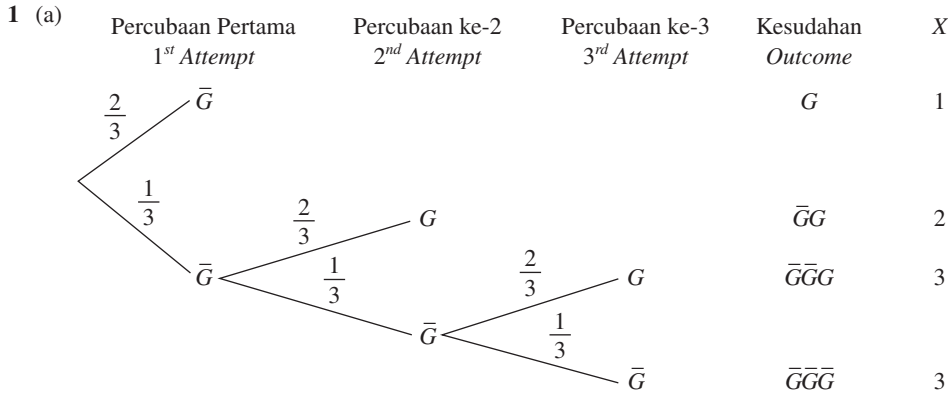


Penyelesaian Lengkap

PRAKTIS 5

Kertas 1

Bahagian A



(b) $P(X=1) = P(G)$
 $= \frac{2}{3}$

$P(X=2) = P(\bar{G}G)$
 $= \frac{1}{3} \times \frac{2}{3}$
 $= \frac{2}{9}$

$P(X=3) = P(\bar{G}\bar{G}G) + P(\bar{G}\bar{G}\bar{G})$
 $= \frac{1}{3} \times \frac{1}{3} \times \frac{2}{3} + \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}$
 $= \frac{1}{9}$

$X = r$	1	2	3
$P(X = r)$	$\frac{2}{3}$	$\frac{2}{9}$	$\frac{1}{9}$

2 (a) $\frac{1}{81} + k + \frac{8}{27} + \frac{32}{81} + 2k = 1$

$3k + \frac{19}{27} = 1$

$3k = \frac{8}{27}$

$k = \frac{8}{81}$

(b) $P(X=0) = \frac{1}{81}$

${}^4C_0 p^0 q^4 = \frac{1}{81}$

$q^4 = \frac{1}{81}$

$q = \frac{1}{3}$

3 (a) $5.85 = 9p$
 $p = 0.65$

(b) $P(X > 6)$
 $= P(X=7) + P(X=8) + P(X=9)$
 $= {}^9C_7 (0.65)^7 (0.35)^2 + {}^9C_8 (0.65)^8 (0.35)^1$
 $+ {}^9C_9 (0.65)^9 (0.35)^0$
 $= 0.3373$

4 (a) $P(X=0) = 0.1296$
 ${}^4C_0 p^0 q^4 = 0.1296$
 $q^4 = (0.6)^4$
 $q = 0.6$

$p = 1 - 0.6$
 $= 0.4$

(b) $P(X=3) = {}^4C_3 (0.4)^3 (0.6)^1$
 $= 0.1536$

5 (a) $X \sim B(6, 0.05)$
 $P(X \geq 1) = 1 - P(X=0)$
 $= 1 - {}^6C_0 (0.05)^0 (0.95)^6$
 $= 0.2649$

(b) $X \sim B(7, 0.2649)$
 $P(2 \leq X \leq 4)$
 $= P(X=2) + P(X=3) + P(X=4)$
 $= {}^7C_2 (0.2649)^2 (0.7351)^5 + {}^7C_3 (0.2649)^3 (0.7351)^4$
 $+ {}^7C_4 (0.2649)^4 (0.7351)^3$
 $= 0.5747$

- 6 (a) (i) Bilangan percubaan yang tetap iaitu 8.
(atau)
Kebarangkalian bahawa seorang murid dilahirkan pada hari Ahad adalah malar pada $\frac{1}{7}$.
Fixed number of trials which is 8.
(or)
The probability that a student has birthday that falls on Sunday is constant at $\frac{1}{7}$.

