

EXAMINATIONS COUNCIL OF ESWATINI

JC

EXAMINATION REPORT

FOR

ADDITIONAL MATHEMATICS

YEAR

2020

JC EXAMINATION REPORT

FOR 2019

JC ADDITIONAL MATHAMETICS

Paper 519

GENERAL COMMENTS

The paper looked accessible to candidates compared to previous year's paper.

Candidates appeared to have had sufficient time to finish the paper. Generally candidates showed their working in the appropriate space. Very few candidates failed to transfer their answers to the answer space.

In spite of the paper looking accessible, the performance of candidates was generally poor. Some questions were hardly attempted. These included Questions 3, 4 and 8(d). Marks ranged from Zero to 100. There were many candidates getting zeros and single digit grades from several centres. The highest mark of 100 was rare.

Candidates still do not follow instructions in some questions. Premature rounding and truncation of numbers was quite common and this resulted in unnecessary loss of accuracy marks. Candidates should be encouraged to use the calculator correctly and only round-off the answer.

COMMENTS ON SPECIFIC QUESTIONS

1 (a) (i) This question was very well done. Most candidates were able to multiply by the negative scalar.

Correct Answer: $\begin{pmatrix} 6 & 14 \\ -10 & 2 \end{pmatrix}$

(ii) This was fairly well done. Some candidates did not put brackets, simplify or else left their answer as a 1 by 3 matrix.

Common incorrect answers; $(3 \ 20 \ 0)$, 23 , $(3 + 20 + 0)$, $\begin{pmatrix} 3 \\ 20 \\ 0 \end{pmatrix}$

Correct Answer: (23)

(iii) This question was poorly done. Common error was that some candidates multiplied the second matrix by -3 , obtaining $\begin{pmatrix} -9 & 3 \\ 15 & 0 \end{pmatrix}$. This resulted in matrices multiplying each other in the next step. For instance, $\begin{pmatrix} 4 & -2 \\ 0 & -3 \end{pmatrix} \begin{pmatrix} -9 & 3 \\ 15 & 0 \end{pmatrix}$.

Correct Answer: $\begin{pmatrix} -5 & 1 \\ 15 & -3 \end{pmatrix}$

(b) This question was fairly well done; most candidates were able to get the value for a , but had difficulty to obtain the value for b . Some were able to get the equation for b but fail to solve it correctly. Common incorrect answers; $a = -16$, $a = 6$ $b = 10$ $b = 8$

Correct Answer: $a = -2, b = -16$

2 (a) This was very poorly done. Most candidates cross multiplied by the denominator, resulting in the denominator being eliminated. This resulted to an answer of $4x - 16$. Quite a number of candidates still do not multiply by a negative outside a bracket correctly resulting in $\frac{7x-7-3x+9}{(x+3)(x-1)}$. Other candidates would simply subtract the

numerators and get $\frac{4}{(x+3)(x-1)}$. Other common incorrect answers included $\frac{5x-16}{(x+3)(x-1)}$

and $\frac{4x-2}{(x+3)(x-1)}$.

Correct Answer: $\frac{4x-16}{(x+3)(x-1)}$

(b) (i) This question was fairly well done. Some candidates wrote the sign the wrong way round, like $(x + 6)(x - 2)$. Another common incorrect answer was $(x - 4)(x + 3)$. Other candidates changed the expression into an equation and solved it. $x - 6 = 0$ or $x + 2 = 0$ $x = 6$ or $x = -2$

Correct Answer: $(x - 6)(x+2)$

(ii) This was poorly done. Common incorrect answers were $(p - 1)$ p $(p - 1)(p + 1)$ $p(p - 1)$ $(p \pm 1)$ $(p^2 - 1)(p^2 + 1)$

Correct Answer: $(p - 1)(p+1)$

- (c) This question was poorly done. Most candidates were multiplying by the LCM only on the left hand side resulting in $10 - 5x - 12 = 1$. Some were correctly multiplying by the LCM both sides but would still bring back the denominator (LCM). For example; $\frac{10-5x-12}{15} = 15$. Other candidates omitted the negative sign in the answer; $x = 3\frac{2}{5}$, or $x = \frac{17}{5}$.

