Jawapan

BAB 5 TABURAN KEBARANGKALIAN

Perbincangan (Halaman 142)
Ya. Jisim murid tidak boleh ditentukan terlebih dahulu.

Latihan Kendiri 5.1

1. (a) {menang, seri, kalah}
   (b) {0, 1, 2, 3, 4, 5}
   (c) {0, 1, 2, 3}
2. $X = \{0, 1, 2, 3, 4\}$

Aktiviti Penerokaan 1 (Halaman 143)

3. Aktiviti 1
   • Boleh dibilang.
   • Nilai dalam bentuk integer.

   Aktiviti 2
   • Nilai bukan dalam bentuk integer.
   • Nilai dalam satu selang.

Latihan Kendiri 5.2

1. (a) $X = \{0, 1, 2, 3, 4, 5, 6\}$. Pemboleh ubah rawak diskret
   (b) $X = \{0, 1, 2, 3, 4, 5, 6, 7\}$. Pemboleh ubah rawak diskret
   (c) $X = \{x : 3 \leqslant x \leqslant 460\}$. Pemboleh ubah rawak selanjar

Aktiviti Penerokaan 2 (Halaman 145)

4. (a) $X = (0, 1, 2)$
   (b) Kebarangkalian mendapat nombor ganjil bagi setiap cabutan ialah $\frac{3}{5}$.

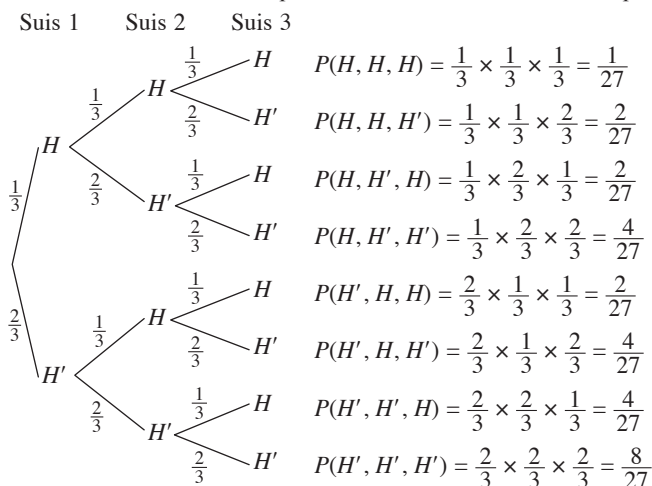5. Katakan G ialah mendapat nombor ganjil dan G' ialah mendapat nombor genap.

Cabutan pertama	Cabutan kedua	Kesudahan	$X = r$	$P(X = r)$
G	G	$\{G, G\}$	2	$\frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$
G	G'	$\{G, G'\}$	1	$\frac{3}{5} \times \frac{2}{5} = \frac{6}{25}$
G'	G	$\{G', G\}$	1	$\frac{2}{5} \times \frac{3}{5} = \frac{6}{25}$
G'	G'	$\{G', G'\}$	0	$\frac{2}{5} \times \frac{2}{5} = \frac{4}{25}$

6. (a) $P(X = 0) = \frac{2}{5} \times \frac{2}{5} = \frac{4}{25}$

   $P(X = 1) = \frac{3}{5} \times \frac{2}{5} + \frac{2}{5} \times \frac{3}{5} = \frac{12}{25}$

   $P(X = 2) = \frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$

   (b) Jumlah kebarangkalian $= \frac{4}{25} + \frac{12}{25} + \frac{9}{25}$
   $$= \frac{25}{25}$$
   $$= 1$$

7. Kebarangkalian setiap nilai X adalah di antara 0 dan 1 dengan jumlah kebarangkalian ialah 1.
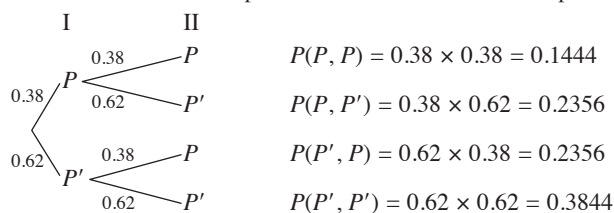
Latihan Kendiri 5.3

1. (a) $X = \{0, 1, 2, 3\}$

(b) Katakan H ialah suis dihidupkan dan H' ialah suis tidak dihidupkan.

Suis 1   Suis 2   Suis 3

$P(H, H, H) = \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{27}$

$P(H, H, H') = \frac{1}{3} \times \frac{1}{3} \times \frac{2}{3} = \frac{2}{27}$

$P(H, H', H) = \frac{1}{3} \times \frac{2}{3} \times \frac{1}{3} = \frac{2}{27}$

$P(H, H', H') = \frac{1}{3} \times \frac{2}{3} \times \frac{2}{3} = \frac{4}{27}$

$P(H', H, H) = \frac{2}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{2}{27}$

$P(H', H, H') = \frac{2}{3} \times \frac{1}{3} \times \frac{2}{3} = \frac{4}{27}$

$P(H', H', H) = \frac{2}{3} \times \frac{2}{3} \times \frac{1}{3} = \frac{4}{27}$

$P(H', H', H') = \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} = \frac{8}{27}$
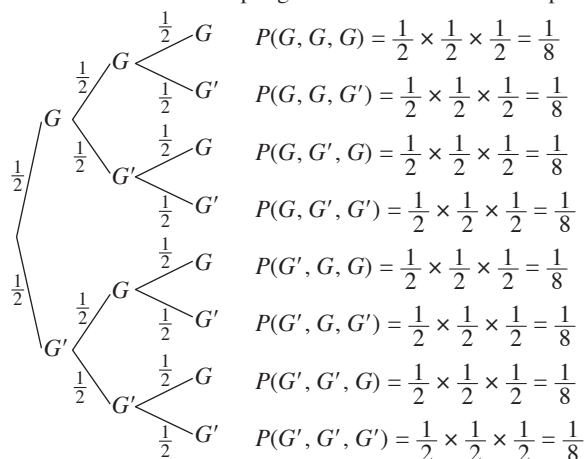
(c) Jumlah kebarangkalian $= \frac{1}{27} + \frac{2}{27} + \frac{2}{27} + \frac{4}{27} + \frac{2}{27} + \frac{4}{27} + \frac{4}{27} + \frac{8}{27} = \frac{27}{27} = 1$

2. (a) $X = \{0, 1, 2\}$

(b) Katakan P ialah kereta putih dan P' ialah bukan kereta putih.

I   II

$P(P, P) = 0.38 \times 0.38 = 0.1444$

$P(P, P') = 0.38 \times 0.62 = 0.2356$

$P(P', P) = 0.62 \times 0.38 = 0.2356$

$P(P', P') = 0.62 \times 0.62 = 0.3844$

3. (a) $X = \{0, 1, 2, 3\}$

(b) Katakan G ialah mendapat gambar dan G' ialah mendapat angka.

