EXAMINATIONS COUNCIL OF ESWATINI

JC

EXAMINATION REPORT

FOR

MATHEMATICS

YEAR

2023

PAPER 1

INTRODUCTION

There were 18 582 candidates who sat for the 2023 Junior Certificate Mathematics Paper 1 examination. The paper consisted of 28 short-answer questions and the total marks for the paper was 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 did not get all the marks.

GENERAL COMMENTS

This year's cohort of Junior Certificate candidates performed fairly well when compared to last year's cohort. There were very few candidates who obtained a raw score of 0 while a considerable number of candidates were able to score 50% and above. The highest score was 97%.

Questions that generally seemed challenging to most of the candidates included **Question 2(b); Question 8; Question 10; Question 12(b); Question 13; Question 15; Question 19(a); Question 25(a) and Question 27(b)**. On the other hand, most candidates were able to get full credit in the following questions: **Question 1(a); Question 5; Question 12(a); Question 18(a);** and **Question 23** (Number of faces).

Most candidates were using the working space effectively and the answers spaces appropriately. However, there were some candidates who used the examiner's column to present their working instead of the working space – something not familiar.

COMMENTS ON SPECIFIC QUESTIONS

1. **(a)** Round off 395 to the nearest 10. [1]

(b) Write 0.15 as a fraction in its simplest form. [2]

Answers

(a) 400

(b) $\frac{3}{20}$

Comments

A majority of the candidates were generally getting both part (a) and part (b) of question 1 correct. Some candidates were making a mistake of leaving out either one or the two zeros thus compromising the value of the given number. Common errors witnessed in part (a) included: 4, 40; 390. For part (b) some candidates could successfully write 0.15 as a fraction but then leave their answer unsimplified (i.e. $\frac{15}{100}$). There were those candidates who did not remove the decimal point in the 0.15 and had a denominator of 100 (i.e. $\frac{0.15}{100}$).

2. Given that x and y are integers,

(a) Find the value of y when $-9 < y < -7$. [1]

(b) Find the value of x when $\frac{5}{8} < \frac{x}{16} < \frac{3}{4}$. [2]

Answers

(a) – 8

(b) 11

Comments

Question 2 was challenging to most of the candidates. There were very few candidates who obtained the correct answer more especially in part (b). In part (a) some learners could notice that y must be a number between – 9 and – 7 and therefore wrote – 8. However, part (b) was not that much trivial thus giving most candidates tough time. Some of the few candidates who attempted answering part (b) could either eliminate the denominator or write equivalent forms of the three fractions with a common denominator (i.e. $10 < x < 12$ or $\frac{10}{16} < \frac{x}{16} < \frac{12}{16}$).

3. A school has 400 learners.

The ratio of boys to girls is 9 : 11.

(a) Find the number of boys. [2]

(b) On a particular day, 50 boys and 50 girls were absent.

Find the ratio of boys to girls in school on that day. [2]

Answers

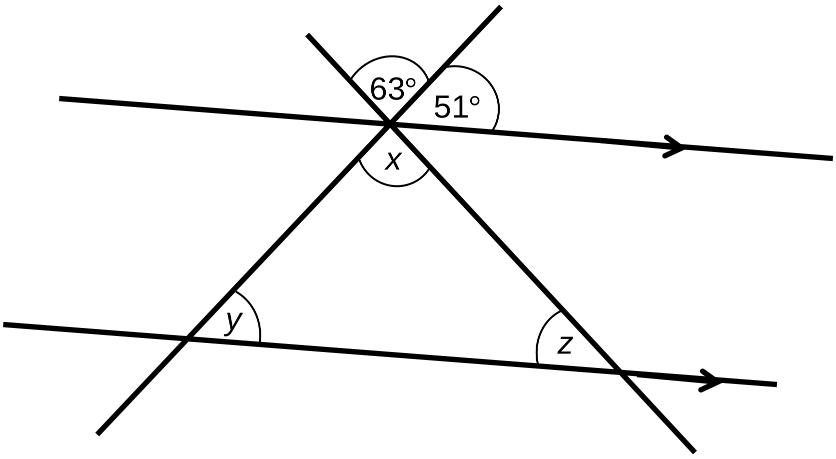
(a) 180

(b) 13 : 17

Comments

Performance in part (a) was fair and not good in part (b). A sizeable number of candidates was able to find the correct answer for part (a). Common errors included writing 9 as a fraction of 11 instead of 20 (i.e. $\frac{9}{11} \times 400$). For part (b), some candidates were leaving the ratio unsimplified (i.e. 130 : 170). Some candidates failed to notice the relatedness of part (a) and part (b) and treated part (b) in isolation to part (b) thus having an incorrect response (i.e. 50 : 50 = 1 : 1).

4. The diagram shows two parallel lines intersected by two straight lines.



NOT TO SCALE

Find the value of angles *x*, *y* and *z*. [3]

Answers

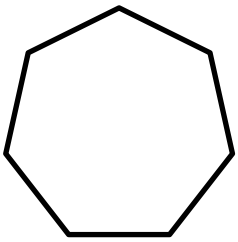
z = 63° , *y* = 51° , *z* = 66°

Comments

The overall performance of the candidates in Question 4 was not good. Candidates demonstrated deficiency in their understanding of angle pairs by failing to ascertain the values of the marked angles in the question. Common errors included swapping the angles and at time writing 60° for all the three angles.

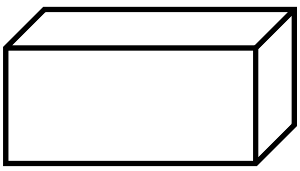
5. Use mathematical terms to complete the statements.

(a)



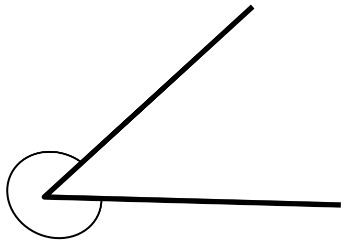
The name of the polygon is ………………………. [1]

(b)



This prism is a ……………………………………….. [1]

(c)



The type of angle marked is ……………….. [1]

Answers

(a) Heptagon

(b) Cuboid

(c) Reflex

Comments

Performance in this question was fair. A sizeable number of candidates were getting full credit. However, the candidates showed a huge problem of spelling as the responses were mostly spelt incorrectly. Some of the incorrect responses witnessed were as follows:

For Heptagon: hectagon; hectorgon; pentagon

For cuboid: cuboard; cube-board; rectangle

For reflex: reflect angle; exterior angle; anticlockwise; clockwise.

