ 0 & 1 \end{pmatrix}$. Some candidates confused placement of entries after multiplying out, hence $\begin{pmatrix} -6 & 0 \\ 8 & 2 \end{pmatrix}$.

Expected Answer: $\begin{pmatrix} -6 & 8 \\ 0 & 2 \end{pmatrix}$

(b) Candidates were expected to express 40 as a product of its prime factors.

This question was poorly done.

Some candidates were failing to present the prime factors as a product. This resulted to the following common wrong answers: 2, 2, 2, 5 or $2^3(5)$. Some candidates did not write their final answers in the answer spaces after showing proper working in the working spaces. Another common wrong answer was $1 \times 2 \times 2 \times 2 \times 5$.

Expected Answer: $2^3 \times 5$

(c) Candidates were expected to factorise $18x^3 - 30x^2$.

This question was fairly done.

Most candidates were factoring out 6 leaving out the letters. Common wrong answers were $6x(3x^2 - 5x)$, $3x^2(6x - 10)$, $x(18x^2 - 30x)$, $6(3x^3 - 5x^2)$. The response $-12x^2$ was also see. Here candidates subtracted $-30x^2$ from $18x^3$, some working not expected in Mathematics.

Expected Answer: $6x^2(3x - 5)$

(d)(i) Candidates were expected to solve the equation $3y - 1 = 7 - 5y$.

This question was fairly done.

A common error was to collect like terms and making y the subject using wrong operations, for example, some candidates when taking the -5y to left hand side, subtracted 5 to get 3y – 6=7 which led to 3y = 13. Surprisingly, the 3 was removed by subtraction or addition such that their answers were y = 10 or y = 16.

Directed numbers was a challenge even in this question. Some candidates had 2y = 8 resulting to y = 4.

Expected Answer: y = 1

(d)(ii) Candidates were expected to solve the inequality $\frac{3 - 2x}{3} \geq \frac{1}{2}$

This question was poorly done.

It is still common for candidates to treat such questions like algebraic fractions where a long line is drawn below the denominators and find the LCM. This lead to $\frac{6-4x \geq 3}{6}$ and candidates were stuck thereafter. Some candidates left their answers as $6-4x \geq 3$. Some were failing to change the inequality sign where it was due.

Expected Answer: $6-4x \geq 3$

Question 5

(a)(i) Candidates were expected to use the points A(-2, 3) and B(1,k) to find the value of k given that the gradient is -3.

This question was poorly done.

Some candidates were using trial and error to find the answer. $\frac{4-13}{1-(-2)} = \frac{-9}{3} = -3 \Rightarrow k = -3$ was common. Some candidates used $m = \frac{x_x - x_1}{y_2 - y_1}$.

Expected answer: $k = 4$.

(ii) Candidates were expected to find the equation of the line.

This question was poorly done.

Working for this question was mostly seen in the answer space for part (a)(i). In fact, candidates first found the equation of the line in part (a)(i) before finding the value of k. Even in this question, operations with directed numbers was a challenge to some candidates. These candidates had $13 = -3(-2) + c$, giving $13 = -6 + c$, leading to $c = 19$.

Expected answer: $y = -3x + 7$

(b)(i) The candidates were given that Bheki is 8 years older than Maxwell and their father is 3 times older than Bheki and 32 years older than Maxwell. Using this information, the candidates were expected to write down an expression for Bheki's age in terms of x.

Poorly done

Most candidates failed to express Bheki's age in terms of x. Some of those who had an idea of what was required were writing equations like $y = x + 8$ and $x = x + 8$. Some candidates had $x - 8$.

Expected answer: $x + 8$

(b)(ii) Candidates were expected to write down two expressions for the father of the two brothers.

Poorly done

Most candidates were able to come up with the expression $x + 32$ derived from Maxwell's age. Coming up with an expression from Bheki's age was a bit challenge to most of the candidates. Candidates failed to include brackets when multiplying Bheki's age by 3, hence $3 \times x + 8 = 3x + 8$ was very common. Some candidates had equations instead of expressions here.

Expected answer: $3(x + 8)$ and $x + 32$

(b)(iii) Candidates were expected to equate the expressions in part (b)(ii) to form an equation, then solve it to find the value of x.

Poorly done

The candidates who had equations in part (b)(ii) had a challenge in answering this question. Some candidates failed to equate the expressions they got above instead they just wrote them separately.

Expected answer: $x = 4$

Question 6

(a)(i) Candidates were expected to use the given graph to find the distance travelled by one of the bikers.