$P(G, G, G) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$P(G, G, G') = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$P(G, G', G) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$P(G, G', G') = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$P(G', G, G) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$P(G', G, G') = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$P(G', G', G) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

$P(G', G', G') = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

(c) Jumlah kebarangkalian $= 8\left(\frac{1}{8}\right) = 1$; $\sum_{i=1}^{8} P(X = r_i) = 1$

Kuiz Pantas (Halaman 148)

Tidak.

Jika produk K pertama yang dipilih tidak dikembalikan ke dalam kotak, $P(K) = \frac{4}{7}$ (Hanya 4 buah produk K yang tinggal dan kotak itu mempunyai 7 buah produk sahaja).

Jika produk K kedua yang dipilih tidak dikembalikan ke dalam kotak, hanya 3 buah produk K yang tinggal dan kotak mempunyai 6 buah produk sahaja. Maka, $P(K) = \frac{3}{6} = \frac{1}{2}$.

Kuiz Pantas (Halaman 149)

(a) $P(X = 0) = {}^3C_0\left(\frac{5}{8}\right)^0\left(\frac{3}{8}\right)^3 = \frac{27}{512}$

(b) $P(X = 2) = {}^3C_2\left(\frac{5}{8}\right)^2\left(\frac{3}{8}\right)^1 = \frac{225}{512}$

(c) $P(X = 3) = {}^3C_3\left(\frac{5}{8}\right)^3\left(\frac{3}{8}\right)^0 = \frac{125}{512}$

Kuiz Pantas (Halaman 149)

$$\sum_{i=1}^{4} P(X = r_i) = \frac{27}{512} + \frac{135}{512} + \frac{225}{512} + \frac{125}{512}$$
$$= 1$$

Latihan Kendiri 5.4

1. $X = \{0, 1, 2, 3, 4, 5\}$

   $P(X = 0) = {}^5C_0(0.6)^0(0.4)^5 = 0.0102$

   $P(X = 1) = {}^5C_1(0.6)^1(0.4)^4 = 0.0768$

   $P(X = 2) = {}^5C_2(0.6)^2(0.4)^3 = 0.2304$

   $P(X = 3) = {}^5C_3(0.6)^3(0.4)^2 = 0.3456$

   $P(X = 4) = {}^5C_4(0.6)^4(0.4)^1 = 0.2592$

   $P(X = 5) = {}^5C_5(0.6)^5(0.4)^0 = 0.0778$
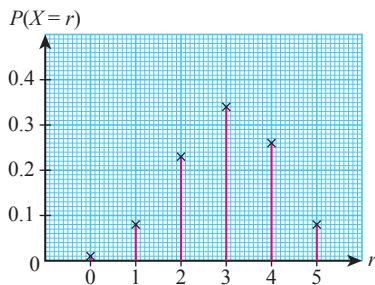
2. (a) $X = \{0, 1, 2, 3, 4\}$
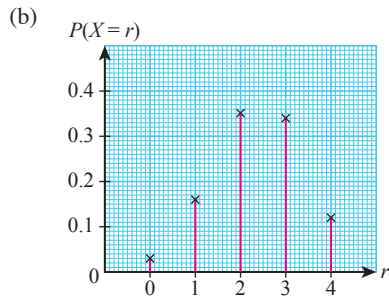
   $P(X = 0) = {}^4C_0(0.59)^0(0.41)^4 = 0.0282$

   $P(X = 1) = {}^4C_1(0.59)^1(0.41)^3 = 0.1627$

   $P(X = 2) = {}^4C_2(0.59)^2(0.41)^2 = 0.3511$

   $P(X = 3) = {}^4C_3(0.59)^3(0.41)^1 = 0.3368$

   $P(X = 4) = {}^4C_4(0.59)^4(0.41)^0 = 0.1212$

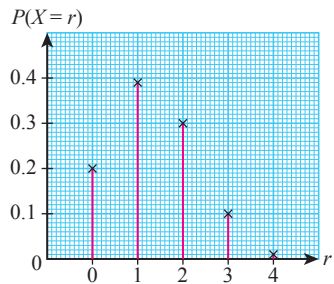| $X = r$	0	1	2	3	4
$P(X = r)$	0.0282	0.1627	0.3511	0.3368	0.1212

(b)

3. $X = \{0, 1, 2, 3, 4\}$

$P(X = 0) = {}^4C_0\left(\dfrac{1}{3}\right)^0\left(\dfrac{2}{3}\right)^4 = 0.1975$

$P(X = 1) = {}^4C_1\left(\dfrac{1}{3}\right)^1\left(\dfrac{2}{3}\right)^3 = 0.3951$

$P(X = 2) = {}^4C_2\left(\dfrac{1}{3}\right)^2\left(\dfrac{2}{3}\right)^2 = 0.2963$

$P(X = 3) = {}^4C_3\left(\dfrac{1}{3}\right)^3\left(\dfrac{2}{3}\right)^1 = 0.0988$

$P(X = 4) = {}^4C_4\left(\dfrac{1}{3}\right)^4\left(\dfrac{2}{3}\right)^0 = 0.0123$

Latihan Formatif 5.1

1. (a) $X = \{0, 1, 2\}$
(b) Pemboleh ubah rawak diskret

2. (a) $X = \{x : 1.2 \text{ cm} \leqslant x \leqslant 10.2 \text{ cm}\}$
(b) Pemboleh ubah rawak selanjar

3. (a) $\displaystyle\sum_{i=1}^{4} P(X = r_i) = 0.2 + 0.35 + 0.3 + 0.15$
$$= 1$$

Maka, $\displaystyle\sum_{i=1}^{4} P(X = r_i) = 1$ adalah pemboleh ubah rawak diskret.

(b)
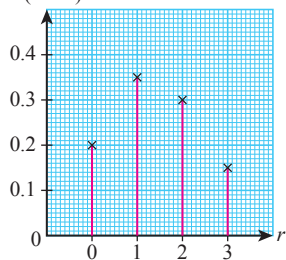
4. (a) $X = \{0, 1, 2, 3\}$
(b) $P(X = 0) = {}^3C_0(0.2)^0(0.8)^3 = 0.512$
$P(X = 1) = {}^3C_1(0.2)^1(0.8)^2 = 0.384$

$P(X = 2) = {}^3C_2(0.2)^2(0.8)^1 = 0.096$

$P(X = 3) = {}^3C_3(0.2)^3(0.8)^0 = 0.008$

$\sum\limits_{i=1}^{4} P(X = r_i) = 0.512 + 0.384 + 0.096 + 0.008$
$= 1$

Maka, $\sum\limits_{i=1}^{4} P(X = r_i) = 1$ adalah pemboleh ubah rawak diskret.