6. Simplify

(a) $36t^3 \div 9t^5$ [2]

(b) $(3xy^3)^3$. [2]

Answers

(a) $\frac{4}{t^2}$

(b) $27x^3y^9$.

Comments

This question was poorly performed overall. Most of the candidates seemed to have challenges with the laws of indices and hence were failing to simplify the given expressions correctly. In part (a) candidates would either divide the numbers correctly and the powers of *t* wrongly of vice versa (i.e. $4t^8$; $4t^{-8}$; $4t^2$; kt^{-2}). Common errors in part (b) included: $6xy^3$; $9x^3y^6$; $27xy^9$.

7. Show that $2\frac{1}{2} \div \frac{5}{16} = 8$. [2]

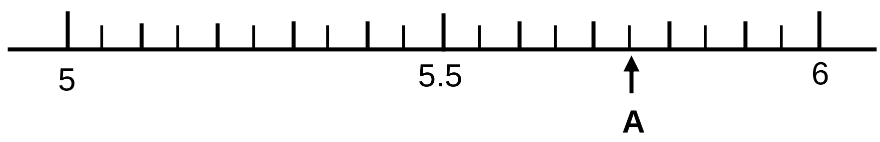
Answers

$\frac{5}{2} \times \frac{16}{5} = 8$

Comments

Performance in this question was good. Most candidates were able the correct steps in the division by a fraction. However, some candidates reciprocated neither or both of the fractions thus missing the point. Others would do it correctly but then continue to divide by 8 ending up having 1 = 1. Common errors included: $\frac{5}{2} \div \frac{5}{16}$; $\frac{2}{5} \times \frac{16}{5}$.

8. Write the number represented by A on the metre scale. [1]



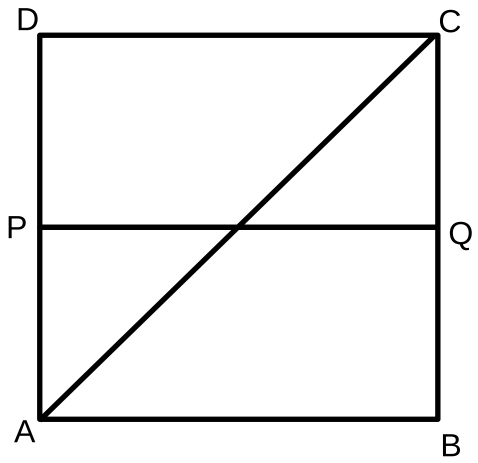
Answers

5.75

Comments

Performance in this question was not good. Most candidates were failing to write down the reading in the scale. The most common incorrect response was $5.7\frac{1}{2}$ and other errors were: 5.7.5; 5.8; 5.25.

9. The diagram shows a square ABCD.
P is the mid-point of AD and Q is the mid-point of CB.
AC id the diagonal of the square.



(a) Shade the region in the square ABCD that is closer to DC than AB, and closer to BC than DC. [1]

(b) The line PQ is the locus of points which are [1]

Answers

(a) As shown on the diagram

(b) Equidistant from DC and AB

Comments

This question was generally not well performed. Most candidates were shading wrong regions in part (a) and showed lack of command in loci. Common errors in part (b) included: parallel to AB and DC; midpoint of AB and DC.

10. The diameter of a circle is 6 cm to the nearest centimeter.

Find the upper bound and lower bound of the diameter. [2]

Answers

Upper bound = 6.5cm ; Lower bound = 5.5 cm

Comments

Performance in this question was poor. A very large proportion of the candidates was failing to respond accurately to this question. Some candidates would interchange the lower and the upper bound. Otherwise there was no common response to this question as candidates would present any number which made it difficult to follow their line of thinking.

11. The number of people who bought tickets to a soccer match was 35 800.

(a) Express 35 800 in standard form. [2]

(b) The price of a soccer match ticket is E53.

Calculate the amount received if 35 800 tickets were sold out. [2]

Answers

(a) 3.58×10^4.

(b) 1 897 400

Comments

Part (a) of question 11 was fairly performed was part (b) was generally well performed. In part (a) candidates were either misplacing the decimal point in 3.58 or missing the index in the power of 10. Sometimes, candidates would truncate or round off 3.58 to 1 decimal place. Common errors included: 3.58×10^{-4} ; 35.8×10^3 ; 3.584 ; 3.5×10^4 ; 3.6×10^4. The candidates who did not get part (b) correct were making mistakes while doing the long multiplication method, otherwise most candidates were getting it correct.

12. **(a)** A box contains 5 red marbles and 4 green marbles.

A marble is chosen at random.

Find the probability of getting

(i) A red marble, [1]

(ii) A marble, [1]

(iii) A black marble. [1]

(b) The probability that a school soccer team wins a soccer match is 0.67.

The probability that the soccer team loses the match is 0.25.

Find the probability that the team gets a draw. [2]

Answers

(a) **(i)** $\frac{5}{9}$

(ii) 1

(iii) 0

(b) 0.08

Comments

Part (a) in this question was fairly done while part (b) was not good at all. Most candidates were getting the probabilities in part (a) correct. However, some candidates either not presenting the probabilities as fractions or not simplifying fractions that could be simplified. Common errors included: 5 in part (i); $\frac{1}{9}$, $\frac{9}{9}$ in part (ii) and $\frac{0}{9}$, none in part (iii). In part (b) most candidates were failing to notice that they had to subtract the sum of 0.67 and 0.25 from 1 and hence their answers were incorrect. Some candidates did attempt to subtract the sum from 1 but obtained 0.8 instead of 0.08. Common errors included: 0.92; 0.8; 0.42.