$$\begin{aligned} \text{(ii)} \quad P(X < 3) &= P(X = 0) + P(X = 1) + P(X = 2) \\ &= {}^8C_0 \left(\frac{1}{7}\right)^0 \left(\frac{6}{7}\right)^8 + {}^8C_1 \left(\frac{1}{7}\right)^1 \left(\frac{6}{7}\right)^7 + {}^8C_2 \left(\frac{1}{7}\right)^2 \left(\frac{6}{7}\right)^6 \\ &= 0.9064 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad P(X = 0) &= 0.1348 \\ {}^nC_0 \left(\frac{1}{7}\right)^0 \left(\frac{6}{7}\right)^n &= 0.1348 \\ \lg\left(\frac{6}{7}\right)^n &= \lg 0.1348 \\ n &= 13 \end{aligned}$$

$$\begin{aligned} 7 \text{ (a)} \quad P(Z \leq -1.3) &= P(Z > 1.3) \\ &= 0.0968 \\ P(Z < a) &= 0.0968 + 0.54 \\ P(Z < a) &= 0.6368 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 1 - P(Z > a) &= 0.6368 \\ P(Z > a) &= 0.3632 \\ a &= 0.35 \end{aligned}$$

$$\begin{aligned} 8 \text{ (a)} \quad P(X < 600, X > 900) &= P\left(Z < \frac{600 - 680}{160}\right) + P\left(Z > \frac{900 - 680}{160}\right) \\ &= P(Z < -0.5) + P(Z > 1.375) \\ &= 0.3085 + 0.0846 \\ &= 0.3931 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad P(600 < X < 680) &= P(-0.5 < Z < 0) \\ &= 0 - P(Z > 0.5) \\ &= 0.5 - 0.3085 \\ &= 0.1915 \\ n &= 0.1915 \times 68 \\ &= 13 \text{ (integer terdekat/nearest integer)} \end{aligned}$$

$$\begin{aligned} 9 \text{ (a)} \quad P(X > 3) &= P\left(Z > \frac{3 - 2.40}{0.75}\right) \\ &= P(Z > 0.8) \\ &= 0.2119 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad P(\mu - k < X < \mu + k) &= 0.5 \\ P\left(\frac{\mu - k - \mu}{0.75} < Z < \frac{\mu + k - \mu}{0.75}\right) &= 0.5 \\ P\left(-\frac{k}{0.75} < Z < \frac{k}{0.75}\right) &= 0.5 \\ 1 - 2P\left(Z > \frac{k}{0.75}\right) &= 0.5 \\ P\left(Z > \frac{k}{0.75}\right) &= 0.25 \\ \frac{k}{0.75} &= 0.674 \\ k &= 0.5055 \end{aligned}$$

$$\begin{aligned} 10 \text{ (a)} \quad P(X = 0) &= P(O \cap O) \\ &= \frac{2}{5} \times \frac{2}{6} \\ &= \frac{2}{15} \end{aligned}$$

$$\begin{aligned} P(X = 1) &= P(A \cap O) + P(O \cap A) \\ &= \frac{3}{5} \times \frac{1}{6} + \frac{2}{5} \times \frac{4}{6} \\ &= \frac{11}{30} \end{aligned}$$

$$\begin{aligned} P(X = 2) &= P(A \cap A) \\ &= \frac{3}{5} \times \frac{5}{6} \\ &= \frac{1}{2} \end{aligned}$$

$X = r$	0	1	2
$P(X = r)$	$\frac{2}{15}$	$\frac{11}{30}$	$\frac{1}{2}$

$$\begin{aligned} \text{(b)} \quad P(X > h) &= 0.9332 \\ P\left(Z > \frac{h - 4k}{k}\right) &= 0.9332 \\ 1 - P\left(Z < \frac{h - 4k}{k}\right) &= 0.9332 \\ P\left(Z < \frac{h - 4k}{k}\right) &= 0.0668 \\ \frac{h - 4k}{k} &= -1.5 \\ h - 4k &= -1.5k \\ h &= 2.5k \end{aligned}$$

Bahagian B

$$\begin{aligned} 11 \text{ (a)} \quad P(X = 1) &= P(1 \cap 1) \\ &= \frac{1}{6} \times \frac{1}{6} \\ &= \frac{1}{36} \end{aligned}$$

$$\begin{aligned} P(X = 2) &= P(1 \cap 2) + P(2 \cap 1) \\ &= \frac{1}{6} \times \frac{2}{6} + \frac{2}{6} \times \frac{1}{6} \\ &= \frac{1}{9} \end{aligned}$$

$$\begin{aligned} P(X = 3) &= P(1 \cap 3) + P(3 \cap 1) \\ &= \frac{1}{6} \times \frac{3}{6} + \frac{3}{6} \times \frac{1}{6} \\ &= \frac{1}{6} \end{aligned}$$

$$\begin{aligned} P(X = 4) &= P(2 \cap 2) \\ &= \frac{2}{6} \times \frac{2}{6} \\ &= \frac{1}{9} \end{aligned}$$

$$\begin{aligned} P(X = 6) &= P(2 \cap 3) + P(3 \cap 2) \\ &= \frac{2}{6} \times \frac{3}{6} + \frac{3}{6} \times \frac{2}{6} \\ &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned}
 P(X=9) &= P(3 \cap 3) \\
 &= \frac{3}{6} \times \frac{3}{6} \\
 &= \frac{1}{4}
 \end{aligned}$$