Correct Answer: $x = -3\frac{2}{5}$

- 3 The whole of this question was left unanswered by most candidates. Some candidates failed to express the vectors in terms of \underline{a} and \underline{b} . They simply wrote the routes using capital letters such as $\overrightarrow{CD} = \overrightarrow{CP} + \overrightarrow{PD}$.

- (a) (i) This question was fairly done. Some candidates seemed not to have read the given information about the diagram. They misinterpreted \overrightarrow{OP} as $9\underline{a}$ yet it was given that $\overrightarrow{AD} = 9\underline{a}$. Common incorrect answer was $3\underline{a}$.

Correct Answer: $2\underline{a}$

- (ii) This was poorly done; Common incorrect answers were $\overrightarrow{CP} + \overrightarrow{PD}$ and $3\underline{b} + 2\underline{a}$

Correct Answer: $3\underline{b} + 2\underline{a}$

- (iii) This question was fairly done. Most candidates did not simplify their answers, for instance they gave it as $-9\underline{a} + 2\underline{a} - 3\underline{b}$. A few number of candidates were unable to work out directed number correctly. Common incorrect answer was $7\underline{a} - 3\underline{b}$.

Correct Answer: $-7\underline{a} - 3\underline{b}$

- (iv) This was fairly done. Most candidates failed to simplify their answers. Some candidates mixed component and base vectors, for example $\overrightarrow{CA} = -5\underline{a} + \overrightarrow{BA}$

Correct Answer $3\underline{b} - 7\underline{a}$

(b) (i) This question was well done. Most candidates got this one correct. Some of them subtracted instead of adding the squares under the square root sign. Others left the answer as $\sqrt{89}$, which resulted in loss of accuracy mark. Quite a number of candidates were not giving the answer to the correct significant figure.

Correct Answer: 9.43

(ii) This was very poorly done. Most candidates were not able to show that the two vectors were parallel. Some of them simple equated the two vectors, producing $-5 = 3x - 2$ which was incorrect. Not many candidates were able to prove that one vector was a scalar multiple of the other.

Correct Answer: $x = -\frac{1}{6}$

4 The whole of this question was generally poorly done. Most candidates seemed to have no clue about probability. For instance, their answers were given as whole numbers instead of fractions. Impossible, yes or no were common incorrect answers. Some did not even attempt to answer the whole question. Some of the few who answered the question wrote 12 as denominator instead of 36.

(a) This was poorly done. Candidates were looking for the number seven from the space diagram hence zero or impossible were common incorrect answers.

Correct Answer: $\frac{6}{36} \left(\frac{1}{6} \right)$

(b) This was poorly done. Some candidates did get 15 as the numerator, many did not have 36 as their denominator.

Correct Answer: $\frac{15}{36} \left(\frac{5}{12} \right)$

(c) This was poorly done; many probably did not know square numbers. Common incorrect answer was $\frac{2}{36}$.

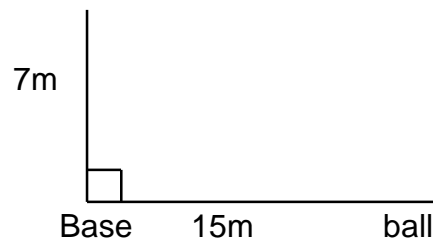
Correct Answer: $\frac{4}{36} \left(\frac{1}{9} \right)$

- (d) This was poorly done; many candidates probably did not know a multiple of a number.

Correct Answer: $\frac{2}{36} \left(\frac{1}{18} \right)$

- 5 (a) This question was fairly well done. Some sketches were just a right angle without labels. Some candidates did not understand the given statements correctly such that most of them interchanged the labeling of 7m and 15m. The 15m was placed on the hypotenuse side of a triangle.

Correct Answer: boy



- (b) This was poorly done. This was of course affected by the incorrect sketches. Some of those who got sketch correct did not round the final answer correct. Most candidates still seemed not to know that the angle of elevation is the same as the angle of depression. Common incorrect answers were 25° , 65° and 65.0° .

