# TINGKATAN 5
BAB 5 : TABURAN KEBARANGKALIAN

KOMPILASI SOALAN MATEMATIK TAMBAHAN
PERCUBAAN SPM 2023

SKEMA PEMARKAHAN

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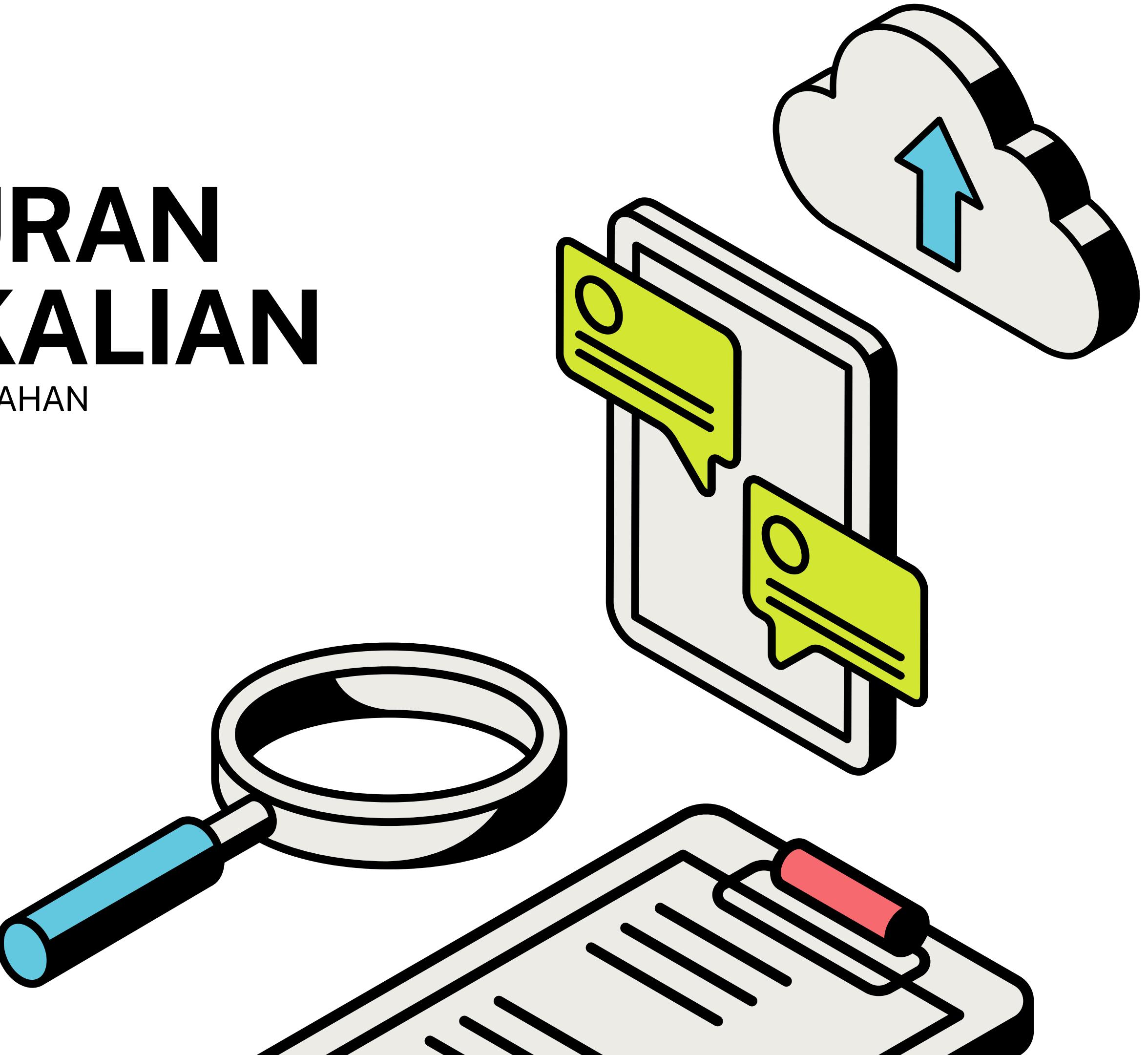
12. (a) Rajah 6 menunjukkan graf taburan binomial $X \sim B(4, p)$.

Diagram 6 shows the graph of a binomial distribution $X \sim B(4, p)$.
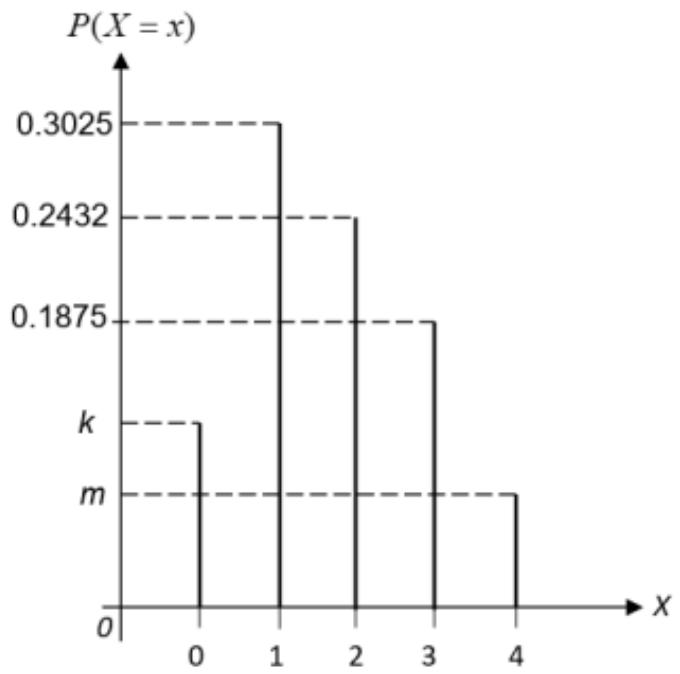

Rajah 6
Diagram 6

Ungkapkan

Express

(i) p dalam sebutan *m*.

p in terms of *m*.