Poorly done

Most candidates did not find the total distance for the return journey, instead they had 25 km which was a sing journey. Very few candidates got the 50 km which was the expected answer.

Expected answer: 50 km

(a)(ii) Candidates were expected to find duration of the time when Veli was not Stationary.

Poorly Done

Most candidates were able to find 15 minutes. From this, they were expected to divide by 2. A variety of solutions here were seen. Answers like 7 minutes 50 seconds, 7 minutes 5 seconds and 7.5 minutes 0 seconds. Some candidates got 15 minutes as their final answer.

Expected Answer: 7 minutes 30 seconds

(a)(iii) Candidates were expected to calculate the average speed between 17:15 and 17:45.

Poorly done

Some candidates failed to change 30 minutes into hours, hence they had $\frac{20}{30}$ km/h. Other common wrong answers were $\frac{30\ \text{min}}{20km} = 1.5km/h$ and $\frac{25}{30}$

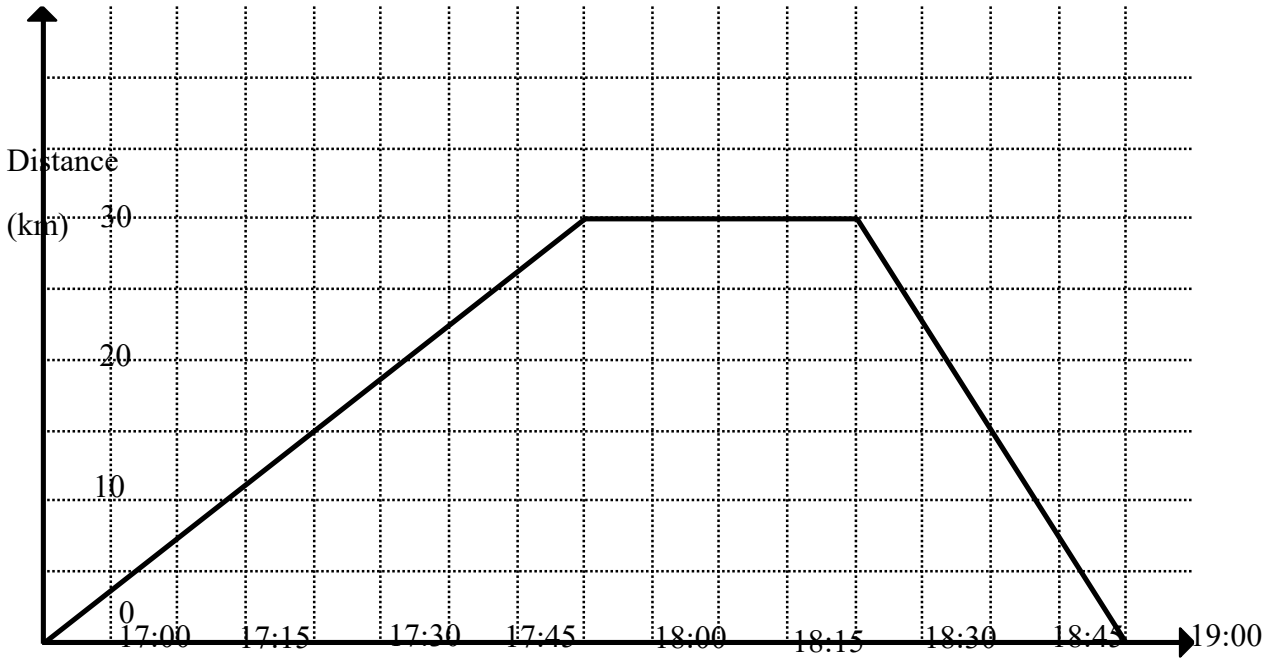
Expected Answer: 40 km/h

(b) Candidates were expected to draw the distance-time graph for Zakhe from the given information

Fairly done

Some candidates confused this diagram with the one in part (a). This was shown by the plotting of the point (17:15, 5) hence the first part of the required diagram was disturbed by this point, otherwise the other parts of the diagram were well done.

Expected answer:



(c) Candidates were expected to state the time when Zakhe arrived home.

Fairly done

Most candidates had the correct answer of 19:00 even though their drawn graphs did not show that.

Expected answer: 19:00

Question 7

(a)(i) Candidates were expected to write down the name of the given polygon.

Fairly done

Common wrong answers were pectagon, fivegone, petagon and polygon.

Some candidates had regular pentagon where the word regular was not necessary.