13. Village B is due west of village A.

Find the bearing of

(a) Village B from village A. [1]

(b) Village A from village B. [1]

Answers

(a) 270°

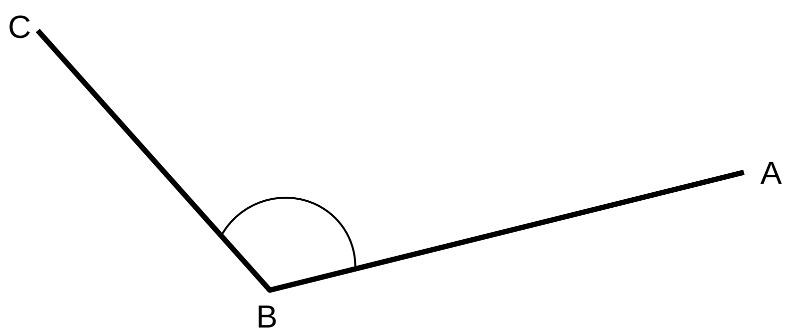
(b) 090°

Comments

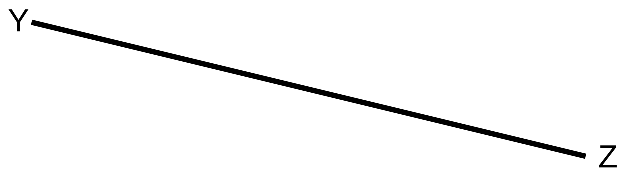
This question was poorly performed by the majority of the candidates. Seemingly most candidates were confusing west and east in the cardinal points and so their answers were inverted. There were some candidates who seemed not to have an idea that a bearing is an angle and that it must be presented using three figures. Common errors included: 180; B → A; 90°; 270° ±90°.

14. In this question, use a **ruler** and **compasses only**.

(a) Construct the bisector of angle ABC. [2]



(b) Construct the perpendicular bisector of the line YZ.



Answers

(a) As shown in the figure

(b) As shown in the figure

Comments

Question 14 was fairly done by most of the candidates. A common error witnessed in this question was the omission of construction arcs in the bisections which tempered with the accuracy of the constructions.

15. Ethan wants to travel 500 km on a business trip.
He hires a car from **Amazing – Ride**.
The chart shows the charge rate of **Amazing – Ride**.

Amazing – Ride
Cost (E) = E220 + E15 for every 10 km travelled

Calculate the cost of hiring a car from **Amazing – Ride** to travel 500 km. [3]

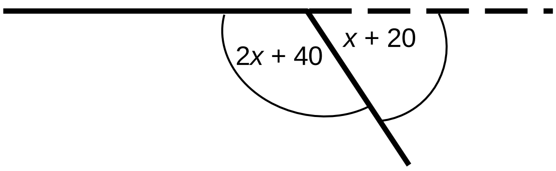
Answers

970

Comments

Question 15 was the trickiest question to the candidates. Very few candidates were able to compute the correct answer to this question. The majority of the candidates began by adding E220 to E15 and then multiplied by either 50 or 500 obtaining the incorrect answers 11750 or 1175000. Other common errors included: $15 \times 50 = 750$; $15 \times 500 = 7500$; $220 + 15 \times 500$.

16. The diagram shows part of a regular polygon.



The interior angle of the polygon is $2x + 40$.

The exterior angle of the polygon is $x + 20$.

(a) Find the value of x. [3]

(b) Find the number of sides of the regular polygon. [2]

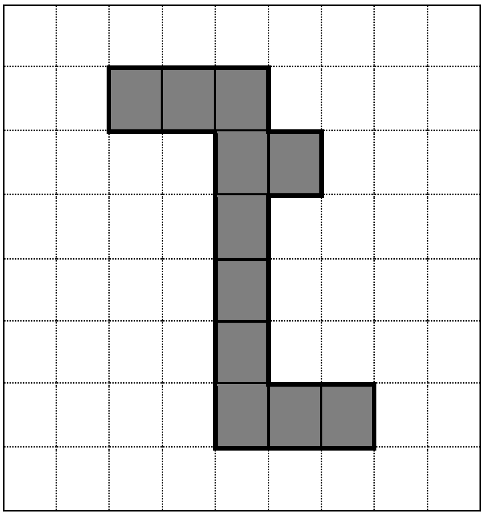
Answers

(a) 40°
(b) 6

Comments

Performance in this question was poor. The majority of the candidates were not getting the correct answers in this question. In part (a) candidates were failing to notice that the two angles made a straight line and were therefore supplementary. Common errors included: 2x + 40 + x + 20 ; 2x + 40 + x + 20 = 360 ; 2x + 40 = x + 20. In part (b) most candidates could not remember that the sum of exterior angles in a polygon is 360. Some of them were probably disturbed by their failure to obtain the correct response in part (a).

17. Shade a box such that the figure has rotational symmetry order 2.



Answers

As shown on the grid

Comments

This question was not well done. A large proportion of the candidature were failing to shade a square that would give a shape with rotational symmetry of order 2. Seemingly most candidates lacked understanding of rotational symmetry. Others would shade more than one square but still produced a shape that did not have the prescribed symmetry property.

18. Given the following set of numbers,

2 8 3 7 2 5

Find

(a) The mode, [1]

(b) The median, [2]

(c) The mean. [2]

Answers

(a) 2

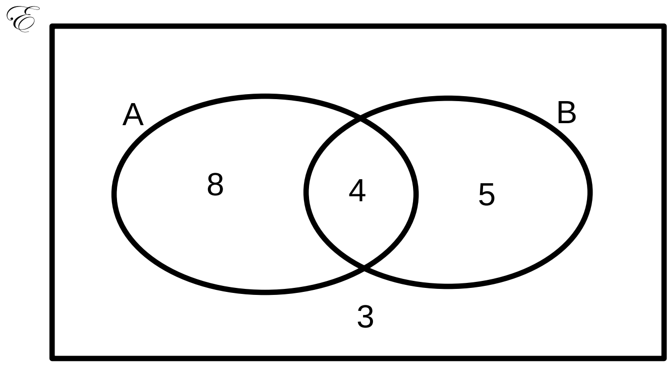
(b) 4

(c) 4.5

Comments

The performance in this question was fair overall. The majority of the candidates got part (a) (the mode) correct. A fair number of candidates were able to find the median and mean for the list of numbers. However, some candidates confused the median with the mean and hence their answers to part (b) and part (c) were swapped. There were also candidates who seemed to have forgotten the methods of calculating the median and the mean. Common errors for the median included: $\frac{3+7}{2}$; (3 and 5) ; $\frac{27}{6}$; 4.5). For part (c) – the mean – the common errors included: $\frac{3+5}{2}$; $\frac{27}{2}$; 4.