(ii) $P(X \geq 1)$ dalam sebutan *k*.

$P(X \geq 1)$ terms of *k*.

[4 markah]

[4 marks]

12 (a)	(i) $^{4}C_{4}\left(p^{4}\right)\left(q^{0}\right)$ atau setara	K1
	$p = \sqrt[4]{m}$	N1
	(ii) $P(X \geq 1) = 1 - P(X = 0)$	K1
	$= 1 - k$	N1

(b) Rajah 7 menunjukkan graf taburan normal bagi pemboleh ubah rawak $X \sim N(\mu, 9)$.

Diagram 7 shows the normal distribution graph for a random variable $X \sim N(\mu, 9)$.
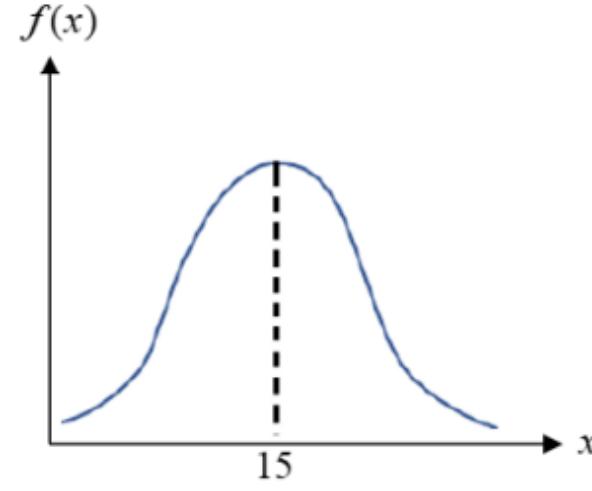
Rajah 7
Diagram 7

Nyatakan

State

(i) nilai μ,

the value of μ,

(ii) nilai bagi sisihan piawai.

value of standard deviation.

[2 markah]

12 (b)	(i) 15	N1
	(ii) 3	N1

15. (a) Diberi bahawa X pemboleh ubah rawak diskrit dengan keadaan $X \sim B(6, p)$ dan $P(X = 6) = \frac{1}{64}$. Cari nilai p.

Given that X is a discrete random variable such that $X \sim B(6, p)$ and $P(X = 6) = \frac{1}{64}$. Find the value of p.

[3 markah]
[3 marks]

(b) Taburan kebarangkalian bagi satu pemboleh ubah rawak diskret $X = \{0, 1, 2, 3, 4\}$ diberi oleh $P(X = r) = m(2r + 1)$ bagi setiap nilai r.

The probability distribution for a discrete random variable $X = \{0, 1, 2, 3, 4\}$ Is given by $P(X = r) = m(2r + 1)$ for each r.

(i) Cari nilai m.
Find the value of m.

(ii) Lukis satu graf bagi taburan kebarangkalian X.
Draw a graph for the probability distribution of X.

[5 markah]
[5 marks]

15. (a)	$^6C_6 p^6 q^{6-6} = \frac{1}{64}$	1
	$p^6 = \frac{1}{64}$	1
	$p = \frac{1}{2}$	1

(b) (i)	$m(2(0)+1) + m(2(1)+1) + m(2(2)+1) + m(2(3)+1) + m(2(4)+1) = 1$	1,1
	$m = \frac{1}{25}$	1

(c)

r	0	1	2	3	4	
P(X= r)	$\frac{1}{25}$	$\frac{3}{25}$	$\frac{5}{25}$	$\frac{7}{25}$	$\frac{9}{25}$	1

1

8

12 Pengurus sebuah kilang membuat kajian terhadap pekerja yang masuk lewat dalam 5 hari berkerja. Rajah 7 menunjukkan graf taburan Binomial kajian tersebut, dengan keadaan X mewakili bilangan hari pekerja yang masuk lewat.

The manager of a factory conducted research on workers who were late in 5 working days. Diagram 7 shows a Binomial distribution graph of the research, such that X represents the number of days workers who were late.
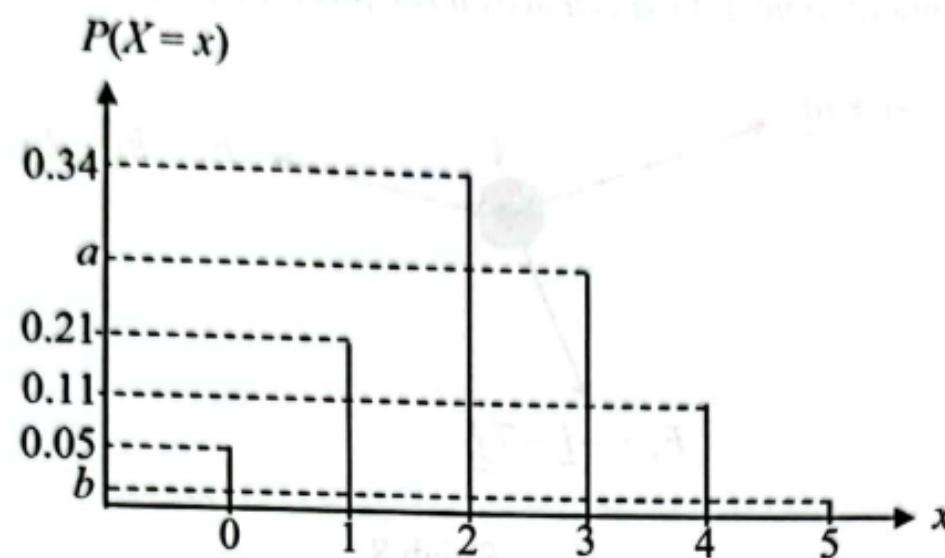
Rajah 7
Diagram 7

(a) Cari nilai $a + b$.
   Find the value of a + b. [1 *markah*]
   [1 *mark*]

(b) Kira kebarangkalian seorang pekerja yang tidak lewat. [2 *markah*]
   Calculate the probability of a worker who were not late. [2 *marks*]

12	(a)	$a + b = 0.29$	N1
	(b)	$^5C_0 \times p^0 \times q^5 = 0.05$	K1
		$q = 0.5493$	N1

11 Dalam suatu kajian, satu sampel n telefon pintar dipilih secara rawak. Didapati bahawa kebarangkalian sebuah telefon pintar rosak selepas 3 tahun ialah 40%. Diberi pemboleh ubah rawak diskret, X mewakili bilangan telefon pintar rosak yang dipilih.