$X=r$	1	2	3	4	6	9
$P(X=r)$	$\frac{1}{36}$	$\frac{1}{9}$	$\frac{1}{6}$	$\frac{1}{9}$	$\frac{1}{3}$	$\frac{1}{4}$

(b) (i) $\mu = np$
 $3k = 4p$
 $p = \frac{3}{4}k$

(ii) $P(X=4) = {}^4C_4 \left(\frac{3k}{4}\right)^4 \left(1 - \frac{3k}{4}\right)^0$
 $\frac{81}{4096} = \left(\frac{3k}{4}\right)^4$
 $\frac{3k}{4} = \frac{3}{8}$
 $k = \frac{1}{2}$

12 (a) $\sigma = \sqrt{20.25}$
 $= 4.5$

$$\begin{aligned}
 P(40 < X < 50) \\
 &= P\left(\frac{40-39.2}{4.5} < Z < \frac{50-39.2}{4.5}\right) \\
 &= P(0.178 < Z < 2.4) \\
 &= P(Z > 0.178) - P(Z > 2.4) \\
 &= 0.4294 - 0.0082 \\
 &= 0.4212
 \end{aligned}$$

Peratus/Percentage = 0.4212×100
 $= 42.12\%$

(b) $P(X < h) = 0.2$
 $P\left(Z < \frac{h-39.2}{4.5}\right) = 0.2$
 $\frac{h-39.2}{4.5} = -0.842$
 $h = 35.4$

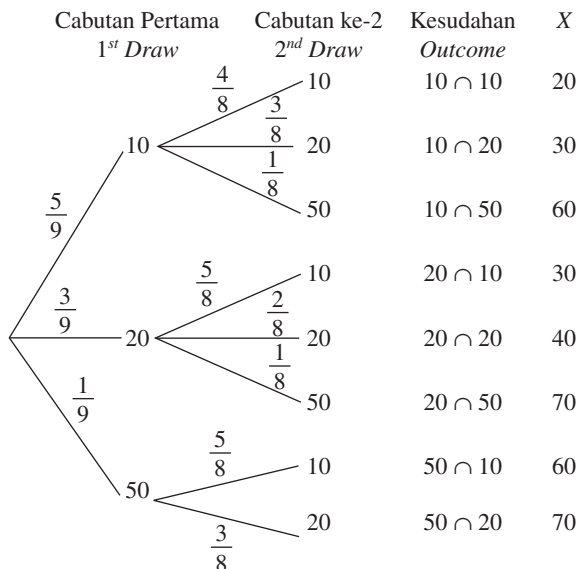
$P(X > k) = 0.2$
 $P\left(Z > \frac{k-39.2}{4.5}\right) = 0.2$
 $\frac{k-39.2}{4.5} = 0.842$
 $k = 43.0$

Julat/Range: $35.4 < X < 43.0$

Kertas 2

Bahagian A

1 (a)



(b) $P(X=20) = P(10 \cap 10)$
 $= \frac{5}{9} \times \frac{4}{8}$
 $= \frac{5}{18}$

$P(X=30) = P(10 \cap 20) + P(20 \cap 10)$
 $= \frac{5}{9} \times \frac{3}{8} \times 2$
 $= \frac{5}{12}$

$P(X=40) = P(20 \cap 20)$
 $= \frac{3}{9} \times \frac{2}{8}$
 $= \frac{1}{12}$

$P(X=60) = P(10 \cap 50) + P(50 \cap 10)$
 $= \frac{5}{9} \times \frac{1}{8} \times 2$
 $= \frac{5}{36}$

$P(X=70) = P(20 \cap 50) + P(50 \cap 20)$
 $= \frac{3}{9} \times \frac{1}{8} \times 2$
 $= \frac{1}{12}$