(c)

5. $p + p + (p + q) + q + q = 1$

$3p + 3q = 1$ ...❶

$p = 2q$ ...❷
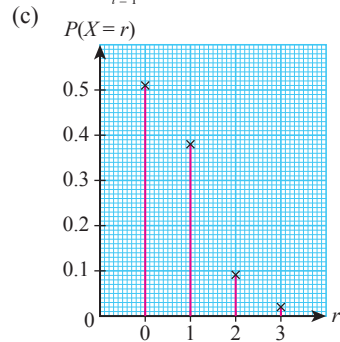
Masukkan ❷ ke dalam ❶, $3(2q) + 3q = 1$

$6q + 3q = 1$

$9q = 1$

$q = \dfrac{1}{9}$

$p = 2\left(\dfrac{1}{9}\right) = \dfrac{2}{9}$

6. (a)

			Kesudahan
M	M	M	3
		S	2.5
		K	2
	S	M	2.5
		S	2
		K	1.5
	K	M	2
		S	1.5
		K	1
S	M	M	2.5
		S	2
		K	1.5
	S	M	2
		S	1.5
		K	1
	K	M	1.5
		S	1
		K	0.5
K	M	M	2
		S	1.5
		K	1
	S	M	1.5
		S	1
		K	0.5
	K	M	1
		S	0.5
		K	0
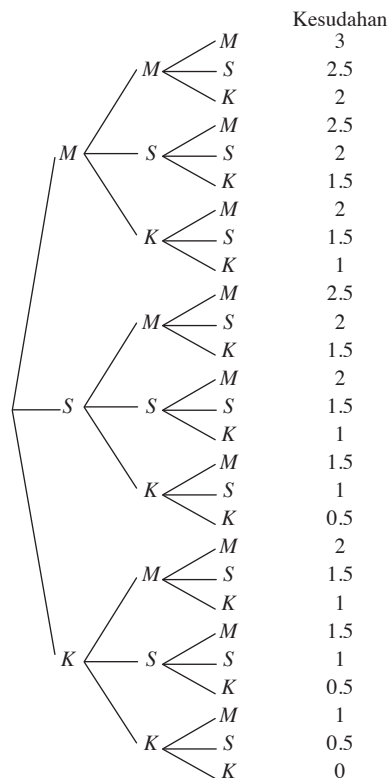
(b) $X = \{0, 0.5, 1, 1.5, 2, 2.5, 3\}$

(c) $P(X = 0) = \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{27}$

$P(X = 0.5) = 3\left(\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}\right) = \frac{3}{27}$
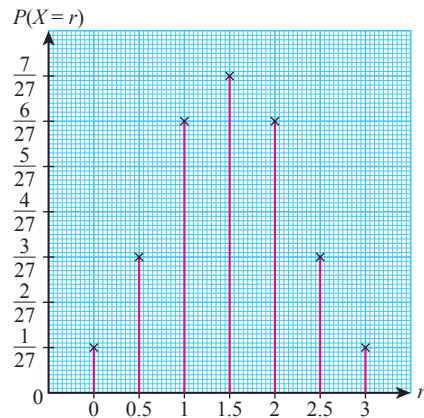
$P(X = 1) = 6\left(\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}\right) = \frac{6}{27}$

$P(X = 1.5) = 7\left(\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}\right) = \frac{7}{27}$

$P(X = 2) = 6\left(\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}\right) = \frac{6}{27}$

$P(X = 2.5) = 3\left(\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}\right) = \frac{3}{27}$

$P(X = 3) = \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{27}$

Aktiviti Penerokaan 3 (Halaman 153)

6. (a) Ya
   (b) Tidak bersandar. Tidak
   (c) Dua jenis – nombor ganjil, nombor genap
   (d) $X = \{0, 1, 2, 3, 4\}$

Latihan Kendiri 5.5

1. (a) $X = \{0, 1\}$
   (b) $p = 0.3$
      Jadi, $q = 1 - 0.3 = 0.7$
      Maka, kebarangkalian 'kegagalan' ialah 0.7.

2. Bukan eksperimen binomial kerana lambungan pertama tidak serupa dengan lambungan kedua.

   $P(\text{lambungan } 1) = \frac{1}{2}$

   $P(\text{lambungan } 2) = \frac{1}{6}$

3. Taburan binomial
   (a) Terdapat dua kesudahan yang mungkin, iaitu upah lebih RM2 000 dan upah kurang RM2 000.
   (b) Tidak bersandar.
   (c) Pemboleh ubah rawak diskret, $X = \{0, 1, 2, 3\}$.
   (d) Kebarangkalian upah lebih RM2 000 $= \frac{1}{2}$ setiap kali.

4. Ya.
   (a) $P(\text{pelajar mengambil kerja sambilan}) = \frac{9}{10}$. Tetap
   (b) $X = \{0, 1, 2, 3, 4\}$. Pemboleh ubah rawak diskret.

(c) Tidak bersandar.

(d) Hanya dua jenis kesudahan.

5.

Melanjutkan pembelajaran di luar negara

Melanjutkan pembelajaran dalam negara

Tidak menyambung pelajaran
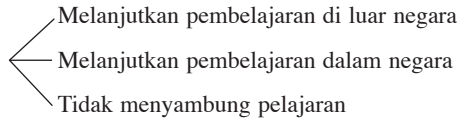
Ada tiga jenis kesudahan.

Bukan taburan binomial kerana taburan binomial hanya mempunyai dua kesudahan sahaja dalam setiap percubaan.

Kuiz Pantas (Halaman 156)

$$P(X < 1) + P(X > 2) = P(X = 0) + P(X = 3)$$
$$= 0.42 + 0.02$$
$$= 0.44$$

Latihan Kendiri 5.6

1. P(menggunakan telefon pintar) $= 0.57, n = 8$

   (a) $P(X = 6) = {}^8C_6(0.57)^6(0.43)^2 = 0.1776$

   (b) $P(X \leqslant 2) = P(X = 0) + P(X = 1) + P(X = 2)$
$$= {}^8C_0(0.57)^0(0.43)^8 + {}^8C_1(0.57)^1(0.43)^7 + {}^8C_2(0.57)^2(0.43)^6$$
$$= 0.0711$$

2. (a) P(komik) $= \dfrac{2}{5}$

Kesudahan

$\{K, K, K\}$

$\{K, K, K'\}$

$\{K, K', K\}$

$\{K, K', K'\}$

$\{K', K, K\}$

$\{K', K, K'\}$

$\{K', K', K\}$

$\{K', K', K'\}$
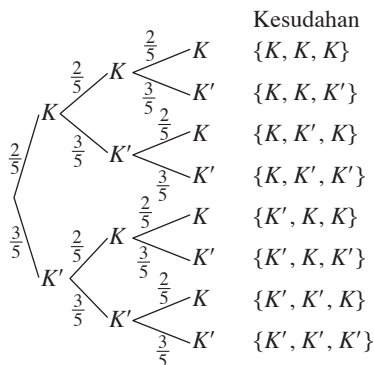
   (b) (i) $P(X = 1) = {}^3C_1\left(\dfrac{2}{5}\right)^1\left(\dfrac{3}{5}\right)^2 = \dfrac{54}{125}$

      (ii) $P(X = 0) = {}^3C_0\left(\dfrac{2}{5}\right)^0\left(\dfrac{3}{5}\right)^3 = \dfrac{27}{125}$