In a study, a sample of n smartphones are chosen at random. It is found that probability that a certain smartphone is spoilt after 3 years is 40%. Given the discrete random variable, X represents the number of spoilt smartphones that has been chosen.

(a) Jika $P(X = 5) = 10P(X = 4)$. Cari nilai n.
   If $P(X = 5) = 10P(X = 4)$. Find the value of n. [3 *markah*]
   [3 *marks*]

(b) Seterusnya, nyatakan min bagi kajian ini.
   Hence, state the min of this study. [1 *markah*]
   [1 *mark*]

11	(a)	$^nC_5(0.4)^5(0.6)^{n-5} = 10\left[^nC_4(0.4)^4(0.6)^{n-4}\right]$	1
		$\dfrac{n!}{(n-5)!5!}(0.4)^5\dfrac{(0.6)^n}{(0.6)^5} = 10\left[\dfrac{n!}{(n-4)!4!}(0.4)^4\dfrac{(0.6)^n}{(0.6)^4}\right]$	1
		$n = 79$	1
	(b)	Min = 31.6	1

12 Rajah 12 menunjukkan graf bagi taburan normal, $X \sim N(\mu, \sigma^2)$.

Diagram 12 shows the graph of normal distribution, $X \sim N(\mu, \sigma^2)$.
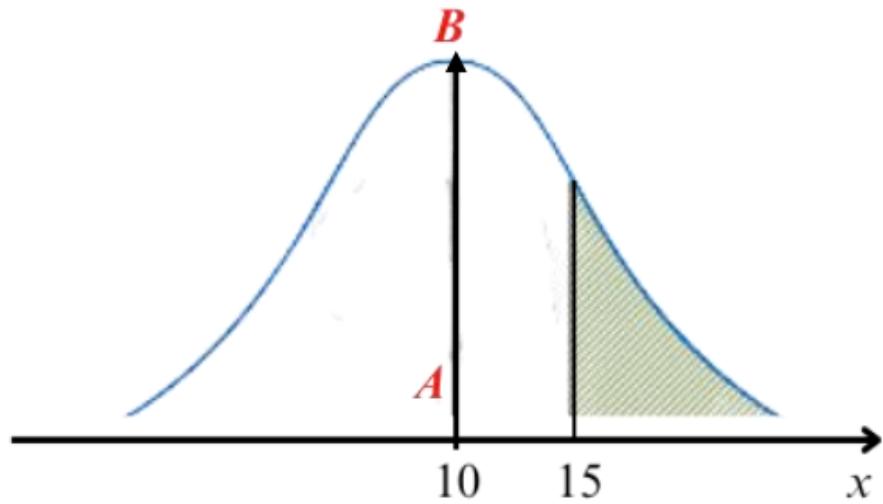
Rajah 12/ *Diagram* 12

Diberi luas rantau berlorek ialah 0.295 dan AB ialah paksi simetri bagi graf itu, cari

Given that the area of the shaded region is 0.295 and AB is the axis of symmetry of the graph, find

(a) nilai μ dan σ.
    the value of μ and σ.

[3 markah / *marks*]

(b) seterusnya, cari nilai $P(7 \leq X \leq 15)$.
    hence, find the value $P(7 \leq X \leq 15)$.

[2 markah / *marks*]

12

(a)
$$\mu = 10 \qquad \boxed{\text{P1}}$$

$$\frac{15-10}{\sigma} = 0.539 \qquad \text{K1}$$

$$\sigma = 9.276 \qquad \boxed{\text{N1}} \qquad \mathbf{3}$$

(b)
$$\frac{7-10}{*9.276} \leq Z \leq \frac{15-10}{*9.276} \qquad \text{K1}$$

$$-0..3234 \leq Z \leq 0.5390$$

$$0.3316 \quad \text{atau} \quad 0.3319 \qquad \boxed{\text{N1}} \qquad \mathbf{2}$$

8. Rajah 8 menunjukkan graf bagi suatu taburan binomial $X \sim B(n, p)$.

Diagram 8 shows the graph of a binomial distribution $X \sim B(n, p)$.
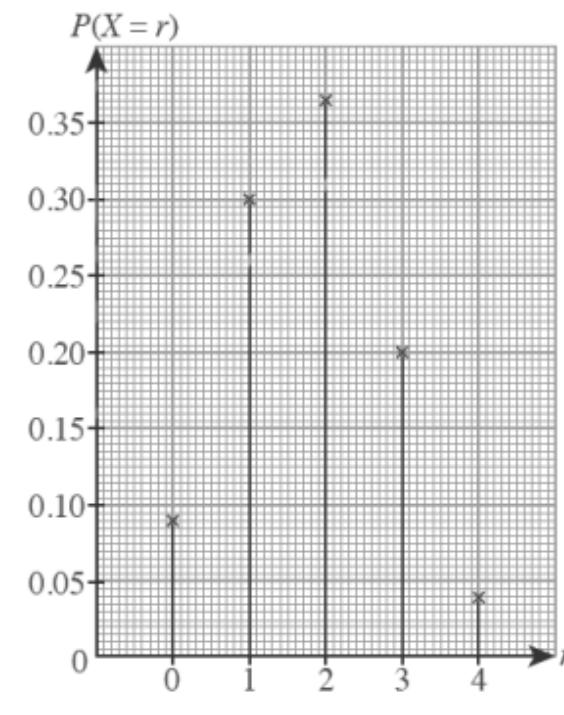
Rajah 8/*Diagram 8*

a) Senaraikan pemboleh ubah rawak diskrit, X bagi taburan itu.