19. The Venn Diagram shows sets A and B.
The number of elements are indicated in each region.



(a) Find n(A´∩ B). [1]

(b) On the Venn Diagram above, shade (A ∩ B)´. [1]

Answers

(a) 5

(b) As shown in the diagram

Comments

Performance in Question 19 was poor. A large proportion of the candidates were failing to get the correct answers. In part (a) most candidates noticed that the question required the number of elements. However, it seemed difficult for the candidates to identify the region in which the number is sought. Again in part (b) it was a challenge for most candidates to identify the region sought.

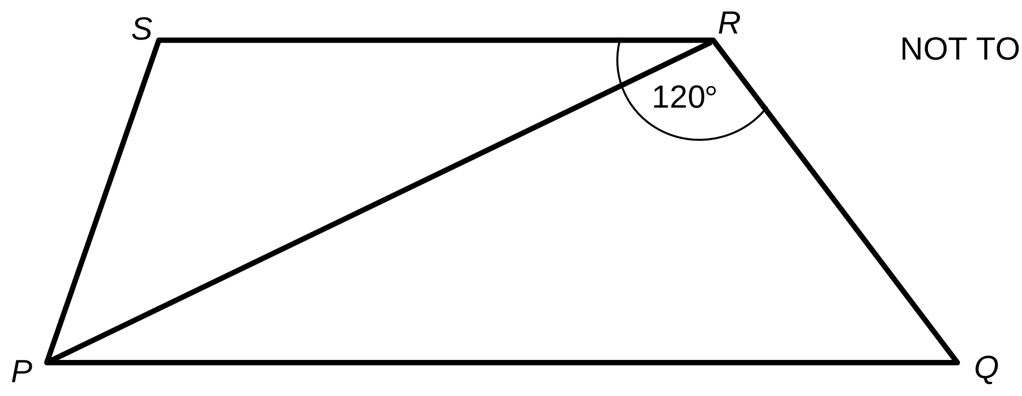
20. The diagram shows a trapezium *PQRS*.

SR and PQ are parallel.

Angle QRS = 120°.

Angle QRP to angle PRS = 2 : 1.

Line PR is a diagonal of the trapezium.



NOT TO SCALE

(a) Calculate angle PRS. [2]

(b) Calculate angle PQR. [2]

Answers

(a) 40°

(b) 60°

Comments

Question 20 was poorly performed by the candidates. In part (a) most candidates were failing to use the given ratio correctly and hence their responses were incorrect. The most common error was 180° – 120° = 60°. Performance in part (b) was better but still a number of the candidates were not getting the required response. Common errors in part (b) included 40° ; 80°.

21. (a) Simplify $7(y-1)-3(y+2)$, [2]

(b) Solve $16-2x \leq 6+3x$. [2]

Answers

(a) $4y-13$
(b) $x \geq 2$

Comments
This question was fairly done. A sizeable number of candidates were able to get the correct responses. A challenge in part (a) was in removing the brackets especially in the second bracket where a negative outside the brackets was involved. Common errors included: 7y – 7 – 3y + 6 : 7y – 7 – 3y + 5 ; 4y – 1 : 10y – 6. In part (b) some candidates were changing the inequality sign to an equal sign. Others were not inverting the inequality sign after division by a negative. Common errors included: x = 2 ; x ≤ 2 ; x > 2.

22. **(a)** Work out $15 - 36 \div 9 + \frac{1}{2}$ of 10. [3]

(b) **(i)** Express 900 as a product of its prime factors. [2]

(ii) Hence or otherwise, find $\sqrt{900}$. [1]

Answers

(a) 16

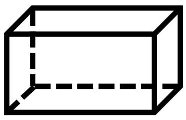
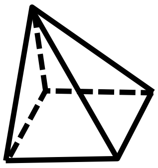
(b) **(i)** $2^2 \times 3^2 \times 5^2$

(ii) 30

Comments

The general performance of the candidates in Question 22 was not good. A number of candidates had a challenge with the order of operations in part (a) (i.e. $21 \div 9 + 5$). There were some candidates who followed the correct order of operations but failed to add and subtract the directed numbers and hence their answer was incorrect (i.e. $15 - 4 + 5 = 15 - 9 = 6$). Part (b)(i) was poorly performed by most of the candidates. Out of the few who attempted to find the prime factors of 900, some would add the prime factors instead of presenting them as a product. Others would leave one factor composite (i.e. $2 \times 2 \times 3 \times 3 \times 25$). Part (b)(ii) was also not well performed by most of the candidates. In this part question, some candidates seemed not to have an understanding of the square root. Others were distracted by the wording of the question (i.e. hence or otherwise) such that they had responses like “hence” or “otherwise”. Common wrong answers in part (b)(ii) included: 302 ; $900 \div 2 = 450$; 300.

23. Fill in the table below. [6]

Solid	Number of vertices	Number of faces	Number of edges
(a) 			
(b) 			

Answers

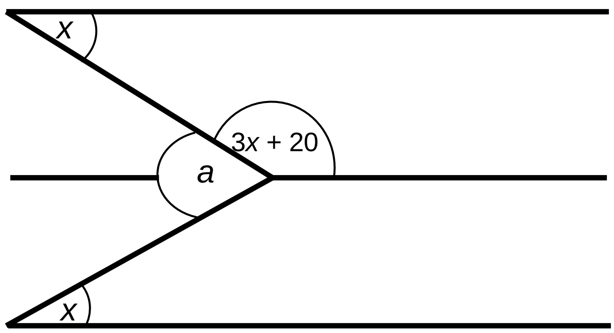
(a) 8 vertives ; 6 faces ; 12 edges

(b) 5 vertices ; 5 faces ; 8 edges

Comments

Question 23 was fairly performed by a majority of the candidates. Most of the candidates did not have a problem with faces as they would capture the correct numbers with respect to faces. However, numerous candidates were confusing vertices with edges and thus their responses were swapped.

24. The diagram shows three parallel lines.



NOT TO SCALE

(a) Find the value of x. [3]

(b) Hence find angle a. [2]

Answers

(a) 40

(b) 80

Comments

Performance in Question 24 was not good overall. Most candidates were not getting the correct responses in this question. For part (a), most of the candidates could not notice that the angles x and $3x + 20$ were co-interior or perhaps they had forgotten that co-interior angles are supplementary. Common errors in part (a) included: x + 3x + 20 = 360 ; 60° ; x + 3x + 20. For part (b) most candidates did not know how to calculate and so they would just write any value without working. Some candidates did notice that the value of a is twice the value of x and they multiplied their incorrect x by 2. Common errors in part (b) included: 120° ; 180 – (3x + 20).