3. P(komputer) $= 0.95, n = 8$

   (a) $P(X = 6) = {}^8C_6(0.95)^6(0.05)^2 = 0.0515$

   (b) $P(X \leqslant 2) + P(X > 7) = P(X = 0) + P(X = 1) + P(X = 2) + P(X = 8)$
$$= {}^8C_0(0.95)^0(0.05)^8 + {}^8C_1(0.95)^1(0.05)^7 + {}^8C_2(0.95)^2(0.05)^6 + {}^8C_8(0.95)^8(0.05)^0$$
$$= 0.6634$$

4. (a)
$$P(X = n) = 0.0319$$
$${}^nC_n \times 0.65^n \times 0.35^0 = 0.0319$$
$$n \log 0.65 = \log 0.0319$$
$$n = \frac{\log 0.0319}{\log 0.65}$$
$$= 8$$

   (b) $P(X > 2) = 1 - P(X = 0) - P(X = 1) - P(X = 2)$
$$= 1 - {}^8C_0(0.65)^0(0.35)^8 - {}^8C_1(0.65)^1(0.35)^7 - {}^8C_2(0.65)^2(0.35)^6$$
$$= 0.9747$$

Aktiviti Penerokaan 4 (Halaman 158)

2. P(bola biru) $= \dfrac{6}{10} = 0.6$

| $X = r$	$P(X = r)$
0	$^5C_0(0.6)^0(0.4)^5 = 0.0102$
1	$^5C_1(0.6)^1(0.4)^4 = 0.0768$
2	$^5C_2(0.6)^2(0.4)^3 = 0.2304$
3	$^5C_3(0.6)^3(0.4)^2 = 0.3456$
4	$^5C_4(0.6)^4(0.4)^1 = 0.2592$
5	$^5C_5(0.6)^5(0.4)^0 = 0.0778$

4. (a) $P(X = 3) = 0.3456$

(b) $P(X < 3) = P(X = 0) + P(X = 1) + P(X = 2)$
$= 0.0102 + 0.0768 + 0.2304$
$= 0.3174$

(c) $P(1 < X < 3) = P(X = 2)$
$= 0.2304$

5. Baca daripada jadual atau graf mengikut syarat yang diberi.

Latihan Kendiri 5.7

1. $P(\text{gred } B) = 0.35$, $n = 6$

(a) $P(X = 4) = {}^6C_4(0.35)^4(0.65)^2 = 0.0951$

(b) $P(X > 1) = 1 - P(X \leq 1)$
$= 1 - P(X = 0) - P(X = 1)$
$= 1 - {}^6C_0(0.35)^0(0.65)^6 - {}^6C_1(0.35)^1(0.65)^5$
$= 0.6809$

2. $P(\text{rosak}) = 0.78$, $n = 7$

(a) $P(X = 4) = {}^7C_4(0.78)^4(0.22)^3 = 0.1379$

(b) $0.1379 \times 200 = 27.59$
≈ 28

3. $P(\text{buatan tempatan}) = 0.54$, $n = 8$

(a) $P(X \geq 2) = 1 - P(X = 0) - P(X = 1)$
$= 1 - {}^8C_0(0.54)^0(0.46)^8 - {}^8C_1(0.54)^1(0.46)^7$
$= 0.9792$

(b) $P(X > 6) = P(X = 7) + P(X = 8)$
$= {}^8C_7(0.54)^7(0.46)^1 + {}^8C_8(0.54)^8(0.46)^0$
$= 0.0565$

4. $P(\text{mesin yang kurang memuaskan}) = 0.05$, $n = 5$

(a) $X = \{0, 1, 2, 3, 4, 5\}$

$X = r$	$P(X = r)$
0	$^5C_0(0.05)^0(0.95)^5 = 0.7738$
1	$^5C_1(0.05)^1(0.95)^4 = 0.2036$
2	$^5C_2(0.05)^2(0.95)^3 = 0.0214$
3	$^5C_3(0.05)^3(0.95)^2 = 0.0011$
4	$^5C_4(0.05)^4(0.95)^1 = 0.00003$
5	$^5C_5(0.05)^5(0.95)^0 = 3.1 \times 10^{-7}$
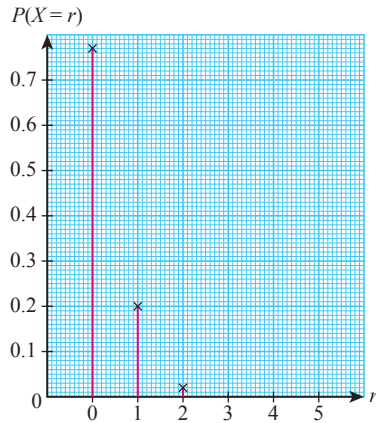
(b) (i) $P(X = 2) = 0.0214$

(ii) $P(X > 1) = 1 - P(X = 0) - P(X = 1)$
$= 1 - 0.7738 - 0.2036$
$= 0.0226$

5. (a) $X = \{0, 1, 2, 3, 4, 5\}$

(b) $\dfrac{1}{36} + \dfrac{1}{4}m + \dfrac{1}{9} + \dfrac{5}{36} + m + 2m = 1$

$3m + \dfrac{1}{4}m = 1 - \dfrac{10}{36}$

$= \dfrac{26}{36}$

$\dfrac{13m}{4} = \dfrac{26}{36}$

$m = \dfrac{2}{9}$

(c) $P(X \geqslant 2) = 1 - P(X = 0) - P(X = 1)$

$= 1 - \dfrac{1}{4}m - \dfrac{1}{9}$

$= 1 - \dfrac{1}{18} - \dfrac{1}{9}$

$= \dfrac{15}{18}$

$= \dfrac{5}{6}$

Maka, $\dfrac{5}{6} \times 100\% = 83.33\%$

6. $P(\text{menghidap penyakit diabetes}) = 0.17$, $n = 10$

(a) $P(X = 5) = {}^{10}C_5(0.17)^5(0.83)^5 = 0.0141$

(b) $P(2 \leqslant X \leqslant 6) = P(X = 2) + P(X = 3) + P(X = 4) + P(X = 5) + P(X = 6)$
$= {}^{10}C_2(0.17)^2(0.83)^8 + {}^{10}C_3(0.17)^3(0.83)^7 + {}^{10}C_4(0.17)^4(0.83)^6$
$+ {}^{10}C_5(0.17)^5(0.83)^5 + {}^{10}C_6(0.17)^6(0.83)^4$
$= 0.5267$

Aktiviti Penerokaan 5 (Halaman 161)

2. $\dfrac{1}{2} \times 100 = 50$

Daripada 100 kali, 50 kali mungkin mendapat gambar.

3. $\dfrac{1}{4} \times 60 = 15$

Daripada 60 soalan, 15 soalan mungkin betul, iaitu $\dfrac{15}{60} = \dfrac{1}{4}$.

Kuiz Pantas (Halaman 162)

Varians ialah kuasa dua beza data daripada min manakala sisihan piawai adalah beza data daripada min. Maka, untuk mendapatkan sisihan piawai, kita perlu punca kuasa duakan nilai varians.