List down all the discrete random variable, X for the distribution.

[1 markah /*mark*]

b) Diberi $P(X \leq 3) = 0.959$, cari

Given that $P(X \leq 3) = 0.959$, find

  (i) nilai p,

    the value of p,

  (ii) min dan varians bagi taburan itu.

    mean and variance for the distribution.

[6 markah/*marks*]

9. Diberi $X \sim N(45, 90.25)$, cari nilai k jika $P(40 < X < k) = 0.1025$.

Given that $X \sim N(45, 90.25)$, find the value of k if $P(40 < X < k) = 0.1025$.

[3 markah/*marks*]

8	a) $X = \{0, 1, 2, 3, 4\}$	N1

	b) i) $P(X = 4) = 1 - 0.959$
	     $^{4}C_4 p^4 q^0 = 0.041$
	
	        $p^4 = 0.041$
	        $p = 0.45$
	 ii) Min $= 4 \times 0.45$
	       $= 1.8$
	     Varians $= 4 \times 0.45 \times 0.55$
	        $= 0.99$
	 Nota: Markah K1 diberi di salah satu rumus min atau varians.
		K1
		 K1
		
		 N1
		
		 N1
		
		 N1

9	$P(\dfrac{40-45}{9.5} < Z < \dfrac{k-45}{9.5}) = 0.1025$ $z = -0.248$ $-0.248 = \dfrac{k-45}{9.5}$ $k = 42.644$	 K1 K1 N1

7. Jadual 7 menunjukkan pengelasan paras gula dalam darah berdasarkan garis panduan daripada Pertubuhan Kesihatan Sedunia (WHO).

Table 7 shows the blood sugar level classifications based on the guideline by the World Health Organisation (WHO).

Paras gula dalam darah *Blood sugar level*	Rendah *Low*	Normal *Normal*	Tinggi *High*
Ukuran, x (Mmol/L) *Measurement, x (Mmol/L)*	$1 < x < 3$	$3 \leq x < 10$	$x \geq 10$

Jadual 7
Table 7

Didapati bahawa paras gula dalam darah bagi sebuah komuniti bertaburan normal dengan nilai min 5.5 Mmol/L dan varians 4 Mmol/L. Individu yang mempunyai paras gula dalam darah yang rendah atau tinggi perlu menjalani rawatan. Jika seorang individu dipilih secara rawak daripada komuniti tersebut, cari kebarangkalian individu tersebut mempunyai paras gula yang rendah dalam darah.

It is found that the blood sugar level of a community has a normal distribution with a mean value of 5.5 Mmol/L and a variance of 4 Mmol/L. Individuals with low or high blood sugar levels should undergo treatment. If an individual is randomly selected from that community, find the probability that the individual has low blood sugar levels.

[3 markah]
[3 marks]

1. X ialah satu pemboleh ubah rawak diskret dengan keadaan $X \sim B(8, p)$. Diberi bahawa sisihan piawai ialah $\frac{4}{3}$ dan $p < q$. Cari nilai p.

X is a discrete random variable such that X ~ B (8, p). It is given that the standard deviation is $\frac{4}{3}$ and p < q. Find the value of p.

[3 markah]
[3 marks]

7		$\mu = 5.5, \sigma = 2$ $P(1 < x < 3)$ $P(\dfrac{1-5.5}{2} < Z < \dfrac{3-5.5}{2})$ $P(-2.25 < Z < -1.25)$ $P(Z < -1.25) - P(Z < -2.25)$ $P(Z > 1.25) - P(Z > 2.25)$ $0.1056 - 0.0122$ 0.0934	K1 K1 N1

1		$\sqrt{8pq} = \frac{4}{3}$ Selesaikan $\sqrt{8p(1-p)} = \frac{4}{3}$ sehingga pemfaktoran $(3p-1)(3p-2) = 0$ $p = \frac{1}{3}$	P1 K1 N1

TABURAN KEBARANGKALIAN

10 (a) Kajian ke atas bekas pelajar SMK Seri menunjukkan bahawa 70% daripada mereka melanjutkan pelajaran di institusi tempatan.

A survey on ex SMK Seri students shows that 70% of them furthered their study at local institutions.

  (i) Jika 10 orang bekas pelajar SMK Seri dipilih secara rawak, cari kebarangkalian tidak lebih daripada 2 orang pelajar melanjutkan pelajaran di institusi tempatan.

  If 10 ex-SMK Seri students are chosen at random, find the probability that not more than 2 students further their study at local institutions.

  (ii) Didapati bahawa seramai 280 pelajar melanjutkan pelajaran mereka di institusi tempatan. Cari jumlah bilangan pelajar yang terlibat dalam kajian tersebut .

  It is found that 280 students furthered their study at local institutions. Find the total number of students involved in the survey.

[5 markah]

[5 marks]

(b) Jisim pelajar sebuah universiti adalah bertaburan secara normal dengan min m kg dan varians 25 kg.

The mass of students in a university is normally distributed with a mean of m kg and variance of 25 kg.

Cari

Find

  (i) nilai *m*, jika 8% daripada pelajar-pelajar itu mempunyai jisim melebihi 70 kg,

  the value of m, if 8% of the students have mass more than 70 kg,

  (ii) kebarangkalian bahawa seorang pelajar yang dipilih secara rawak dari universiti itu mempunyai jisim kurang daripada 50 kg.

  the probability that a student choosen at random from the university will has a mass less than 50 kg.