Correct Answer: 25.0°

- 6 (a) (i) This question was fairly well done. Most candidates were able to remove the denominator by multiplying by 3 both side. They were however failing to remove the square root sign correctly. Some were only squaring the side with the square root sign. Some were squaring both sides but only squared 3 or m producing equations like $9m = n - 8$ and $3m^2 = n - 8$.

Correct Answer: $n = 9m^2 + 8$

- (ii) This was fairly well done. Candidates who got the correct formula were able to substitute correctly. Many of those who did not get the correct formula were able to substitute in their formulas. Most of them went back to the original equation to substitute in it. Many candidates would however fail to get the correct answer after substituting correctly.

Correct Answer: 44

- (b) This question was well done. Most candidates were able to get the correct answer. Very few of them failed to change the inequality sign after dividing by a negative. Some changed the inequality sign to an equal sign. Common incorrect answers were $x = \frac{7}{4}$ and $x > \frac{7}{4}$.

Correct Answer: $x < \frac{7}{4}$

- (c) (i) This was well done. Many candidates were able to get the correct answer. Very few of them were able to substitute with 2 in the function but failed to work out and simplify correctly. Common incorrect answer was -2 .

Correct Answer: $\frac{4}{5}$

- (ii) This was well done. Many candidates were able to get the correct answer. Very few of them were able to substitute with zero in the function but failed to work out and simplify correctly.

Correct Answer: $\frac{-1}{5}$

- (d) (i) This question was fairly well done. Most candidates were able to realize the connection between opposite sides of a rectangle and formed the required equations. Some of them seemed not to understand the question at all. Common incorrect answers were $3x + 2y = 6$, $2x - 3y = 9$; $(3x + 2y)9$, $(2x - 3y)6$; $3x + 2y$, $2x - 3y$.

Correct Answer: $2x - 3y = 6$ $3x + 2y = 9$

- (ii) This was well done. Those candidates who got correct equations in (i) were able to solve the two equations simultaneously. Most of those who did not get the correct equations in (i) were able to solve their equations correctly. Very few failed to get correct answers from correct equations.