25. **(a)** Express 195 minutes in hours. [2]

(b) Express 3^{-3} as a fraction. [1]

Answers

(a) 3.25

(b) $\frac{1}{27}$

Comments

Part (a) of Question 25 was not well done. Most candidates were able to find the number of full hours in 195 minutes but had a problem with expressing the remaining 15 minutes in hours. Common wrong answers included: 3.15 hours ; 315 hours ; 3 hours ; 3 hours 15 minutes. For part (b), most candidates had a challenge with the negative index. Some candidates could remember that the negative index meant the reciprocal but then failed to find the correct cube of 3. Common errors included: 27 ; – 27 ; $\frac{1}{9}$; $\frac{1}{3^3}$.

26. **(a)** Construct a triangle XYZ using a ruler, protractor and compasses.

XY = 10 cm, XZ = 7 cm and angle YXZ = 60°. [3]

(b) Measure line YZ. [1]

(c) State the name given to triangle XYZ. [1]

Answers

(a) Correct construction

(b) 8.9 cm

(c) Scalene triangle

Comments

This question was fairly done by most of the candidates. Problems in the construction of the triangle would be in measuring the 60° angle accurately and sometimes mearing the lengths of the sides. Another challenge noticed was in part © where candidates were required to give a name to the constructed triangle. A number of the candidates seemed not familiar with the scalene triangle and so they would name it as isosceles, equilateral or right angled triangle.

27. **(a)** Simplify $\frac{2h}{9} \times \frac{3}{h^3}$. [2]

(b) Convert 0.05 km to centimetres. [2]

Answers

(a) $\frac{2}{3h^2}$

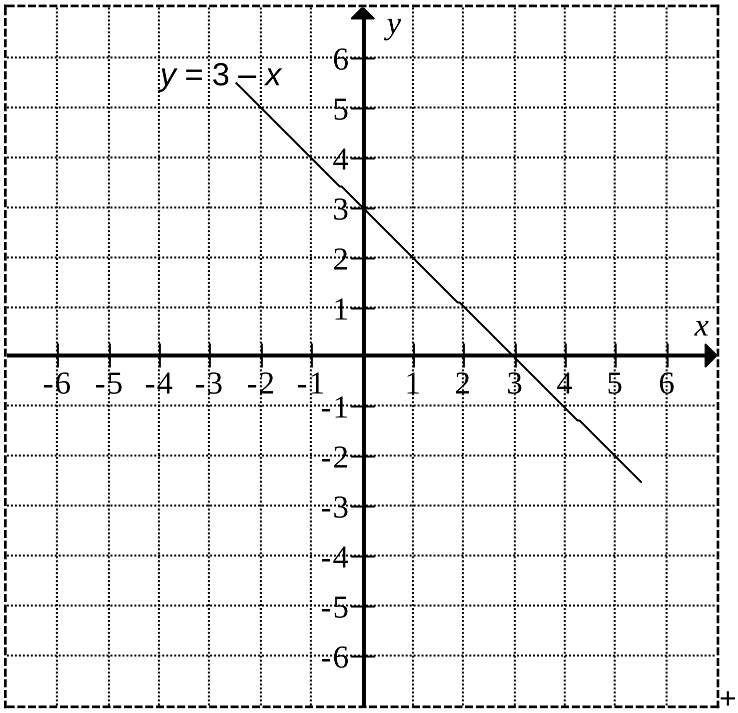
(b) 5 000

Comments

The majority of the candidates were failing to score all the marks in this question. In part (a), most candidates were placing the h^2 in the numerator when it was supposed to be a denominator. There were very few candidates who managed to convert the 0.05 km to centimetres in part (b). Most of the candidates were using incorrect conversion factors apart from the 100 000 and so their answers were incorrect. Other candidates were dividing by their conversion factors instead of multiplying. Common wrong answers included: 5 ; 50 ; 500 ; 50 000 ; 0.0005.

28. The grid shows the graph of y = 3 – x.

(a) Complete the table for the equation y = 2x – 3.



x	–1	0	3
y = 2x – 3		–3	

(b) **(i)** On the grid, draw the graph of y = 2x – 3. [2]

(ii) Hence, solve the equations

y = 3 – x

y = 2x – 3. [2]

Answers

(a) As shown in the table

(b) **(i)** As drawn on the grid

(ii) x = 2 ; y = 1

Comments

Performance in Question 28 was fair for most of the candidates. A number of the candidates could draw the correct line on the grid and complete the table correctly. However, some candidates could not notice that part (b)(ii) required the use of the graph and thus they used algebraic methods to solve the simultaneous equations. There were other candidates who attempted drawing a parabola on the grid while they had the correct table. This showed that some candidates could not relate the table to the graph of $y = 2x - 3$ required. This was evidenced by either a correct graph and wrong table or a correct table and wrong graph.

CONCLUSION

In conclusion, the 2023 Junior Certificate cohort of candidates generally showed a deficiency in knowledge and understanding of topics such as: Operations with directed numbers; Bearings; Loci and Sets. Most candidates could not add and subtract numbers involving negatives properly. They also seemed ignorant about bearings being special angles that are expressed using three figures. Moreover, unit conversion was more of a challenge to the candidates. On another note, most candidates were challenged by questions requiring the skill of problem solving (i.e. Question 3 and Question 15). Otherwise, candidates generally had enough time to write the paper and any blanks were allegedly due to failure to retrieve the required content knowledge on the candidates' side.

Paper 2

General Comments

The overall performance of the candidates was better compared to the previous years. Most candidates accessed the whole paper. Very few candidates left some questions unanswered. This means that the candidates had enough time to write the paper. The marks for this paper ranged from 0 to 99. There were fewer candidates who got zeros compared to other years.

This year, there were several cases of candidates misreading questions, like question **1(a)(i)** some did not see the negative sign before the brackets. Another question that had the same problem was question **5(b)** where some candidates misread *b* as *h* and *c* as *e*.

Most candidates had a challenge with solving equations let alone forming them. Cases of solving by 'inspection' were recorded where candidates will think of the solution to the equation and substitute it into the equation then conclude that that was the correct solution. This resulted to the poor performance of the candidates as the concept of solving equations was more than 20% of the paper.