$X=r$	20	30	40	60	70
$P(X=r)$	$\frac{5}{18}$	$\frac{5}{12}$	$\frac{1}{12}$	$\frac{5}{36}$	$\frac{1}{12}$

$$\begin{aligned}
 2 \text{ (a)} \quad P(12 < X < 15) &= P\left(\frac{12-13.8}{1.2} < Z < \frac{15-13.8}{1.2}\right) \\
 &= P(-1.5 < Z < 1) \\
 &= 1 - P(Z > 1.5) - P(Z > 1) \\
 &= 1 - 0.0668 - 0.1587 \\
 &= 0.7745
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad X &\sim B(7, 0.7745) \\
 P(X \geq 5) &= P(X=5) + P(X=6) + P(X=7) \\
 &= {}^7C_5(0.7745)^7(0.2255)^2 \\
 &\quad + {}^7C_6(0.7745)^6(0.2255)^1 \\
 &\quad + {}^7C_7(0.7745)^7(0.2255)^0 \\
 &= 0.8055
 \end{aligned}$$

$$\begin{aligned}
 3 \text{ (a)} \quad np &= 2.4 \dots \textcircled{1} \\
 \sqrt{npq} &= 1.2 \\
 npq &= 1.44 \dots \textcircled{2} \\
 \textcircled{2} \div \textcircled{1}: \frac{npq}{np} &= \frac{1.44}{2.4} \\
 q &= 0.6 \\
 p &= 1 - 0.6 = 0.4 \\
 n(0.4) &= 2.4 \\
 n &= 6
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad X &\sim B(6, 0.4) \\
 P(X < 2, X > 4) &= 1 - P(X=2) - P(X=3) \\
 &\quad - P(X=4) \\
 &= 1 - {}^6C_2(0.4)^2(0.6)^4 \\
 &\quad - {}^6C_3(0.4)^3(0.6)^3 \\
 &\quad - {}^6C_4(0.4)^4(0.6)^2 \\
 &= 0.2742
 \end{aligned}$$

$$\begin{aligned}
 4 \text{ (a)} \quad \text{(i)} \quad \sigma &= \sqrt{7(0.55)(0.45)} \\
 &= 1.316 \\
 \text{(ii)} \quad P(X=4) &= {}^7C_4(0.3)^4(0.7)^3 \\
 &= 0.09724
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad P(X \geq 1) &\geq 0.95 \\
 1 - P(X=0) &\geq 0.95 \\
 P(X=0) &\leq 0.05 \\
 {}^nC_0(0.15)^0(0.85)^n &\leq 0.05 \\
 0.85^n &\leq 0.05 \\
 \lg 0.85^n &\leq \lg 0.05 \\
 n \lg 0.85 &\leq \lg 0.05 \\
 n &\geq 18.43 \\
 n &= 19
 \end{aligned}$$

$$\begin{aligned}
 5 \text{ (a)} \quad P(X=0) &= \frac{{}^5C_0 \times {}^4C_3}{{}^9C_3} \\
 &= \frac{1}{21} \\
 P(X=1) &= \frac{{}^5C_1 \times {}^4C_2}{{}^9C_3} \\
 &= \frac{5}{14} \\
 P(X=2) &= \frac{{}^5C_2 \times {}^4C_1}{{}^9C_3} \\
 &= \frac{10}{21} \\
 P(X=3) &= \frac{{}^5C_3 \times {}^4C_0}{{}^9C_3}
 \end{aligned}$$

$$= \frac{5}{42}$$

$X=r$	0	1	2	3
$P(X=r)$	$\frac{1}{21}$	$\frac{5}{14}$	$\frac{10}{21}$	$\frac{5}{42}$

$$\begin{aligned}
 \text{(b)} \quad \text{(i)} \quad \mu &= \frac{50+70}{2} \\
 &= 60 \text{ kg}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad P(X > 70) &= \frac{1-0.8}{2} \\
 P(X > 70) &= 0.1 \\
 P\left(Z > \frac{70-60}{\sigma}\right) &= 0.1 \\
 P\left(Z > \frac{10}{\sigma}\right) &= 0.1 \\
 \frac{10}{\sigma} &= 1.282 \\
 \sigma &= 7.8 \text{ kg}
 \end{aligned}$$

$$\begin{aligned}
 6 \text{ (a)} \quad P(X < 4) &= \frac{51}{500} \\
 P\left(Z < \frac{4-\mu}{\sigma}\right) &= 0.102 \\
 \frac{4-\mu}{\sigma} &= -1.27 \\
 4-\mu &= -1.27\sigma \dots \textcircled{1}
 \end{aligned}$$