[5 markah]

10 (a)(i)	$^{10}C_0 (0.7)^0 (0.3)^{10}$ atau $^{10}C_1 (0.7)^1 (0.3)^9$ atau $^{10}C_2 (0.7)^2 (0.3)^8$	K1
	$^{10}C_0 (0.7)^0 (0.3)^{10}$ + $^{10}C_1 (0.7)^1 (0.3)^9$ + $^{10}C_2 (0.7)^2 (0.3)^8$	K1
	0.00159	N1
(a)(ii)	Bilangan Pelajar = $\dfrac{280}{0.7}$	K1
	400	N1
10 (b)(i)	$z = 1.406$	P1
	$\dfrac{70 - m}{5} = 1.406$	K1
	$m = 62.97$	N1
(b)(ii)	$\dfrac{50 - {}^*62.97}{5}$	K1
	0.00474	N1

MELAKA (K2)

11 (a) Untuk menentukan sama ada sejumlah besar stok perintang dari sebuah kilang elektronik diterima ataupun ditolak, satu sampel yang terdiri daripada 30 perintang dipilih secara rawak akan diuji. Stok tersebut diterima sekiranya tiada perintang rosak dikesan dan stok tersebut ditolak sekiranya 2 atau lebih perintang dikesan rosak. Jika hanya satu perintang dikesan rosak, sebanyak 30 perintang lagi dipilih secara rawak sebagai sampel kedua akan diuji semula dan stok ini diterima sekiranya sampel yang kedua ini tiada perintang rosak dikesan. Jika stok mengandungi 1% perintang rosak sebenarnya, cari peratusan stok yang akan ditolak dan bilangan perintang diterima sekiranya 1000 perintang dihasilkan oleh kilang.

To determine whether to accept or reject a large stock of resistor from an electronic factory, a random sample of 30 resistors is tested. The stock is accepted if no defective resistors are found and is rejected if 2 or more resistors are found to be defective. If a resistor is found to be defective, a second sample of 30 resistors are tested and the stock is accepted if the second sample does not contain any defective resistor. If the stock actually contains 1% defective resistors, find the percentage that the stock is rejected and total resistor accepted if 1000 resistor is produced by the factory.

[4 markah/*marks*]

(b) Bilangan murid tingkatan 5 di SMK Johan adalah seramai 200 orang. Didapati bahawa jisim murid-murid itu bertabur secara normal dengan min 50 kg dan varians 25 kg². Koperasi sekolah perlu membuat jangkaan untuk menempah baju sukan mengikut saiz, iaitu saiz S, M dan L, daripada pembekal berdasarkan berat badan murid.

The number of form 5 students in SMK Johan is 200. It is found that the mass of the students distributed normally with a mean of 50 kg and a varians of 25 kg². The school cooperative needs to make an estimation to order the sports shirt according to the size, which are S, M and L, from the supplier based on the mass of the students.

(i) Koperasi sekolah telah menempah sebanyak 20 helai baju sukan saiz S daripada pembekal. Berapakah jisim maksimum bagi murid-murid yang memakai saiz S?
The school cooperative has ordered 20 S-size sports shirt from the supplier. What is the maximum mass of the students who wear S-size?

[3 markah/*marks*]

(ii) Diberi bahawa baju sukan saiz L adalah untuk murid yang 53.73 kg dan ke atas. Hitung bilangan minimum baju sukan saiz L yang akan ditempah oleh koperasi sekolah
Given that L-size sports shirts are meant for students who weighed 53.73 kg and above. Calculate the minimum number of L-size sports shirts which will be ordered by the school cooperative.

[3 markah/*marks*]

11 (a)	$30C_0(0.01^0)(0.99^{30})$	
	atau $30C_1(0.01^1)(0.99^{29}) \times 30C_0(0.01^0)(0.99^{30})$	1
	$1 - [30C_0(0.01^0)(0.99^{30}) + 30C_1(0.01^1)(0.99^{29}) \times 30C_0(0.01^0)(0.99^{30})]$	1
	9.45%	1
	905 *atau* 906	1

(b) i	$P\left(z \le \dfrac{X-50}{5}\right) = 0.1$	1
	$\dfrac{X-50}{5} = -1.282$	1
	43.59	1
(b) ii	$P\left(z \ge \dfrac{53.73-50}{5}\right)$	1
	0.2278×200	1
	46	1

9 (a) Sebuah kajian menunjukkan seorang daripada 20 orang rakyat Malaysia adalah pembawa Talasemia. Hasil kajian di sebuah sekolah menunjukkan 56 orang murid merupakan pembawa Talasemia.

A study shows that one in 20 Malaysians is a carrier of Thalassaemia. In a study at a school, the result shows that 56 students are carriers of Thalassaemia.

(i) Cari jumlah bilangan murid di sekolah tersebut. [2 markah]

Find the total number of students in the school. [2 marks]

(ii) Satu sampel 7 orang murid dipilih secara rawak daripada sekolah tersebut, cari kebarangkalian bahawa maksimum 2 orang murid merupakan pembawa Talasemia. [3 markah]

A sample of 7 students are chosen at random from the school, find the probability that a maximum of 2 students are carriers of Thalassaemia. [3 marks]

(b) Satu kajian menunjukkan bahawa gaji bulanan belia antara umur 25 tahun hingga 35 tahun adalah bertabur secara normal seperti yang ditunjukkan dalam Rajah 4.

A study shows that the monthly salary of the youths between age of 25 to 35 years old is normally distributed as shown in Diagram 4.
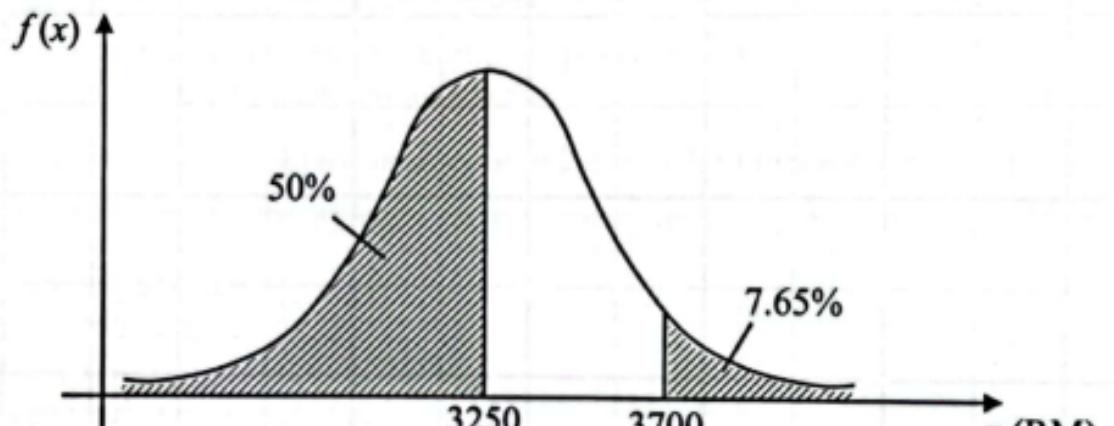
Rajah 4