There were some cases of drawing diagrams using a pen and writing working using a pencil and eventually erasing the pencil so that only solutions in the answer spaces are left.

Even this year there were candidates who got correct answers from the working spaces but ended up writing wrong answers in the answer spaces. Some were leaving the answer spaces blank even though they had some answers in the working spaces.

COMMENTS ON SPECIFIC QUESTIONS

Question 1

(a) (i) Fairly done

Some candidates misread the -2 outside the bracket such that their solution was $\begin{pmatrix}-18 & 2 & 30\end{pmatrix}$. Other candidates got the correct answer $\begin{pmatrix}18 & -2 & -30\end{pmatrix}$ but continued to add the entries to get $\begin{pmatrix}-14\end{pmatrix}$ which was one of the common wrong answers. Some candidates presented their solutions in the answer space without brackets. Some had commas separating the entries.

(ii) Fairly done

Operations using directed numbers was a big challenge in this question, for example, most candidates had $4 - {}^{-}1 = 3$ instead of 5. Common wrong answers were $\begin{pmatrix}4 & 3\\ -2 & 5\end{pmatrix}$, $\begin{pmatrix}1 & 3\\ -2 & 5\end{pmatrix}$, $\begin{pmatrix}4 & 3\\ 0 & 5\end{pmatrix}$.

(b) Fairly done

Most candidates who did not score in this question did not understand what the question required. They were writing the order of the matrix. Common wrong answers were 3 by 1, 2 and 2 by 3.

(c) Poorly done

Very few candidates had an idea of what was required by this question. Most candidates had $(5,7) - \begin{pmatrix}3\\ -4\end{pmatrix}$ and got stuck. Some candidates were able to present the coordinates of T as a position vector but ended up having $\begin{pmatrix}3\\ -4\end{pmatrix} - \begin{pmatrix}5\\ 7\end{pmatrix} = \begin{pmatrix}-2\\ -11\end{pmatrix}$ and eventually getting $(-2,-11)$ as the coordinates of S. Some candidates presented the coordinates of S as a column vector.

Some common wrong answers were $(-2,-11)$, $\begin{pmatrix}2\\ 11\end{pmatrix}$, $\begin{pmatrix}-2\\ -11\end{pmatrix}$

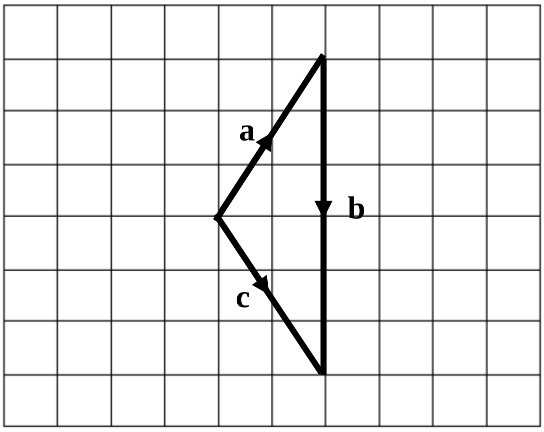
(d) Poorly done

Very few candidates got this question. A very common error was to join the ends of the given vectors. Some candidates just drew vector **c** in the diagram using the given column vector. Some added the column vectors of **a** and **b** to show that this gives vector **c**. Most of the candidates who had an idea of what was required by the question were leaving out the arrows or did not label their vectors.

Answers

(a) **(i)** $(18 \quad -2 \quad -30)$ **(ii)** $\begin{pmatrix} 2 & 3 \\ -2 & 5 \end{pmatrix}$ **(b)** 3 **(c)** (2, 11)

(d)



<u>Question 2</u>

This question was generally well done. There were no candidates that gave numbers not in the given list as their answers.

(a) (i) Fairly done

Some candidates gave 21 as a cube number. Some gave both 21 and 27.

(ii) Fairly done

Some candidates did not have an idea of what a range is. The common wrong answers were 27 and 11.

(iii) Well done

Most candidates got this question correctly. Since 17 was the only factor of 34 in the given list, it was easy for the candidates to find the correct answer.

(iv) Well done

This question was got by most candidates. Candidates figured out that 7 was the only common factor of 21 and 35 from the given list.

(b) (i) Fairly done

Most candidates were able to write the sequence correctly. Most of the candidates who missed the sequence had -4 as the next term after 1, hence one of the common wrong answers was -4, -8, -12. Some candidates wrote only one term which was -3 leaving the other ones out.

(ii) Poorly done

Most candidates had an idea of the rule of the sequence but failed to present it in the correct way hence some common wrong answers were $x-4$, $n-4$, $x \to x-4$. Some candidates gave a long explanation of the rule of the sequence such that they ran out of the answering space.

Answers

(a) **(i)** 27, **(ii)** 22 **(iii)** 17 **(iv)** 7 **(b)** **(i)** -3, -7, -11 **(ii)** subtract 4

Question 3

(a) Well done

Most candidates were able to subtract time correctly.

(b) Poorly done

Very few candidates got this question correctly. Some candidates missed the next departure time from Mbabane after 0740 hours. They took it as 1150 hours which was the arrival time to Matsapha for Trip 2. A common wrong answer was 4 hours 10 minutes.

(c) Poorly done

Most candidates got the correct answer from wrong working in this question. Some added the distance between Mbabane and Matsapha to get 36 + 36 = 72. Some candidates failed to convert 30 minutes into ours hence they had $\frac{36}{30} = 1.2$ km/h which was the most common wrong answer.

(d) Poorly done

Very few candidates had an idea of what was required by this question. Most candidates had a good start when answering the question since $\frac{36}{90}$ was very common. Some failed to convert $\frac{36}{90} = 0.4$ into minutes. They just left their answers as 0.4. Some candidates who were able to convert 0.4 hours into 24 minutes missed the subtraction of times. They were getting 1730 – 24 = 1705.

Most candidates missed the instruction 'Write the departure time for trip 3 **in the table**'. They were not writing their answers in the table hence did not score all marks.

Answers

(a) 35 minutes **(b)** 3 hours 40 minutes **(c)** 72 km/h **(d)** 1706 hours

Question 4

(a) (i) Fairly done

Most candidates were able to state the correct transformation but failed to describe it. Most candidates had a challenge of getting the correct equation of the line of reflection. They gave it as y = -2 instead of x = -2. There were cases where candidates gave the line of reflection as = -2.