Latihan Kendiri 5.8

1. $X \sim B(n, p)$

   $\mu = 45 = np$ ... ❶

   $\sigma^2 = 9 = npq$ ... ❷

   ❷ ÷ ❶: $q = \dfrac{9}{45}, \quad p = \dfrac{4}{5}$

   $\qquad\qquad = \dfrac{1}{5}$

   $np = 45$

   $n\left(\dfrac{4}{5}\right) = 45$

   $\quad n = 56.25$

   Oleh sebab n ialah suatu integer, maka $n = 56$.

2. $X \sim B(120, 0.4)$

   $\mu = np = 120(0.4) = 48$

   $\sigma = \sqrt{npq} = \sqrt{120(0.4)(0.6)} = 5.367$

3. $n = 5\ 000, p = \dfrac{8}{10} = \dfrac{4}{5}$

   $\mu = 5\ 000 \times \dfrac{4}{5} = 4\ 000$

   $\sigma^2 = 5\ 000 \times \dfrac{4}{5} \times \dfrac{1}{5} = 800$

   $\sigma = \sqrt{800} = 20\sqrt{2}$

4. $p = \dfrac{3}{5}, n = 1\ 000$

   $\mu = 1\ 000 \times \dfrac{3}{5} = 600$

   $\sigma^2 = 600 \times \dfrac{2}{5} = 240$

   $\sigma = \sqrt{240} = 4\sqrt{15}$

Kuiz Pantas (Halaman 163)

Nilai bagi log 0.88 adalah negatif.

Nilai bagi log 0.15 juga adalah negatif.

Diketahui bahawa jika $-a < -b$, maka $a > b$.

Maka, $n \log 0.88 < \log 0.15$

$\qquad -0.0555n < -0.8239$

$\qquad\ \ 0.0555n > 0.8239$

$\qquad\qquad\ \ n > \dfrac{0.8239}{0.0555}$

Latihan Kendiri 5.9

1. $P(\text{dapat biasiswa}) = \dfrac{1}{3}$

   (a) $P(X = 7) = {}^7C_7\left(\dfrac{1}{3}\right)^7\left(\dfrac{2}{3}\right)^0 = \dfrac{1}{2\ 187}$

   (b) $P(X = 2) = {}^7C_2\left(\dfrac{1}{3}\right)^2\left(\dfrac{2}{3}\right)^5 = \dfrac{224}{729} = 0.3073$

   (c) $P(X \leqslant 2) = P(X = 0) + P(X = 1) + P(X = 2)$

   $\qquad\qquad = {}^7C_0\left(\dfrac{1}{3}\right)^0\left(\dfrac{2}{3}\right)^7 + {}^7C_1\left(\dfrac{1}{3}\right)^1\left(\dfrac{2}{3}\right)^6 + {}^7C_2\left(\dfrac{1}{3}\right)^2\left(\dfrac{2}{3}\right)^5$

   $\qquad\qquad = \dfrac{416}{729}$

   $\qquad\qquad = 0.5706$

2. $\mu = np = 36, \sigma^2 = npq = 14.4$

   (a) $q = \dfrac{14.4}{36} = 0.4$

   $\quad p = 0.6$

   $\quad n = \dfrac{36}{0.6} = 60$

(b) $n = 8$

$\qquad P(X = 4) = {}^8C_4(0.6)^4(0.4)^4 = 0.2322$

3. $P(\text{Sains}) = 0.8 = p$

(a) $\qquad P(X = n) = 0.1342$

$\qquad {}^nC_n(0.8)^n(0.2)^0 = 0.1342$

$\qquad\qquad n \log 0.8 = \log 0.1342$

$$n = \frac{\log 0.1342}{\log 0.8}$$

$$= 9$$

(b) $P(X < 3) = P(X = 0) + P(X = 1) + P(X = 2)$

$\qquad\qquad = {}^9C_0(0.8)^0(0.2)^9 + {}^9C_1(0.8)^1(0.2)^8 + {}^9C_2(0.8)^2(0.2)^7$

$\qquad\qquad = 3.139 \times 10^{-4}$

Latihan Formatif 5.2

1. $X = \{0, 1, 2, 3, 4\}$

$X = r$	$P(X = r)$
0	${}^4C_0(0.5)^0(0.5)^4 = 0.0625$
1	${}^4C_1(0.5)^1(0.5)^3 = 0.2500$
2	${}^4C_2(0.5)^2(0.5)^2 = 0.3750$
3	${}^4C_3(0.5)^3(0.5)^1 = 0.2500$
4	${}^4C_4(0.5)^4 (0.5)^0 = 0.0625$

2. $P(X > 3) = \dfrac{3}{6} = \dfrac{1}{2}$

$X = \{0, 1, 2, 3\}$

$X = r$	$P(X = r)$
0	$\dfrac{1}{8}$
1	$\dfrac{3}{8}$
2	$\dfrac{3}{8}$
3	$\dfrac{1}{8}$
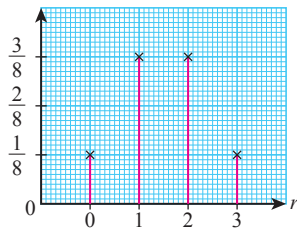
3. $P(\text{Melanjutkan pelajaran selepas tamat}) = 0.85, n = 8$

(a) $P(X = 8) = {}^8C_8(0.85)^8(0.15)^0 = 0.2725$

(b) $P(X < 3) = P(X = 0) + P(X = 1) + P(X = 2)$

$\qquad\qquad = {}^8C_0(0.85)^0(0.15)^8 + {}^8C_1(0.85)^1(0.15)^7 + {}^8C_2(0.85)^2(0.2)^6$

$\qquad\qquad = 2.423 \times 10^{-4}$

4. P(durian yang busuk) $= 0.1$, $n = 50$

$\mu = 50(0.1) = 5$

$\sigma^2 = 5(0.9) = 4.5$

$\sigma = 2.121$

5. $X \sim B(n, p)$

$\mu = np = 5$, $\sigma^2 = npq = 4$

(a) $q = \dfrac{4}{5}$, $p = \dfrac{1}{5}$

$5 = n\left(\dfrac{1}{5}\right)$

$n = 25$

(b) $P(X = 3) = {}^{25}C_3\left(\dfrac{1}{5}\right)^3\left(\dfrac{4}{5}\right)^{22} = 0.1358$