Diagram 4

(i) Cari sisihan piawai. [3 markah]

Find the standard deviation. [3 marks]

(ii) Jika 12 000 orang belia dipilih secara rawak, cari bilangan belia yang mempunyai gaji bulanan antara RM 3 250 hingga RM 3 700. [2 markah]

If 12 000 youths are chosen at random, find the number of youths who have monthly salary between RM 3 250 and RM 3 700. [2 marks]

NO	PERATURAN PEMARKAHAN	
9(a)(i)	$n \times \dfrac{1}{20} = 56$	K1
		N1
	1120	K1
(ii)	$^7C_0\left(\dfrac{1}{20}\right)^0\left(\dfrac{19}{20}\right)^7$ atau $\quad ^7C_1\left(\dfrac{1}{20}\right)^1\left(\dfrac{19}{20}\right)^6$ atau $\quad ^7C_2\left(\dfrac{1}{20}\right)^2\left(\dfrac{19}{20}\right)^5$	K1
	$^7C_0\left(\dfrac{1}{20}\right)^0\left(\dfrac{19}{20}\right)^7 + \ ^7C_1\left(\dfrac{1}{20}\right)^1\left(\dfrac{19}{20}\right)^6 + \ ^7C_2\left(\dfrac{1}{20}\right)^2\left(\dfrac{19}{20}\right)^5$	K1
	0.9962	N1
(b)(i)	$P(X > 3700) = 0.0765$ atau $z = 1.429$	K1
	$\dfrac{3700 - 3250}{\sigma} = 1.429$	K1
	314.91	N1
(ii)	$12\,000 \times 0.4235$	K1
	5082	N1
		10 markah

11 (a) Dalam tinjauan terhadap 1200 pekerja di Syarikat PAMA, gaji bulanan pekerja bertabur secara normal dengan min RM5000 dan sisihan piawai RM1000 . Syarikat PAMA mentakrifkan 'Gaji Kompetitif' adalah RM4500 atau lebih tinggi.

In a survey of 1200 employees at PAMA company, their monthly salaries are normally distributed with a mean of RM5000 and a standard deviation of RM1000. PAMA company defines a "Competitive Salary" as being RM4500 or higher.

  (i) Hitung bilangan pekerja yang mendapat 'Gaji Kompetitif' mengikut piawaian syarikat.

   Calculate the number of employees who are earning a 'Competitive Salary' according to the company's standard.

  (ii) 10% daripada pekerja yang dalam kategori gaji tinggi perlu menyumbang kepada tabung kebajikan syarikat PAMA. Hitung gaji minimum yang perlu dimiliki oleh pekerja untuk membuat sumbangan tersebut.

   10% of employees in the category of high salary have to contribute to the PAMA company's welfare fund. Calculate the minimum salary of employees who have to make the contribution.

[7 markah]
[7 marks]

(b) Kebarangkalian seorang pelajar menggunakan bas sekolah ialah 0.35. Suatu sampel 7 orang murid yang dipilih secara rawak. Hitung kebarangkalian bahawa lebih daripada 2 orang murid tidak menggunakan bas sekolah.

The probability that a student takes a school bus is 0.35. A sample of 7 students are selected at random. Calculate the probability that more than 2 students who do not taking school bus.

[3 markah]
[3 marks]

11	(a)	(i)	$P\left(Z \geq \dfrac{4500-5000}{1000}\right)$	1
			$1-P(Z>0.5)$	1
			0.6915×1200	1
			$829 // 830$	1
		(ii)	$P(Z \geq \dfrac{m-5000}{1000}) = 0.10$	1
			$\dfrac{m-5000}{1000} = 1.281 // 1.28155 // 1.2816$	1
			$m = 6281 // 6281.55 // 6281.60$	1
	(b)		${}^7C_0(0.65)^0(0.35)^{7-0} @ {}^7C_1(0.65)^1(0.35)^{7-1} @$ ${}^7C_2(0.65)^2(0.35)^{7-2}$ **Atau** ${}^7C_5(0.35)^5(0.65)^{7-5} @ {}^7C_6(0.35)^6(0.65)^{7-6} @$ ${}^7C_7(0.35)^7(0.65)^{7-7}$	1
			$1-{}^7C_0(0.65)^0(0.35)^{7-0} - {}^7C_1(0.65)^1(0.35)^{7-1} -$ ${}^7C_2(0.65)^2(0.35)^{7-2}$ **Atau** $1-{}^7C_5(0.35)^5(0.65)^{7-5} - {}^7C_6(0.35)^6(0.65)^{7-6} -$ ${}^7C_7(0.35)^7(0.65)^{7-7}$	1
			0.9444	1

11 (a) Jisim buah durian di sebuah kebun bertaburan normal dengan min 1.936 kg, dan sisihan piawai σ. Diberi bahawa 7.35% daripada bilangan buah durian itu berjisim lebih daripada 2.5 kg. Cari

The masses of durian in an orchard are normally distributed with a mean 1.936 kg and standard deviation σ. It is given that 7.35% of the numbers of durians are more than 2.5 kg. Find

(i) nilai σ.

   the value of σ.

(ii) kebarangkalian bahawa sebiji durian yang dipilih secara rawak mempunyai jisim kurang daripada 1.5 kg.

   the probability that a durian chosen randomly will have a mass less than 1.5 kg.

