SAMPEL PERCUMA

Kertas Trial STPM Semester 3 Mathematics T Kedah 2024

Set penuh: Kertas Percubaan STPM

Semester 3 · 10 subjek (2024)

Sampel ini: 4 muka surat. Set penuh ada:

- 2 fail PDF
- Semester 1: kertas percubaan (trial) negeri, subjek yang dipilih + skema
- Blueprint 30 hari Semester 1 (setiap subjek)
- Semester 3: percubaan 2024, 10 subjek, banyak negeri, soalan + skema dalam satu fail

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MATHEMATICS T

PAPER 3

One and a half hours

Section A [45 marks]

Answer **all** *questions in this section.*

1. The frequency table shows the ages of guest in the Hotel KH.

Age (x years)	Frequency
$0 \leq x < 5$	6
$5 \leq x < 10$	13
$10 \leq x < 20$	14
$20 \leq x < 30$	15
$30 \leq x < 50$	12

(a) Draw a histogram for the above data. [3]

(b) Calculate estimates of the mean and mode of the ages of guest in the Hotel KH . Use your calculations to justify your statement about the shape of the frequency distribution. [5]

2. The probability that it rains in a certain area is $\frac{1}{5}$. The probability that an accident occurs at a particular junction of a road in that area is $\frac{1}{20}$ if it rains and $\frac{1}{50}$ if it does not rain. Find the probability that it rains if an accident occurs at the junction. [3]

3. The continuous random variable X has probability density function

$$f(x) = \begin{cases} \sqrt{\frac{x-1}{12}}, & 1 \leq x \leq b \\ 0, & otherwise \end{cases}$$

where b is a constant.

(a) Determine the value of b. [3]

(b) Find the cumulative distribution function of X and sketch its graph. [6]

(c) Calculate E(X) [4]

4. (a) Why do we use inferential statistics? [1]

(b) In a survey carry out among 400 form six students, and find that 288 are registered voters.

(i) Compute a 95% confidence interval for the proportion of students who are registered voters, and interpret the confidence interval. [4]

(ii) Given that the proportion is indeed close to 75%, find the smallest sample size n to be taken as to estimate the proportion to within 0.02 with 95% confidence.

[3]

5. A fast food outlet claims that every customer is served within 13 minutes after an order is placed. A sample of 400 orders show that the average time is 14 minutes with a standard deviation of 10 minutes. Use a 5% level of significance to test if the claim is true. [5]

6. The data shows the score of the 60 students.

Score	0	1	2	3	4	5
Frequency	4	9	13	15	10	9

Test at 5% significant whether the data could fits the distribution of B(5, 0.55)

[8]

Section B [15 marks]

Answer **one** *question only in this section.*

You may answer all questions **but** *only the first answer will be marked*

7. (a) A tour company has 3 buses which can each be hired out for a day at a time. The total number of requests for the hire of a bus, for any particular day, follows a poisson distribution with mean 2. Find the probability that, for a particular day,

(i) at least two requests are received for the hire of a bus [3]

(ii) all requests for the buses can be met. [3]

If, for any day, fewer than 3 requests are received for the hire of a bus, the buses used are chosen at random. Find the probability that a particular bus is not used on a given day. [4]

(b) The time, in minutes, that a youth spends on tiktok in a day follows a normal distribution with mean 100 and variance σ^2. It is known that 616 out of 2000 youth spent less than 80 minutes in tiktok in a day. Find the value of σ. [5]

8. A coffee company is investigating the cholesterol-lowering effects of removing a particular oil in the production of a new coffee product. Over a period of several weeks, a group of 50 volunteers drink this new coffee product. For each volunteer, the decrease in cholesterol level, x mmol/L, is measured. The results, in suitable units, are as follows.

$\sum(x-175)=900$ and $\sum(x-175)^2=1900\,0$

(a) Find the unbiased estimate for mean and variance of the population of the decrease in cholesterol level. [7]

The coffee company will promote the new coffee product if it believes that the population mean decrease in cholesterol is more than 190 mmol/L.

(b) Determine, to 2 decimal places, the smallest value of the sufficient level of an appropriate test so that the sample provides sufficient evidence that the mean decrease in cholesterol level is more than 190mmol/L [5]

(c) Calvin order 200 packets of this new coffee product to sell in a day. He finds that, on average, he can sell 4 out of 5 packets a day. Calculate the probability of the mean packet of coffee product sold per day to be at least 158 over a period of 60 days.

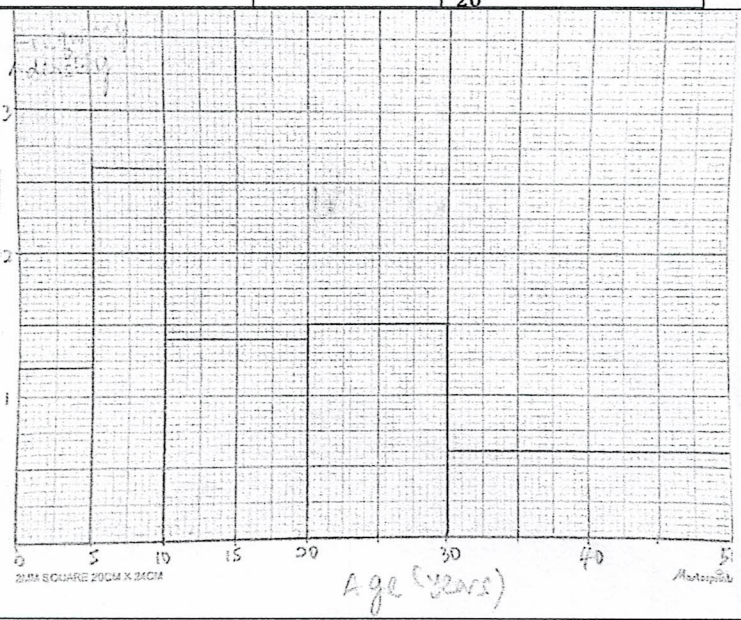
[3]

2024 P3 Trial Exam Marking Scheme

1a

Age (x years)	Frequency	Frequency density
$0 \le x < 5$	6	$\frac{6}{5} = 1.2$
$5 \le x < 10$	13	$\frac{13}{5} = 2.6$
$10 \le x < 20$	14	$\frac{14}{10} = 1.4$
$20 \le x < 30$	15	$\frac{15}{10} = 1.5$
$30 \le x < 50$	12	$\frac{12}{20} = 0.6$

B1(Frequency density)



Drawing 2 bar correct D1
All correct D2

b

mean = $\frac{2.5 \times 6+7.5 \times 13+15 \times 14+25 \times 15+40 \times 12}{60}$

$= \frac{1177.5}{60}$ M1

$= 19.625$ A1

Mode $= 5 + \frac{1.4}{1.4+1.2}(5)$ M1

$= 7.6923$ A1

As mean > mode, the distribution is skewed to the right A1

Total 8

2

$P(R|A) = \frac{P(R \cap A)}{P(A)}$

$= \frac{\frac{1}{5} x \frac{1}{20}}{\frac{1}{5} x \frac{1}{20} + \frac{4}{5} x \frac{1}{50}}$ M2

$= \frac{\frac{1}{100}}{\frac{13}{500}} = \frac{5}{13}$ A1

Total 3

TAMAT SAMPEL

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