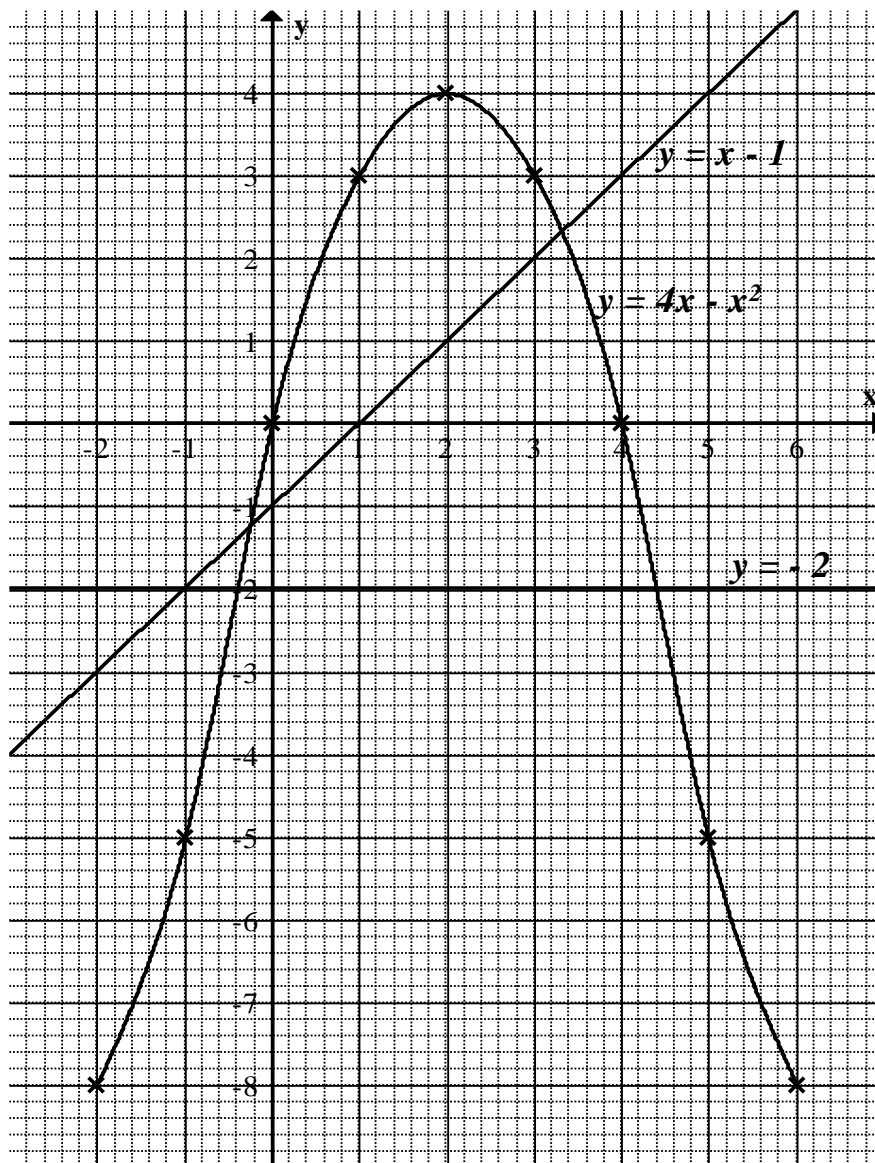
Correct Answer: $x = 3$ and $y = 0$

- 7 (a) This was very well done. Many candidates were able to get these correct.

Correct Answer: $p = 4$ $q = -5$

- (b) This question was generally well done. All points were plotted correctly although some omitted the first and the last coordinates. This was probably due to incorrect given y-value for both coordinates. Most candidates drew a smooth curve. Very few candidates still use straight lines in joining the points which result in loss of a mark. Candidates should be encouraged to use a free-hand when drawing the curve.

Correct Answer:



- (c) This was well done. Most of the candidates were able to get the correct answer. A small number of them did not know how to write an equation of a line. Common incorrect answer was $y = 2$.

Correct Answer: $x = 2$

- (d) (i) This question was poorly done. Those with correct graphs were able to get it correct. Many candidates did not draw the graph $y = -2$. Some candidates did not use the graphs but just solved the equation algebraically. Others candidates still do not write the negative sign for the point on the negative axis.

Correct Answer: $x = -0.4$ or $x = 4.4$

- (ii) This was very poorly done. Very few candidates were able to draw the graph $y = x - 1$. Some were not accurate in reading the values from the x-axis. Some did not write the negative sign for the point on the negative axis

Correct Answer: $x = -0.3$ or $x = 3.3$

- 8 The whole of this question was generally very poorly done. Most candidates did not attempt to answer it. Some candidates seemed not to know when to use the trigonometric ratios and the Pythagoras rule.

- (a) This was poorly done. Very few were able to use the cosine ratio correctly. Many candidates were confusing the ratios. Some used sine instead of cosine. Common errors were $\cos 25^\circ = \frac{SR}{10}$, $\sin 25^\circ = \frac{10}{SR}$. Some of the few that used the correct method/ratio rounded off the answer to two or four significant figures which resulted in loss of accuracy mark.

Correct Answer: 11.0

- (b) This was poorly done. Most candidates failed to use the correct ratio. They used cosine instead of sine. Many rounded off the answer to two or four significant figures which resulted in loss of accuracy mark. Common error was $\cos 25^\circ = \frac{h}{10}$

Correct Answer: 4.23

- (c) This question was fairly well done. Most candidates used the Pythagoras rule correctly. However, there were a few who rounded off prematurely and lost an accuracy mark. Some failed to give their answer to three significant figures.

Common error was $PM = \sqrt{6^2} + \sqrt{4.23^2}$

Correct Answer: 4.26

- (d) This question was very poorly done. Many left it unanswered. Only the good candidates got it correct. Premature rounding and truncation of answer was quite common and this resulted in loss of accuracy marks.

Correct Answer: 110.2°

- 9 The whole of this question was generally well answered. Many candidates were able to score all the marks for this particular question.

- (a) This was well done. The cumulative frequency table was completed correctly.

Correct Answer: 37, 65, 83, 95, 100

- (b) This was well done.