[5 markah / *marks*]

(b) Dalam sebuah bakul, didapati 84% buah durian adalah elok. Jika satu sampel 8 biji durian dipilih secara rawak, cari kebarangkalian bahawa

In a basket, 84% of durians are in good condition. If a sample of 8 durians are chosen at random, find the probability that

(i) tepat 6 biji durian adalah elok.

   exactly 6 durians are in good condition.

(ii) selebih-lebihnya 7 biji durian adalah elok.

   at most 7 durians are in good condition.

[5 markah / *marks*]

11
(a)
(i) $P\left(Z > \frac{2.5-1.936}{\sigma}\right) = 0.0735$ | P1 |

$\frac{2.5-1.936}{\sigma} = 1.45$ (K1)

$\sigma = 0.3890$ | N1 |

   3

(ii)

$P\left(Z < \frac{1.5-1.936}{*0.3890}\right)$ (K1)

$P(z < -1.1208)$

0.1312 | N1 |

   2

(b)
(i) $p = 0.84$ dan $q = 0.16$ | P1 |

$P(X = 6) = {}^{8}C_{6} \times 0.84^{6} \times 0.16^{2}$ (K1)

0.2518 | N1 |

   3

(ii) $P(X \le 7)$

$1 - P(X = 8)$ | P1 | $P(X = 0) + P(X = 1) + ... + P(X = 7)$

$1 - {}^{8}C_{8} \times 0.84^{8} \times 0.16^{0}$

0.7521 | N1 |

   2

TABURAN KEBARANGKALIAN

9.

a) Dalam satu kajian, didapati bahawa 85% daripada pelajar di sebuah sekolah memiliki sebuah kalkulator saintifik. Satu sampel yang terdiri daripada 8 orang pelajar dipilih secara rawak dari sekolah itu, cari kebarangkalian bahawa sekurang-kurangnya 2 orang pelajar **tidak** memiliki kalkulator saintifik.

*In a study, it was found that 85% of students in a school, owned a scientific calculator. A sample consisting of 8 students is randomly selected from the school, find the probability that at least 2 students **does not** own a scientific calculator.*

[3 markah/*marks*]

b) Satu laporan analisis markah peperiksaan percubaan SPM di SMK Tamparuli telah dibuat, dan didapati markah bagi Sejarah bertaburan normal dengan min 55 markah dan varians 56.25. Didapati seramai 258 orang pelajar mendapat markah antara 52 dan 72.

An analysis report of the SPM trial examination scores at SMK Tamparuli was made, and it is found that the scores for History were normally distributed with a mean of 55 and variance 56.25. A total of 258 students scored between 52 and 72 marks.

 (i) Cari jumlah pelajar yang menduduki peperiksaan percubaan SPM di sekolah itu.

  Find the number of students that sit for the SPM trial examination in the school.

 (ii) Jika 98.12% daripada pelajar-pelajar tersebut lulus dalam Sejarah, hitungkan markah lulus.

  If 98.12% of the students were passed in History, calculate the passing marks.

[7 markah/*marks*]

9

a)

$$1 - P(X = 7) - P(X = 8)$$

$$= 1 - {}^8C_7(0.85)^7(0.15)^1 - {}^8C_8(0.85)^8(0.15)^0$$ **K1 K1**

$$= 1 - 0.3847 - 0.2725$$

$$= 0.3428$$ **N1**

b) i)

$$P(\frac{52-55}{7.5} < Z < \frac{72-55}{7.5})$$

$$= P(-0.400 < Z < 2.267)$$ **K1**

$$= 0.6437$$

$$\frac{258}{N} = 0.6437$$ **K1**

$$N = 401$$ **N1**

ii)

$$P(Z > \frac{m-55}{7.5}) = 0.9812$$ **K1 K1**

$$z = -2.08$$

$$-2.08 = \frac{m-55}{7.5}$$ **K1 N1**

$$m = 39.4, \text{ markah lulus} = 40$$

9 Sebuah kotak mengandungi 4 bungkusan berlabel P dan 3 bungkusan berlabel Q. Semasa proses pemeriksaan kualiti, satu bungkusan diambil secara rawak dan labelnya dicatatkan. Pemeriksaan ini dijalankan sebanyak tiga kali. Diberi bahawa X mewakili bilangan kali bungkusan Q diperiksa.

A box contains 4 packages labeled P and 3 packages labeled Q. During the quality inspection process, one package is taken at random and its label is recorded. This inspection were carried out three times. Given that X represents the number of times a package Q is checked.

(a) Senaraikan X dalam bentuk tatatanda set.

List X in set notation form.

[1 markah]
[1 mark]

(b) Lukis gambar rajah pokok untuk mewakilkan semua kesudahan yang mungkin bagi X.

*Draw a tree diagram to represent all the possible outcomes for X.*

[4 markah]
[4 marks]

(c) Senaraikan taburan nilai X serta kebarangkalian masing-masing dan lukis satu graf untuk mewakili taburan kebarangkalian tersebut.

List the distribution of the value of X together with their respective probabilities and draw a graph to represent the probability distribution.

[5 markah]
[5 marks]

| | Lukis dengan betul sekurang-kurangnya 1 betul | N1 |
| | Lukis **semua** dengan betul | |

$P(X = r)$ graph with points plotted at $r = 0, 1, 2, 3$

9	(a)		$X = \{0, 1, 2, 3\}$	P1
	(b)		Lukis dengan betul sekurang-kurangnya 1 dahan betul	K1
			Lukis **semua** dengan betul	N1

Kesudahan $\quad X = r$

{PPP} — 0
{PPQ} — 1
{PQP} — 1
{PQQ} — 2
{QPP} — 1
{QPQ} — 2
{QQP} — 2
{QQQ} — 3

| | | | Senaraikan semua kesudahan dengan betul | P1 |
| | | | Senaraikan semua $X = r$ | P1 |