Expected answer: Pentagon

(a)(ii) Candidates were expected to find the size of an interior angle of the regular pentagon.

Poorly done.

Very few candidates differentiated between size of an interior angle and sum of interior angles of a polygon. Most candidates found the sum of interior angles of a pentagon, hence their answer was 540°. Some candidates got 75 when divided 360 by 5 hence their final answer was 105°. Other common wrong answers were 36° and 72°.

Expected answer: 108°.

(b)(i) Candidates were expected to reflect the given triangle on the line x = 8.

Fairly done

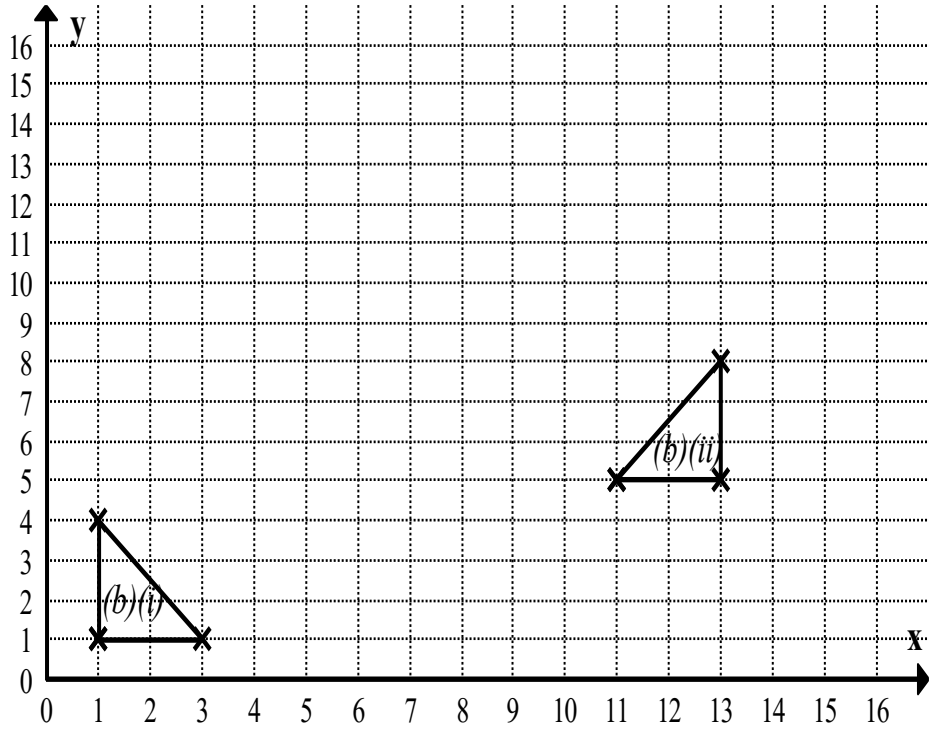
Most candidates who failed this question reflected on the line y = 8 instead of x = 8.

(b)(ii) Candidates were required to translate the given triangle using the translation vector $\begin{pmatrix} -2 \\ -4 \end{pmatrix}$

Well done

Most candidates were able to correctely translate the given triangle using the given column vector.

Expected answer:



(b)(iii) Candidates were expected to describe fully the single transformation that maps triangle A onto tringle B.

Fairly done

Candidates were able to recognise the transformation as enlargement even though a handful of them had **enlarged**. Some candidates had more than 1 transformation while some used clockwise or anticlockwise to describe enlargement. Some candidates stated that triangle B is 2 times bigger than triangle A. All these showed that candidates had some challenges with describing enlargement.

Some candidates failed to find the correct centre of enlargement while some had -2 as the scale factor.

Expected answer: enlargement, centre (1 , 4), scale factor 2.

Question 8

(a) Candidates were expected to use the given information to complete the given table showing frequency and sector angles.

Fairly done

Most candidates got the 45°. Most of them failed to fill in the other three blank spaces with correct values. The total number of students in their table exceeded the expected 200 and likewise the sum of the sector angles exceeded 360°

Expected Answer: 45°, 75, 70, 126°.

(b) Candidates were expected to use the table in part(a) to draw a pie chart.

Fairly done

No labelling of sectors was very common in this cohort. It was also common to see a sector for netball which was not even in the given table.

(c) In this question, candidates were required to use their tables to find the required probabilities. It was common for candidates not to divide the possible outcomes by the total outcomes, hence their answers were whole numbers. Some candidates used the sector angles to find the probabilities such that answers like $\frac{54}{360}$ were seen. Some candidates were wrongly simplifying the probabilities.