6. $X \sim B(10, p)$

(a) $\sigma^2 = npq = \dfrac{12}{5}$, $n = 10$

$\dfrac{12}{5} = npq$

$pq = \dfrac{6}{25} = \dfrac{2 \times 3}{5 \times 5}$

$p < 0.5$, maka $p = \dfrac{2}{5}$ dan $q = \dfrac{3}{5}$

$\mu = 10\left(\dfrac{2}{5}\right) = 4$

(b) $P(X = 4) = {}^{10}C_4(0.4)^4(0.6)^6 = 0.2508$

7. $\mu = np = 20 \times \dfrac{1}{2} = 10$

$\sigma^2 = npq = 10 \times \dfrac{1}{2} = 5$

8. P(Kalkulator bertahan lebih 8 tahun) $= \dfrac{1}{5}$

(a) $P(X = n) = 0.0016$

${}^{n}C_n\left(\dfrac{1}{5}\right)^n\left(\dfrac{4}{5}\right)^0 = 0.0016$

$n \log 0.2 = \log 0.0016$

$n = \dfrac{\log 0.0016}{\log 0.2}$

$= 4$

(b) $n = 4$, $p = 0.2$

$P(X > 1) = 1 - P(X = 0) - P(X = 1)$

$= 1 - {}^{4}C_0(0.2)^0(0.8)^4 - {}^{4}C_1(0.2)^1(0.8)^3$

$= 0.1808$

9. (a) $16 \times \dfrac{3}{4} = 12$

(b) $n = 16$, $p = \dfrac{3}{4}$

(i) $P(X = 16) = {}^{16}C_{16}\left(\dfrac{3}{4}\right)^{16}\left(\dfrac{1}{4}\right)^0$

$= 0.01$

(ii) $\dfrac{x}{16} \times 100\% = 60\%$

$x = 9.6$

Maka, $x = 10$ soalan betul.

$P(X = 10) = {}^{16}C_{10}\left(\dfrac{1}{4}\right)^{10}\left(\dfrac{3}{4}\right)^6$

$= 1.359 \times 10^{-3}$

Kuiz Pantas (Halaman 166)

Tinggi manusia, tekanan darah, skor IQ dan ralat sukatan.

Kuiz Pantas (Halaman 167)

Apabila $n \to \infty$, maka taburan binomial akan menghampiri taburan normal, iaitu graf berbentuk loceng dan simetri pada min.

Latihan Kendiri 5.10

1. (a) $\mu = 15$
   (b) R: $P(X < 12)$
       Q: $P(X > 18)$
   (c) $P(X < 18) = 0.7635$
       $P(X > 18) = 1 - 0.7635$
       $\qquad\qquad\;\; = 0.2365$
       $P(15 < X < 18) = 1 - 2(0.2365)$
       $\qquad\qquad\qquad\quad\; = 0.5270$

2. $X \sim N(\mu, 16)$
   (a) $\mu = 12$
   (b)
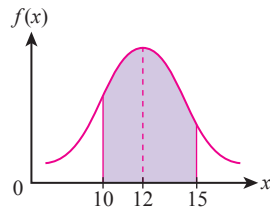
Aktiviti Penerokaan 6 (Halaman 170)

5. (a) Nilai min percubaan akan menjadi lebih konsisten.
   (b) Ya, nilai min percubaan menghampiri nilai min teori, iaitu 0.5.
   (d) Nilai min percubaan, μ' = Nilai min teori, μ.

Latihan Kendiri 5.11

1. $Z = \dfrac{X - \mu}{\sigma} = \dfrac{19.5 - 24}{6} = -0.75$

2. $X \sim N(500, 169)$

   $1.35 = \dfrac{X - 500}{13}$

   $\quad X = 13(1.35) + 500$
   $\qquad = 517.55$

3. (a) $Z = \dfrac{0.14 - 0.15}{0.05} = -0.2$

   (b) $-0.12 = \dfrac{X - 0.15}{0.05}$

   $\qquad\quad X = 0.15 - 0.12(0.05)$
   $\qquad\qquad = 0.144$ kg

4. $\mu = 45$

   $1.5 = \dfrac{60 - 45}{\sigma}$

   $\;\;\sigma = \dfrac{15}{1.5}$

   $\quad = 10$

Kuiz Pantas (Halaman 174)

$P(Z > 0) = P(Z < 0) = 0.5$

Kuiz Pantas (Halaman 175)

Semakin besar nilai z, semakin kecil luas di bawah graf.
Nilai $z = 0.235$ adalah lebih besar daripada $z = 0.23$, maka perlu tolak 0.0019 daripada 0.4090.

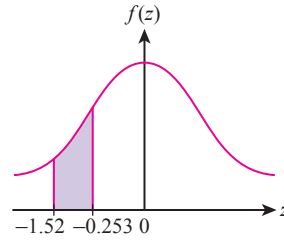**Latihan Kendiri 5.12**

1. $\mu = 350$, $\sigma = 45$

$$P(280 < X < 375) = P\left(\frac{280 - 350}{45} < Z < \frac{375 - 350}{45}\right)$$
$$= P\left(-\frac{14}{9} < Z < \frac{5}{9}\right)$$

2. (a) $P(Z \leqslant 0.538) = 0.7046$

   (b) $P(-2.1 < Z < 1.2) = 0.8671$

   (c) $P(-1.52 < Z < -0.253) = P(Z > 0.253) - P(Z > 1.52)$
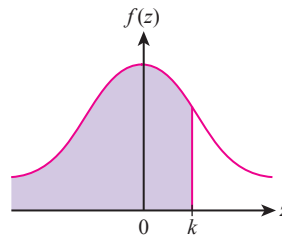 $$= 0.3359$$

   (d) $P(0 \leqslant Z \leqslant 1.984) = 0.5 - P(Z > 1.984)$
   $$= 0.4764$$
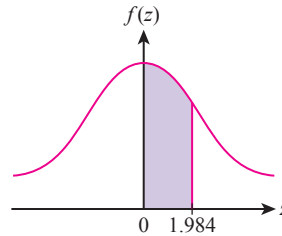
3. $0.0157, 0.8606, 0.5664, 0.2876, 0.2286, 0.3785, 0.821, -0.984, -0.107, 0.471, 0.729$

4. (a) $\quad P(Z < k) = 0.6078$
   $$1 - P(Z > k) = 0.6078$$
   $$P(Z > k) = 0.3922$$
   $$k = 0.274$$

   (b) $P(Z \geqslant k) = 0.4538$
   $$k = 0.116$$
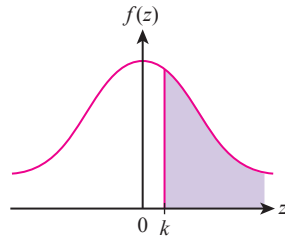
5. $\quad P(X < 16.2) = 0.7654$
$$P\left(Z < \frac{16.2 - 15}{\sigma}\right) = 0.7654$$
$$1 - P\left(Z > \frac{1.2}{\sigma}\right) = 0.7654$$
$$P\left(Z > \frac{1.2}{\sigma}\right) = 0.2346$$
$$\frac{1.2}{\sigma} = 0.724$$
$$\sigma = \frac{1.2}{0.724}$$
$$= 1.657$$
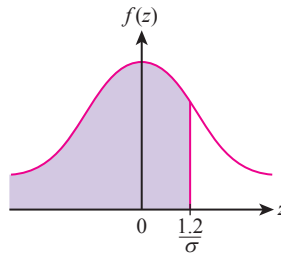
6. $\quad P(X > 0.69) = 0.5178$
$$P\left(Z > \frac{0.69 - 0.75}{\sigma}\right) = 0.5178$$
$$P\left(Z > \frac{-0.06}{\sigma}\right) = 0.5178$$
$$\frac{-0.06}{\sigma} = -0.045$$
$$\sigma = 1.333$$