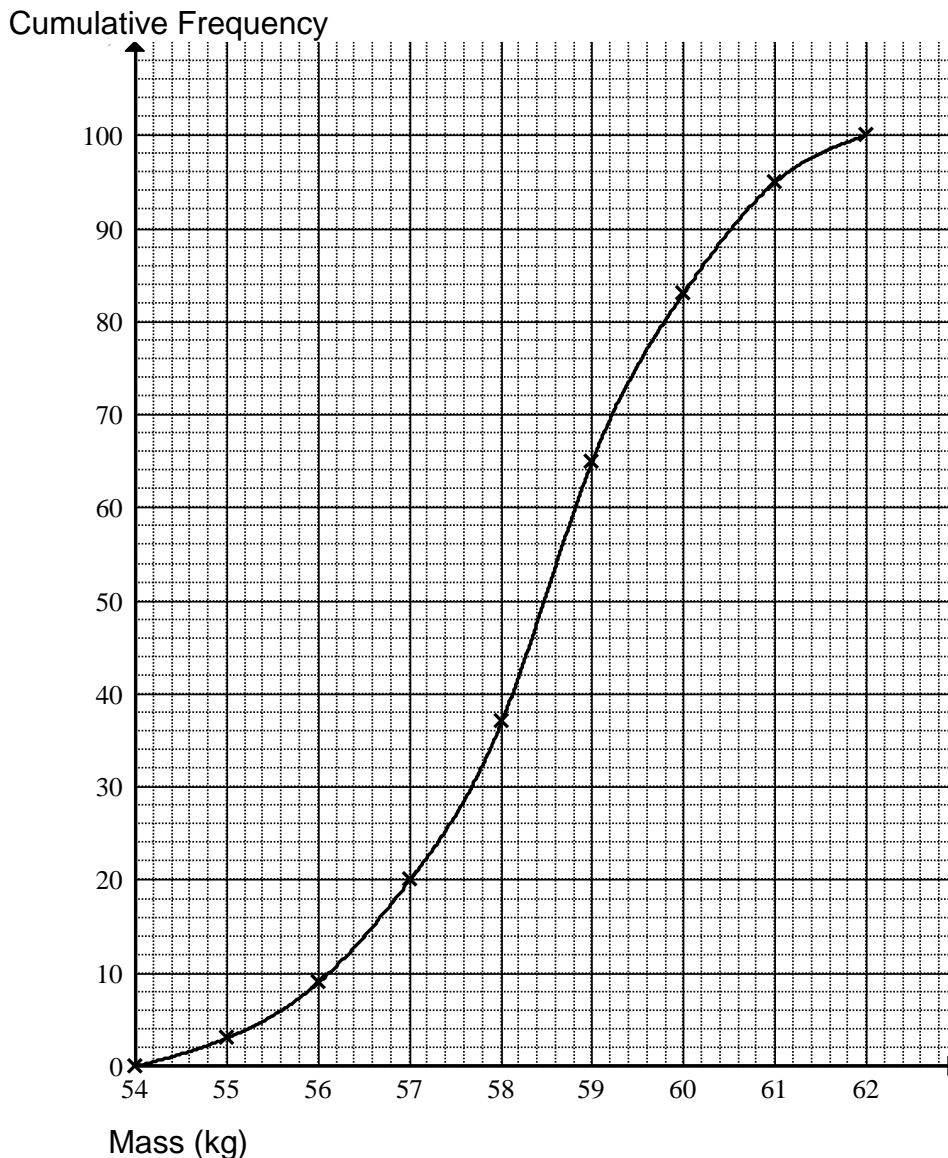
Correct Answer: 100

- (c) This was well done. Many got this one correct. Very few got it wrong due to addition errors.

Correct Answer: 63

- (d) This question was well done. Only a few number of candidates did not answer this question. Most points were correctly plotted using the cumulative frequency values. Some candidates interchanged the axes. Most curves were smoothly drawn.

Correct Answer:



- (e) This was fairly well done. Some candidates calculated the median position and gave it as their answer. Others calculated the median position and only showed it on the diagram. Some were able to show the median position and the median correctly but were failing to read the scale correctly.

Correct Answer: 58.5 kg