



MAJLIS PEPERIKSAAN MALAYSIA



LAPORAN PEPERIKSAAN STPM & MUET 2020

Mathematics (M) (950)



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MATHEMATICS (M) (950/1)

OVERALL PERFORMANCE

The number of candidates for this subject was 753. The percentage of candidates who obtained a full pass was 24.56%.

The achievement of candidates according to grades is as follows:

Grade	A	A–	B+	B	B–	C+	C	C–	D+	D	F
Percentage	1.86	0.80	0.66	1.59	3.72	6.37	9.56	4.52	3.85	6.11	60.96

CANDIDATES' RESPONSES

PAPER 950/1

General comments

In general, there was some significant difference in the quality of answer produced by different centres. Many candidates were weak in basic mathematics concept and lack of thinking and reasoning skills. Only a handful number of candidates seemed to be prepared and presented systematic work.

Comments on individual questions

Question 1

Most of the candidates were not able to find the exact value of x . In fact, they could not even write out $e^{2x} - e^x - 1 = 0$. Some candidates were confused between law of logarithm and law of indices. Only a small number of candidates were able to find the exact value by using formula or completing the square method. There were quite a number of candidates that did not know that $e^x > 0$, so they ended up with two answers which were wrong. Some candidates lost marks because they gave the final answer in decimal place.

$$\text{Answer: } x = \ln \left(\frac{1 + \sqrt{1 + 4e}}{2} \right)$$

Question 2

For the first part of the question, almost all candidates were not able to find the general term because they do not understand the meaning of general term. For the second part of the question, most of the candidates tried to expand as a series. However, they failed to find the coefficients because they did not expand enough terms.

$$\text{Answer: } \frac{12!}{(12-r)!r!} 2^{12-r} x^{12-3r} \quad (a) \ 126\ 720; \quad (b) \ -14\ 080$$

Question 3

Most of the candidates were able to reduce the augmented matrix into row echelon form. However, they were not able to draw the right conclusion. For instance, $(k + 1)z = 0$. They did not know the system of linear equation has a unique solution and infinitely many solutions.

Answer: $x = 4, y = -1, z = 0$

Question 4

Most of the candidates were able to do part (a). However, many could not sketch the graph correctly in part (b). Quite a number of candidates lost marks because they did not verify that the point as a minimum point. Only a few candidates managed to sketch the graph correctly.

Question 5

Most of the candidates were able to convert to partial fractions but some candidates made careless mistakes when converting into partial fractions. They missed out the x for the numerator hence they were not able to integrate correctly. Some wrote $\int \frac{x}{2(x^2 + 2)} dx = \frac{x \ln(x^2 + 2)}{2(2x)}$ which was wrong.

Answer: $\frac{5}{2x} - \frac{x}{2(x^2 + 2)}, \frac{5}{2} + \frac{1}{4} \ln \frac{3}{e^2 + 2}$

Question 6

Most of the candidates were able to use the technique of integrating factor to solve the linear differential equation. Some candidates made mistake when finding the integrating factor. They found $\sqrt{2x}$ instead of \sqrt{x} which was mentioned in the question.

Answer: $y = \frac{e^{3x}}{6x^2} + \frac{A}{x^2}$

Question 7

Those candidates who attempted to answer the question did badly because they did not know how to show the function is not one-to-one. Some obtained marks for the sketching of graphs. The candidates could not sketch the graph of $g(x) = |x - 3|$. For part (d), almost all candidates could not do it, because they could not see that this integral involved two terms as this was a piecewise function.

Answer: (c) 2 roots; (d) $14 - 2 \ln 2$

Question 8

Most candidates were able to prove the derivative and did very well in part (a). However, there were some candidates who did not know how to differentiate $\ln x$. Some candidates were very weak in differentiating logarithmic functions as well as composite function. They were not able to solve the

differential equation. Most of them wrote $\int \frac{1}{\sqrt{1 + u^2}} du = \int (1 + u^2)^{\frac{1}{2}} du = \frac{(1 + u^2)^{\frac{3}{2}}}{\frac{3}{2}}$ which was wrong.

Answer: (c) When $x = 1, \frac{dy}{dx} = 1$, when $x = -1, \frac{dy}{dx} = -1$

MATHEMATICS (M) (950/2)

OVERALL PERFORMANCE

The number of candidates for this subject was 748. The percentage of candidates who obtained a full pass was 69.65%.

The achievement of candidates according to grades is as follows:

Grade	A	A–	B+	B	B–	C+	C	C–	D+	D	F
Percentage	8.02	5.75	8.02	11.63	12.30	14.84	9.09	5.21	2.67	4.81	17.65

CANDIDATES' RESPONSES

PAPER 950/2

General comments

In general, the performance of candidates was satisfying. The candidates were good in answering in quantitative questions but weak in explaining, commenting and interpreting the results obtained. There was a significant difference in the quality of scripts produced by different centres. Some candidates had been well prepared and showed considerable confidence in their responses.

Comments on individual questions

Question 1

Almost all the candidates managed to construct the stem-and-leaf diagram correctly. In part (b), candidates could get the mean, mode and median correctly. However, some of them gave only one mode, as if they do not know that mode can be more than one value. In part (c), majority of the candidates give the correct reason for the median as a better measure of central tendency. However, some of them did not know whether the skewness should be negative or positive.

Answer: (b) Mean = 3.31, Mode = 2.4 and 3.4, Median = 3.15; (c) Median

Question 2

Most candidates could find $P(E)$ but majority could not answer $P(M|E)$ because they could not determine $P(M \cap E)$ correctly.

Answer: (a) (i) 0.21, (ii) $\frac{2}{3}$; (b) (i) 0.762, (ii) $\frac{45}{119}$

Question 3

There were candidates who did not attempt this question at all.