7. $Y \sim N(\mu, \sigma^2) = Y \sim N(\mu, 16)$

$$P\left(Y > \frac{14.5 - \mu}{4}\right) = 0.7321$$

$$\frac{14.5 - \mu}{4} = -0.619$$

$$\mu = 14.5 + 4(0.619)$$
$$= 16.98$$

8. $\qquad P(X > 80) = 0.0113$

$$P\left(Z > \frac{80 - \mu}{\sigma}\right) = 0.0113$$

$$\frac{80 - \mu}{\sigma} = 2.28$$

$$80 - \mu = 2.28\sigma \qquad \text{...}❶$$

$$P(X < 30) = 0.0287$$

$$P\left(Z < \frac{30 - \mu}{\sigma}\right) = 0.0287$$

$$\frac{30 - \mu}{\sigma} = -1.9$$

$$30 - \mu = -1.9\sigma \qquad \text{...}❷$$

❶ − ❷

$$50 = 2.28\sigma + 1.9\sigma$$
$$\sigma = 11.96$$
$$\mu = 80 - 2.28(11.96)$$
$$= 52.73$$
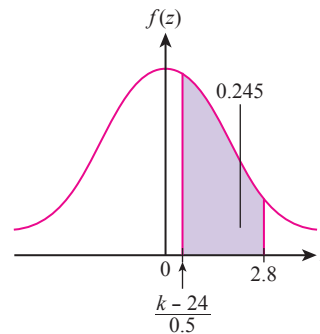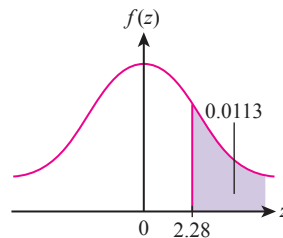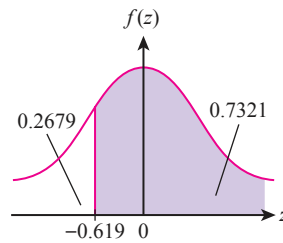
Latihan Kendiri 5.13

1. $\mu = 210$, $\sigma = 12$

(a) $Z = \dfrac{216 - 210}{12} = 0.5$

(b) $-1.8 = \dfrac{X - 210}{12}$

$$X = 210 - 12(1.8)$$
$$= 188.4$$

2. $\mu = 24$, $\sigma = 0.5$

$$P\left(k < X < 25.4\right) = 0.245$$

$$P\left(\frac{k - 24}{0.5} < Z < \frac{25.4 - 24}{0.5}\right) = 0.245$$

$$P\left(\frac{k - 24}{0.5} < Z < \frac{1.4}{0.5}\right) = 0.245$$

$$P\left(Z > \frac{k - 24}{0.5}\right) = 0.245 + 0.00256$$

$$= 0.2476$$

$$\frac{k - 24}{0.5} = 0.682$$

$$k = 24 + 0.5(0.682)$$
$$= 24.34$$

3. $\mu = 145$, $\sigma = 10$

(a) $P(X \geqslant 140) = P\left(Z \geqslant \dfrac{140 - 145}{10}\right)$

$$= P(Z \geqslant -0.5)$$
$$= 0.6915$$

(b) $P(X \leqslant 150) = P\left(Z \leqslant \dfrac{150 - 145}{10}\right)$

$$= P(Z \leqslant 0.5)$$
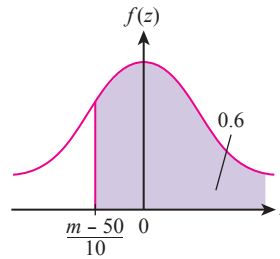$$= 0.6915$$

Bilangan murid $= 0.6915 \times 450 = 311$

4. $\mu = 50$, $\sigma = 10$

(a) $P(X \geqslant 70) = P\left(Z \geqslant \dfrac{70 - 50}{10}\right)$

$\qquad\qquad = P(Z \geqslant 2)$

$\qquad\qquad = 0.02275$

Bilangan murid $= 0.02275 \times 200 = 5$

(b) $\qquad P(X \geqslant m) = 0.6$

$P\left(Z \geqslant \dfrac{m - 50}{10}\right) = 0.6$

$\qquad \dfrac{m - 50}{10} = -0.253$

$\qquad\qquad m = 50 - 0.253(10)$

$\qquad\qquad\quad = 47.47$

$\qquad\qquad\quad \approx 47$

5. (a) $\qquad P(X > 75) = 0.1$

$P\left(Z > \dfrac{75 - \mu}{\sigma}\right) = 0.1$

$\qquad \dfrac{75 - \mu}{\sigma} = 1.282$

$\qquad 75 - \mu = 1.282\sigma \qquad \ldots❶$

$\qquad P(X < 40) = 0.25$

$P\left(Z < \dfrac{40 - \mu}{\sigma}\right) = 0.25$

$\qquad \dfrac{40 - \mu}{\sigma} = -0.674$

$\qquad 40 - \mu = -0.674\sigma \quad \ldots❷$

❶ − ❷:

$35 = (1.282 + 0.674)\sigma$

$\sigma = 17.89$

$\mu = 75 - 1.282(17.89)$

$\quad = 52.07$
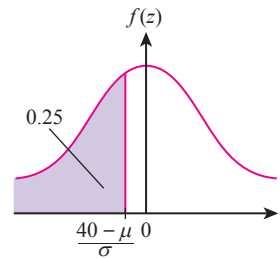
6. $\mu = 840$, $\sigma = 24$

(a) $P(812 < X < 882) = P\left(\dfrac{812 - 840}{24} < Z < \dfrac{882 - 840}{24}\right)$

$\qquad\qquad\qquad\qquad = P\left(\dfrac{-28}{24} < Z < \dfrac{42}{24}\right)$

$\qquad\qquad\qquad\qquad = 0.8383$

(b) $P(X \leqslant 812) = P\left(Z \leqslant \dfrac{-28}{24}\right)$

$\qquad\qquad\qquad = 0.1217$

Kebarangkalian buah betik yang tidak dijual di luar negara atau pasar tempatan $= 1 - 0.8383 - 0.1217$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 0.04$

Maka, bilangan buah betik yang tidak dieksport ke luar negara atau dijual di pasar tempatan $= 0.04 \times 2\,500$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 100$

Latihan Formatif 5.3

1. $P(k < Z < 0) = 0.3415$

$\qquad P(Z < k) = 0.5 - 0.3415$

$\qquad\qquad\qquad = 0.1585$

$\qquad\qquad\quad k = -1.001$

2. $\mu = 12$, $\sigma^2 = 4$

(a) $Z = \dfrac{14.2 - 12}{2} = \dfrac{2.2}{2} = 1.1$

(b) $P(11 < X < 13.5) = P\left(\dfrac{11 - 12}{2} < Z < \dfrac{13.5 - 12}{2}\right)$