(ii) Poorly done

Most candidates failed to get the desired response to this question. Most candidates wrote the transformation and did not describe it. Some of those who described the transformation were stating the centre leaving the angle and direction while others stated the angle without direction and centre. It was very common for candidates to write 90°without direction. Some were writing -90°anticlockwise. There were some cases where candidates gave the centre as 0 or 0,0.

(b) Generally this question was fairly done, however, some candidates swapped the labels or were not labelling at all.

(i) Well done.

Most candidates were able to give the correct translation but some were challenged by the labelling.

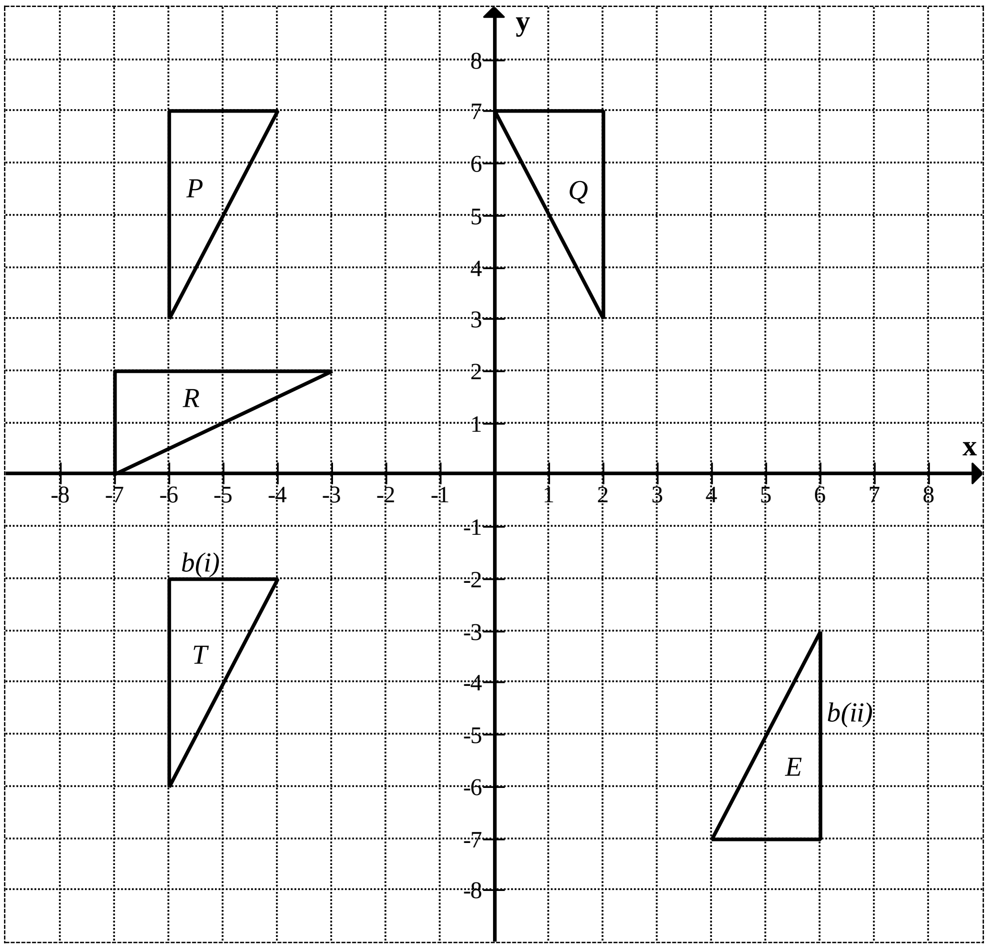
(ii) Poorly done

Some candidates left this question unanswered. Some candidates had their image in the second quadrant of which it was either smaller or bigger than P. There were candidates who had the image of P congruent to P, on the correct quadrant and facing the correct direction but sifted a little bit up or down. This showed that the candidates were not using their rulers correctly. Some candidates misinterpreted the part of the question **scale factor -1 about the origin** such that they use (-1, 0) as their centre of enlargement.

Answers

(a) (i) Reflection, line $x = -2$. **(ii)** rotation, centre (0, 0), 90° anticlockwise

(b)



<u>Question 5</u>

(a) Fairly done

Most candidates were able to substitute but were unable to work out to the correct answer. Most candidates were not putting brackets when substituting into q^2 such that $3(2) + -3^2 = 6 - 9 = -3$ was very common. There were few cases where candidates missed the sign in between 3p such that 3p = 32 after substitution was seen.

(b) Poorly done

Most candidates were giving partial factorisation while others were cancelling out the common factors to be factorised and gave 2a + 11c as their final answer. Common wrong answers were b(6a + 33c) or 3(2ab + 11bc)

(c) (i) Poorly done

Most candidates were able to collect the like terms up to 5x = 20 but wrote this in the answer space or substituted their = sign for a minus sign such that their answer was 5x – 20.

(ii) Poorly done

Most candidates we unable to remove the fractions. They used incorrect LCMs as a result, they got stuck along the way. Common wrong LCM were $3b^2$ and $9b^2$. Some candidates would write the left hand side as a single fraction but failed along the way.

(d) Poorly done

Most candidates lost the denominator so that their final answers were 2x + 9 or 2x + 21. Removing the second bracket while trying to write as a single fraction was a challenge to most of the learners. This was evident by $\dfrac{5x + 15 - 3x - 6}{15}$

(e) (i) Poorly done

This question was inaccessible to most of the candidates. Interpreting the word problem to algebra was a no go area to most of the candidates. Some of those who tried used J instead of the given x such that their expression was 2J – 3. Some wrote J = 2x – 3.

(ii) Poorly done

Most candidates were equating their expression in part **(e)(i)** to 97. The common wrong answer was 2x – 3 =97 which gave 50.

Answers

(a) 15 **(b)** $3b(2a + 11c)$ **(c)(i)** $x = 4$ **(ii)** $b = 4$ **(d)** $\dfrac{2x + 21}{15}$

(e)(i) $2x - 3$ **(ii)** $x = 20$

Question 6

(a) Fairly done

Some candidates did not change the given dimensions to the same units. $\frac{15}{0.5} \times 100$ was common. Some candidates had $\frac{15}{100} \times 0.5$.