For part (a), most of the candidates know that $P(X < 1) = \int_0^1 e^{-\frac{x}{4}} dx$ but they did not know how to integrate the function.

For part (b), most of the candidates got the correct expected amount of refund but some candidates found the value by taking $P(X < 1) = \frac{1}{4} \int_0^1 e^{-\frac{x}{4}} dx$ and multiplied with RM15 000. This showed that the candidates did not really understand the question.

Answer: (a) 0.2212, 0.1723; (b) RM4 610.25

Question 4

The overall performance of candidates was good. Many candidates were unable to explain well the difference between Spearman rank and Pearson correlation coefficients. Almost all candidates tried to solve this question. However, few of them did not get the correct value of d .

Question 5

Overall performance of candidates was good. The question was a straightforward question. Many of the candidates were able to interpret and use the correct formula for the part (b) Laspeyres quantity index.

Answer: (a) 111.59; (b) 123.18

Question 6

For parts (a) and (b), most of the candidates could plot time series data but not all the candidates managed to comment correctly.

For part (c), majority of the candidates failed to comment the effect of centred four-quarter moving averages on the original time series.

Question 7

Most of the candidates could answer all the questions in part (a) and part (b) correctly but only a few candidates managed to justify why the approximate distribution is appropriate.

Answer: (a) $n = 24$; (b) (i) 0.9715, (ii) 0.9624

Question 8

Almost all the candidates could not comment correctly to question in part (a). In part (b), majority of the candidates could answer question correctly but failed to give a correct reason and interpret their answer.

Answer: (b) (i) $y = -3.0511 + 0.4753x$, (ii) $y = 25.46$ km, (iv) $r^2 = 0.9870$, (v) $d = 2.0766$

MATHEMATICS (M) (950/3)

OVERALL PERFORMANCE

The number of candidates for this subject was 740. The percentage of candidates who obtained a full pass was 70.68%.

The achievement of candidates according to grades is as follows:

Grade	A	A–	B+	B	B–	C+	C	C–	D+	D	F
Percentage	8.38	7.16	11.08	7.84	13.38	13.65	9.19	4.86	1.76	2.70	20.00

CANDIDATES' RESPONSES

PAPER 950/3

General comments

The performance of the candidates showed a wide range of mathematical ability among STPM candidates. There was significant difference in the quality of scripts produced by different centres. There were quite a number of good scripts with well-planned and almost same as the mark scheme.

Comments on individual questions

Question 1

In part (a), most of the candidates misunderstood the meaning of “for a duration of 10 years” as “for 10th year” to get the book value. Since they did not do well in part (a), they could not obtain answer for part (b). For part (c), most of the good candidates answered well. However, some candidates used the wrong formula (present value instead of future value) when calculating the value of R .

Answer: (b) After 9 years; (c) RM2 278.17

Question 2

The performance of the candidates was moderate. Some candidates could obtain the marginal cost function and calculate the marginal cost for 50 pairs of shoes. However, most of the candidates were unable to use marginal cost to estimate the change of cost. They mixed up the concept of marginal cost and exact cost.

Answer: (a) $C(q) = 8 + 6q$; (b) Decreases by RM1 540

Question 3

Good candidates were able to construct second and third simplex tableau and state the optimum solution. Most of the candidates failed to obtain final tableau correctly because they chose pivot row wrongly. Some of them made careless mistakes when performing further iterations.

$$\text{Answer: } (b) \ x = \frac{9}{7}, y = \frac{16}{7}, P = \frac{150}{7}$$

Question 4

Most of the candidates did well for part (a). For part (b), some candidates lost marks because they stated non-critical activities in path form.

Answer: (a) $r = 4, s = 8$; (b) A, D, E, G, H; (c) Not more than 2 weeks

Question 5

The performance of candidates was quite good for part (a). However, many candidates faced some problems in obtain holding cost. The wrong holding cost was affecting the answers for every step of the solution and finally they obtained wrong answer. Some candidates made careless mistakes when applying the formulae for the annual total cost. For part (b), some candidates were unable to calculate the duration of backorder and give reasonable reason the backorder policy should be adopted or not.

Answer: (a) RM112 177.35; (b) Backorder inventory policy should not be adopted

Question 6

Candidates poorly attempted in this question. Most of the candidates obtained the pay-off matrix wrongly. They misunderstood “win A’s notes” / “win B’s notes” as “win sum of the notes”. Some candidates obtained dominance strategy wrongly. A number of candidates didn’t state 0 for strategy which was already eliminated.

$$\text{Answer: } \text{Player A : } \left(\frac{1}{2}, \frac{1}{2}, 0\right), \text{ Player B : } \left(\frac{2}{3}, \frac{1}{3}, 0\right)$$

Question 7

Many candidates could determine the objective function and two out of three constraints of the linear programming. Some candidates did not recognise $x, y \geq 0$ as constraints which should be included in the model. Some candidates were able to plot the constraints and objective function but did not label it. Those candidates who plot the constraints correctly mostly could shade the region and estimate optimal number of bottles and corresponding maximum daily profit well. Some candidates lost marks because they used calculation method instead of graphical method to determine the optimal solution.

Answer: (b) $x = 6$ and $y = 2$, Maximum profit = RM440;
(c) $x = 3.5$ and $y = 5.3$, Maximum profit = RM440

Question 8

Most of the candidates could draw an AON network with all the preceding activities, duration, EST and LST but quite a number of candidates did not manage to get full marks because they didn't draw the key. Some candidates stated the critical path instead of critical activities. For the Gantt chart, some candidates did draw the total float. Many candidates were unable to deliver a clear statement for the reason why the project could not be completed within the time frame with only two workers.

Answer: (b) A, E, F, G; (d) At least 3 workers

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