(i) Fairly done

Common wrong answers were $\frac{1}{30}$ and $\frac{3}{100}$

Expected answer: $\frac{30}{200}$

(ii) Fairly done

Some candidates failed to add the two probabilities. They presented their answers as two separate probabilities which were $\frac{75}{200}$ and $\frac{70}{200}$. Some candidates wrote in ratio form which was 145:200.

Expected answer: $\frac{145}{200}$

(iii) Fairly done

Most candidates knew that the answer here was 0 but had a challenge of presenting this 0. Several answers were seen, for example $\frac{0}{100}$, $\frac{0}{4}$, none.

Expected answer: 0 or $\frac{0}{200}$.

(d)(i) Candidates were expected to state the mode from the given table.

Fairly done

Most candidates were able to state the correct modal boot size. Some of those who failed this question were giving their answers as 9 which was the frequency related to the mode. Some had 6 as their answer.

Expected Answer: 7

(d)(ii) Candidates were expected to calculate the mean boot size from the given frequency table.

Poorly done

Some candidates were finding the median. Some had the correct calculations in the numerator but that was spoiled by dividing by 6, 7 or 42. Common wrong answers were: $\frac{195}{6}$, $\frac{195}{7}$, $\frac{195}{42}$ and $\frac{42}{7} = 6$.

Expected answer: 6.5

Question 9

(a) Candidates were expected to form an expression for the area of the shaded region in the given diagram and present it in its simplest form.

Poorly done

Some candidates had their final answer as $5(2x + 3)$. Some candidates were not inserting bracket in expressions, for example, $5 \times 2x + 3 - 3 \times x + 4$ resulting to $10x + 3 - 3x + 4 = 7x + 7$ or $7x - 1$.

Some candidates were failing to open brackets involving a negative sign outside. These candidates had $7x + 27$ as their final answer.

Expected answer: $7x + 3$

(b)(i) Candidates were expected measure the given line.

Well done

Most candidates were able to give the correct dimension of the line even though they had challenges with units, for example, some had 8mm. The most common wrong answer was 9cm.

Expected answer: 8cm

(b)(ii) Candidates were expected to bisect the given line.

Fairly done.

Candidates were able to bisect the line even though they did not have proper construction arcs if they had them. Some constructions arcs were only above or below the line to be bisected.

(b)(iii) Candidates were expected to locate the point C such that C is due South of A and AC meets the perpendicular bisector of AB.

Poorly done

Some marked the point C somewhere below the point A not meeting their bisector. Some located the point C along the line AB commonly the midpoint of AB.

Question 10

(a)(i) Candidates were expected to find the area of the given trapezium which is cross-section of the prism.

Poorly done.

Common wrong answers were $8 \times 6 = 48$, $6 \times 4 = 24$, $\frac{1}{2}(8 \times 6) = 24$.

Some of the candidates who used the formula $\frac{1}{2}(a+b)h$, could not identify the correct parallel sides and the height. Some of them had $\frac{1}{2}(8+6)\times 4 = 28$.

Expected answer: 36

(a)(ii) Candidates were expected to use the answer in part **(a)(i)** to find the volume of the prism.

Poorly done

Most candidates used the formula $V = l \times b \times h$ to find the volume of the prism. They had V = 8 x 6 x 4 =192. Some had 48 x 15 = 720

Expected answer: 540

(a)(iii) Candidates were expected to use their answer in part **(a)(ii)** to find the density of the prism given that its mass is 1350g.

Fairly done

Most candidates knew the formula for calculating density given the mass and the volume. The challenge in this question, candidates had complicated expressions to simplify from their answers in part (a)(ii). When trying to simplify their answers they failed to round off correctly. Common answers in this question were $\frac{1350}{192} = 7.03$ and $\frac{1350}{720} = 1.88$.

Expected answer: 2.5

(b) Candidates were expected to find the surface area of a cylindrical pipe of radius 3 cm and length 100cm.

Poorly done

Very few candidates got this question. This was a practical question that tested how much the candidates know about cylindrical pipes. Most candidates were closing the pipe on both side

hence the common wrong answer was 1940.52 form $2\pi rh + 2\pi r^2$. Some candidates used $\pi r^2 h = 3.14 \times 9 \times 100 = 2826$. Coincidentally some candidates had the correct answer of 1884 from $\pi r^2 h = 3.14 \times 3^2 \times 100 = 3.14 \times 6 \times 100 = 1884$ whereby their 3^2 was 6.

Expected answer: 1884





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