(c) Dilihat $P = \frac{4}{7}$ dan $Q = \frac{3}{7}$ — P1

Mencari sekurang-kurangnya 1 kebarangkalian kesudahan dengan betul — K1
Senaraikan **semua** kesudahan kebarangkalian dengan betul — N1

$$P(X = 0) \rightarrow \frac{3}{7} \times \frac{3}{7} \times \frac{3}{7} = \frac{27}{343} \;/\!/\; 0.08$$

$$P(X = 1) \rightarrow 3\left(\frac{3}{7} \times \frac{4}{7} \times \frac{3}{7}\right) = \frac{108}{343} \;/\!/\; 0.31$$

$$P(X = 2) \rightarrow 3\left(\frac{3}{7} \times \frac{4}{7} \times \frac{4}{7}\right) = \frac{144}{343} \;/\!/\; 0.42$$

$$P(X = 3) \rightarrow \frac{4}{7} \times \frac{4}{7} \times \frac{4}{7} = \frac{64}{343} \;/\!/\; 0.19$$

K1

10 (a) Pemboleh ubah rawak selanjar X bertaburan normal dengan min 12 dan sisihan piawai σ.
Diberi bahawa skor-z ialah 2.25 apabila $X = 16.5$.

X is a continuous random variable which normally distributed with mean 12 and standard deviation σ. It is given that z-score is 2.25 when X = 16.5.

Cari
Find

(i) nilai σ,
  value of σ,

(ii) nilai k apabila $P(X > k) = 0.7145$.
  value of k when P(X > k) = 0.7145.

[5 markah]
[5 marks]

(b) Kebarangkalian kelas 5 Khaldun menang dalam perlawanan futsal antara kelas ialah $\dfrac{3}{7}$.

Jika kelas 5 Khaldun mengambil bahagian dalam 6 kali perlawanan, cari kebarangkalian bahawa

The probability of class 5 Khaldun win a futsal match between classes is $\dfrac{3}{7}$. If class 5 Khaldun participates in 6 matches, find the probability that

(i) kelas 5 Khaldun kalah semua perlawanan,
  class 5 Khaldun lose all matches,

(ii) kelas 5 Khaldun menang lebih daripada 2 perlawanan.
  class 5 Khaldun win more than 2 matches.

[5 markah]
[5 marks]

10	(a) (i)	$2.25 = \dfrac{16.5-12}{\sigma}$ $\sigma = 2$	K1 N1
	(ii)	$0.567 @ 0.566$	P1
		$\dfrac{k-12}{2} = -0.567 @ -0.566$	K1
		$k = 10.87$	N1
	(b) (i)	$^6C_0 \left(\dfrac{3}{7}\right)^0 \left(\dfrac{4}{7}\right)^6$	K1
		0.03482	N1
	(ii)	Tulis $1 - P(X=0) - P(X=1) - P(X=2)$ @ $P(X=3) + P(X=4) + P(X=5) + P(X=6)$	P1
		$1 - {}^6C_0\left(\dfrac{3}{7}\right)^0\left(\dfrac{4}{7}\right)^6 - {}^6C_1\left(\dfrac{3}{7}\right)^1\left(\dfrac{4}{7}\right)^5 - {}^6C_2\left(\dfrac{3}{7}\right)^2\left(\dfrac{4}{7}\right)^4$ @ ${}^6C_3\left(\dfrac{3}{7}\right)^3\left(\dfrac{4}{7}\right)^3 + {}^6C_4\left(\dfrac{3}{7}\right)^4\left(\dfrac{4}{7}\right)^2 + {}^6C_5\left(\dfrac{3}{7}\right)^5\left(\dfrac{4}{7}\right)^1 + {}^6C_6\left(\dfrac{3}{7}\right)^6\left(\dfrac{4}{7}\right)^0$	K1
		$0.5147 // 0.5148$	N1

10 (a) Dalam lambungan sebiji dadu adil, lambungan yang menghasilkan nombor gandaan 3 dianggap sebagai kejayaan. Cari bilangan lambungan minimum yang perlu dilakukan supaya kebarangkalian mendapat sekurang-kurangnya satu kejayaan adalah lebih besar daripada 0.9. **[5 markah]**

In a toss of a fair dice, obtaining a number which is a multiple of 3 is consider as a success. Find the minimum number of tosses required so that the probability of obtaining at least one success is greater than 0.9.

[5 marks]

(b) Jisim sekampit tepung, dalam kg, bertabur secara normal dengan min, μ kg dan sisihan piawai, σ kg. Jika 97.5% daripada kampit tepung itu mempunyai jisim kurang daripada 50.1 kg dan 88.49% daripadanya mempunyai jisim lebih daripada 34.3 kg, cari nilai bagi μ dan nilai σ. **[5 markah]**

The mass of a bag of flour, in kg, is normally distributed with a mean of μ kg and a standard deviation of σ kg. If 97.5% of the bags of flour have masses less than 50.1 kg and 88.49% have masses more than 34.3 kg, find the value of μ and of σ.

[5 marks]

10	(a)	$P(X \geq 1) > 0.9$	**P1**
		$P(X = 0) < 0.1$	**P1**
		$^{n}C_0 \left(\dfrac{1}{3}\right)^0 \left(\dfrac{2}{3}\right)^n < 0.1$	**K1**
		$n \log_{10} \dfrac{2}{3} < \log_{10} 0.1$ & selesaikan	**K1**
		$n = 6$	**N1**

(b)	$P(X > 50.1) = 0.025$ @ $P(X < 50.1) = 0.975$	
	@ $P(X > 34.3) = 0.8849$	
	$P\left(Z > \dfrac{50.1 - \mu}{\sigma}\right) = 0.025$ @ $P\left(Z > \dfrac{34.3 - \mu}{\sigma}\right) = 0.8849$	**K1**
	$\dfrac{50.1 - \mu}{\sigma} = 1.96$ @ $\dfrac{34.3 - \mu}{\sigma} = -1.2$	**K1**
	$\dfrac{50.1 - \mu}{1.96} = \dfrac{34.3 - \mu}{1.2}$	**K1**
	$\mu = 40.3$	**N1**
	$\sigma = 5$	**N1**