(b) (i) Well done

Few candidates calculated using compound interest instead of simple interest. Some candidates did not answer the question. They were giving the simple interest instead of the whole amount to be paid after 3 years. Some candidates multiplied the E5000 by 3 then added the simple interest to get E15750 as their final answer.

(ii) Fairly done

Some candidates divided 3100 by 15 instead of 15.5. Some ignored the decimal point hence divided by 1550.

Answers

(a) 30% **(b)(i)** E5750 **(ii)** $200

Question 7

(a) (i) Poorly done

Most candidates did not have an idea of what was required by the question. Some wrote the correct answer without working while some equated the wrong sides.

(ii) Poorly done

Most candidates proved to know what perimeter is. This was evident as most candidates added the three sides of the triangle to get 7x + 9 and gave this as their final answer. Very few candidates substituted their value of x in part (a)(i) into 7x + 9.

(b) (i) Poorly done

Candidates had a challenge with 'show that' questions. In this questions a lot of workings that led to the answer of 8 were seen. For example 10 – 2 = 8, 16 ÷ 2 = 8, 4 + 4 =8. Very few candidates noticed that the Pythagoras' rule should be used. Some of these had $8^2 + 6^2 = 10^2$ which is a wrong way of proving. Some candidates wrote $6^2 + 10^2 = 136$ therefore BC = $\sqrt{136}$. There were those candidates who simple drew an 8 cm long line in the answer space.

(ii) Fairly done

Most candidates were able to write $\sin B = \frac{6}{10} = 0.6$. The common mistake was to skip the step $B = \sin^{-1} 0.6$ and wrote the final answer of which most rounded it to 37° instead of 36.9° and that resulted to a loss of marks. Very few candidates confused the trigonometric ratios. A solution like 360°- 90°= 270° was common to some candidates.

(b) (iii) Poorly Done

This question was inaccessible to most candidates. Most candidates who tried it did not use the correct formula for the area of a semi-circle while others used a radius of 4cm instead of 5cm. The following errors were common for the area of the semi-circle; 3.14×4^2, 3.14×10, 3.14×10^2, 3.14×5^2. Some candidates had difficulty in finding the area of the triangle, they were unable to recognise the correct height, hence the following error was common. $\frac{1}{2} \times 6 \times 10 = 30$.

Answers

(a) (i) $x = 2$ **(ii)** 23 **(b)(i)** 8 cm **(ii)** B = 36.9° **(iii)** 15.25 cm^2

Question 8

(a) Poorly done

Answers like, 1 < 4, $x < 1 \leq 4$ were common. Some candidates wrote one of these; $x > 1$ or $x \leq 4$. There were those candidates who wrote 'flow of numbers' as their answer for this question.

(b) (i) Fairly done

Most candidates recognised that the line passes the y-axis at -2 but failed to present this correctly. Their common wrong answers were y = -2, x = -2, (0, -2) .

(ii) Poorly done

Most candidates failed to calculate the gradient correctly. They picked wrong coordinates from the line as they confused the scale, for example $m = \frac{-3-1}{-1-1} = 2$ was common.
Common wrong answers were y = 2x – 2 , y = x – 2 , y > -2.

(iii) Poorly done

Some candidates who got the right answer in part (b)(ii) were substituting y for x in their inequality. They had $x \geq 4x - 2$. There were those candidates who used a strict inequality.

Answers

(a) $1 < x \leq 4$ **(b) (i)** -2 **(ii)** $y = 4x - 2$ **(iii)** $y \geq 4x - 2$

Question 9

(a) Fairly done

Most candidates had an idea that $density = \frac{mass}{volume}$ but failed to rearrange for volume to be subject as a result $\frac{2}{700}$ was common and surprisingly this gave the correct answer of 350 for some candidates. Those candidates who could not relate density and mass for volume had the following wrong answers. $5 \times 7 = 35$, $\frac{700}{35} = 20$.

(b) Poorly done

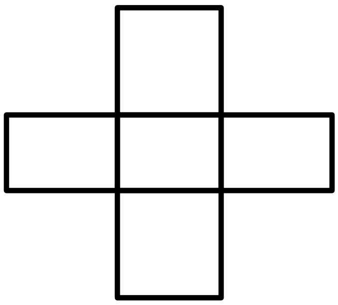
It was common for candidates to get the correct answer either from wrong working or no working in this question. Some had $\frac{700}{35} = 10$, while others had $7 \times 5 \times 10 = 350$ then concluded that the answer is 10.

(c) Poorly done

A lot of unexpected answers were seen on this question. Some candidates draw a football goal post with a net. Most candidates nicely drew card boxes with flips on top to show that it is open. Some of those who had an idea of what a net is had 6 faces or even 7 faces.

Answer

(a) 350 cm^3 **(b)** 10 cm

(c) 

Question 10

(a) Well done

Most candidates got this question correct. Those candidates who couldn't score maximum marks were either omitting the frequency for 0 books of misreading the frequency for 4 books. It was common that candidates write the frequency for 4 books as 6.5 or 8 or even 9.

(b) Well done

Most candidates who did not score marks in this question were leaving out the frequency for 0 books lost even if they had it in their frequency tables, hence the common wrong answer was 52.

(c) Well done

The common wrong answers for this question were 16 or 4.

(d) Poorly done

Some candidates were finding the median instead of mean. A common error was to write the mean as $\frac{60}{6} = 10$. Some divided their sum of frequency × variable by 6, i.e $\frac{133}{6}$. Some candidates who gave their answer as a decimal were giving it to 2 significant figures.

(e) Poorly done

Most candidates used the 5 for 5 lost books instead of frequency to calculate the sector angle. They had $\frac{5}{60} \times 360° = 30°$ as the common wrong answer. Some calculated percentage instead of sector angle. Some candidates drew a pie chart for this question.

(f) Poorly done

Most candidates who did not score maximum marks in this question added the frequencies for 4 and 5 to get 7 + 4 = 11 and left that as their answer. Some were confused by 'more than' such that they included the frequency for 3 in their calculation. These had $\frac{25}{60}$ as a common wrong answer.

Answers

(a)

Number of books	0	1	2	3	4	5
Number of learners	**8**	11	**16**	**14**	**7**	**4**

(b) 60 **(c)** 2 **(d)** $2\frac{13}{60}$ **(e)** 24° **(f)** $\frac{11}{60}$