$$\begin{aligned}
 P(X > 8) &= \frac{121}{500} \\
 P\left(Z > \frac{8-\mu}{\sigma}\right) &= 0.242 \\
 \frac{8-\mu}{\sigma} &= 0.7 \\
 8-\mu &= 0.7\sigma \dots \textcircled{2}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{2} - \textcircled{1}: 4 &= 1.97\sigma \\
 \sigma &= 2.030 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 \text{Daripada/From } \textcircled{1}, \\
 4-\mu &= -1.27(2.030) \\
 \mu &= 6.578 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad P(\mu - \sigma < X < \mu + \sigma) \\
 &= P\left(\frac{\mu - \sigma - \mu}{\sigma} < Z < \frac{\mu + \sigma - \mu}{\sigma}\right) \\
 &= P(-1 < Z < 1) \\
 &= 1 - 2P(Z > 1) \\
 &= 1 - 2(0.1587) \\
 &= 0.6826
 \end{aligned}$$

Bahagian B

$$\begin{aligned}
 7 \text{ (a)} \quad P(X=1) &= 9P(X=3) \\
 {}^4C_1 p^1 q^3 &= 9 \times {}^4C_3 p^3 q^1 \\
 p^1 q^3 &= 9p^3 q^1 \\
 q^2 &= 9p^2 \\
 q &= 3p \dots \textcircled{1} \\
 p + q &= 1 \dots \textcircled{2}
 \end{aligned}$$

Gantikan ① ke dalam ②/Substitute ① into ②,

$$p + 3p = 1$$

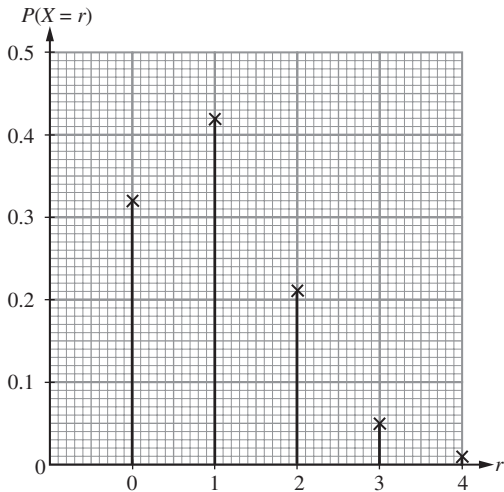
$$4p = 1$$

$$p = 0.25$$

(b)

$X = r$	0	1	2	3	4
$P(X = r)$	0.316	0.422	0.211	0.047	0.004

(c)



8 (a) (i) $\mu = 9(0.15)$

$$= 1.35$$

(ii) $P(X < 3)$

$$= P(X = 0) + P(X = 1) + P(X = 2)$$

$$= {}^9C_0(0.15)^0(0.85)^9 + {}^9C_1(0.15)^1(0.85)^8$$

$$+ {}^9C_2(0.15)^2(0.85)^7$$

$$= 0.8591$$

(b) (i) $P(X < 16) = 0.15$

$$P\left(Z < \frac{16 - \mu}{2.5}\right) = 0.15$$

$$\frac{16 - \mu}{2.5} = -1.036$$

$$16 - \mu = -2.59$$

$$\mu = 18.59$$

(ii) $P(18.59 < X < 20)$

$$= P\left(\frac{18.59 - 18.59}{2.5} < Z < \frac{20 - 18.59}{2.5}\right)$$

$$= P(0 < Z < 0.564)$$

$$= 0.5 - P(Z > 0.564)$$

$$= 0.5 - 0.2864$$

$$= 0.2136$$

9 (a) $P(300 < X < 500)$

$$= P\left(\frac{300 - 396}{84} < Z < \frac{500 - 396}{84}\right)$$

$$= P(-1.143 < Z < 1.238)$$

$$= 1 - P(Z > 1.143) - P(Z > 1.238)$$

$$= 1 - 0.1265 - 0.1079$$

$$= 0.7656$$

(b) $P(X > 500) = P(Z > 1.238)$

$$= 0.1079$$

Bilangan buah mangga yang dijual kepada pasar raya

Number of mangoes sold to supermarket

$$= 2\,000 \times 0.7656$$

$$= 1\,531$$

Bilangan buah mangga yang dijual kepada pasar tempatan

Number of mangoes sold to local market

$$= 2\,000 \times 0.1079$$

$$= 216$$

Jumlah jualan/Total sales

$$= 1\,531 \times \text{RM}1.80 + 216 \times \text{RM}2.30$$

$$= \text{RM}3\,252.60$$

(c) $P(X > m) = 0.95$

$$P\left(Z > \frac{m - 396}{84}\right) = 0.95$$

$$P\left(Z < \frac{m - 396}{84}\right) = 0.05$$

$$\frac{m - 396}{84} = -1.645$$

$$m = 257.8$$