$\qquad\qquad\qquad\qquad = P\left(-0.5 < Z < \dfrac{1.5}{2}\right)$

$\qquad\qquad\qquad\qquad = 0.4649$

3. $P(m < Z < 0.35) = 0.5124$

$\qquad P(Z > 0.35) = 0.3632$

$\qquad P(Z < m) = 1 - 0.3632 - 0.5124$

$\qquad\qquad\qquad = 0.1244$

4. $\mu = 3.1$, $\sigma = 0.3$

(a) $P(2.9 < X < 3.3) = P\left(\dfrac{2.9 - 3.1}{0.3} < Z < \dfrac{3.3 - 3.1}{0.3}\right)$

$\qquad\qquad\qquad\qquad = P\left(-\dfrac{2}{3} < Z < \dfrac{2}{3}\right)$

$\qquad\qquad\qquad\qquad = 0.4950$

(b) $\qquad P(X < m) = 0.25$

$\qquad P\left(Z < \dfrac{m - 3.1}{0.3}\right) = 0.25$

$\qquad\qquad \dfrac{m - 3.1}{0.3} = -0.674$

$\qquad\qquad\qquad m = 3.1 - 0.3(0.674)$

$\qquad\qquad\qquad\quad = 2.898$ kg
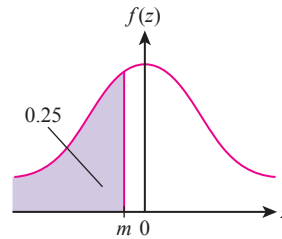
5. (a) $\qquad P(X < 600) = 0.0012$

$\qquad P\left(Z < \dfrac{600 - 650}{p}\right) = 0.0012$

$\qquad\qquad\qquad -\dfrac{50}{p} = -3.034$

$\qquad\qquad\qquad\qquad p = \dfrac{50}{3.034}$

$\qquad\qquad\qquad\qquad\quad = 16.48$

(b) $P(645 < X < 660) = P\left(\dfrac{645 - 650}{16.48} < Z < \dfrac{660 - 650}{16.48}\right)$

$\qquad\qquad\qquad\qquad = P\left(-\dfrac{5}{16.48} < Z < \dfrac{10}{16.48}\right)$

$\qquad\qquad\qquad\qquad = 0.3472$

$\qquad$ Bilangan ikan $= \dfrac{350}{0.3472}$

$\qquad\qquad\qquad\qquad = 1\ 008$

6. $\mu = 80$, $\sigma = 15$

(a) $P(X > 85) = P\left(Z > \dfrac{85 - 80}{15}\right)$

$\qquad\qquad\qquad = P\left(Z > \dfrac{1}{3}\right)$

$\qquad\qquad\qquad = 0.3694$

$\qquad$ Maka, $0.3694 \times 200 \approx 74$

(b) $P(X < 85) = 1 - 0.3694$

$\qquad\qquad\qquad = 0.6306$

$\qquad\qquad\quad p = 63.06$

Latihan Sumatif

1. $X = \{2, 4, 6, 8, 10, 12\}$

2. (a) $\dfrac{1}{12} + \dfrac{5}{12} + \dfrac{1}{3} + q = 1$

$\qquad\qquad\qquad q = \dfrac{1}{6}$

(b) $P(X > 2) = \dfrac{1}{3} + \dfrac{1}{6} = \dfrac{1}{2}$

3. (a)

Kesudahan
6
3
3
0
3
0
0
−3
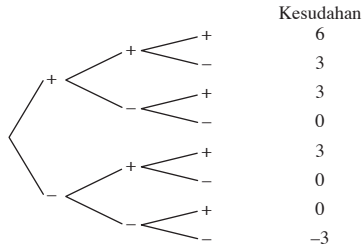
(b) $X = \{-3, 0, 3, 6\}$

4. (a) $X = \{0, 1, 2, 3\}$

$X = r$	$P(X = r)$
0	$^3C_0(0.45)^0(0.55)^3 = 0.1664$
1	$^3C_1(0.45)^1(0.55)^2 = 0.4084$
2	$^3C_2(0.45)^2(0.55)^1 = 0.3341$
3	$^3C_3(0.45)^3(0.55)^0 = 0.0911$

$$\sum_{i=1}^{4} P(X = r_i) = 0.1664 + 0.4084 + 0.3341 + 0.0911 = 1$$

Maka, X ialah pemboleh ubah rawak diskret.

(b)

$X = r$	0	1	2	3
$P(X = r)$	0.1664	0.4084	0.3341	0.0911
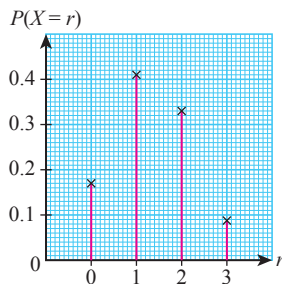
5. $X \sim B(6, 0.4)$

(a) $P(X = 2) = {}^6C_2(0.4)^2(0.6)^4 = 0.3110$

(b) $P(X > 4) = P(X = 5) + P(X = 6)$
$$= {}^6C_5(0.4)^5(0.6)^1 + {}^6C_6(0.4)^6(0.6)^0$$
$$= 0.0410$$

(c) $P(X \leqslant 2) = P(X = 0) + P(X = 1) + P(X = 2)$
$$= {}^6C_0(0.4)^0(0.6)^6 + {}^6C_1(0.4)^1(0.6)^5 + {}^6C_2(0.4)^2(0.6)^4$$
$$= 0.5443$$

6. $p = 0.6, n = 8$

(a) $P(X = 3) = {}^8C_3(0.6)^3(0.4)^5 = 0.1239$

(b) $P(X > 4) = P(X = 5) + P(X = 6) + P(X = 7) + P(X = 8)$
$$= {}^8C_5(0.6)^5(0.4)^3 + {}^8C_6(0.6)^6(0.4)^2 + {}^8C_7(0.6)^7(0.4)^1 + {}^8C_8(0.6)^8(0.4)^0$$
$$= 0.5941$$

7. $p = \dfrac{18}{30} = \dfrac{3}{5}, n = 9$

(a) $P(X = 4) = {}^9C_4(0.6)^4(0.4)^5 = 0.1672$

(b) $P(X \geqslant 7) = P(X = 7) + P(X = 8) + P(X = 9)$
$$= {}^9C_7(0.6)^7(0.4)^2 + {}^9C_8(0.6)^8(0.4)^1 + {}^9C_9(0.6)^9(0.4)^0$$
$$= 0.2318$$

8. $p = \frac{1}{5}, q = \frac{4}{5}, n = 35$

$\mu = np$

$\quad = 35 \times \frac{1}{5}$

$\quad = 7$

$\sigma^2 = npq$

$\quad = 7 \times \frac{4}{5}$

$\quad = \frac{28}{5}$

$\quad = 5.6$

$\sigma = 2.366$

9. $\mu = 7, \sigma^2 = 2.8$

(a) $\quad \mu = np$

$\quad\quad 7 = np \quad\quad \ldots❶$

$\quad\quad \sigma^2 = npq$

$\quad\quad 2.8 = npq$

$\quad\quad q = \frac{2.8}{np} \quad \ldots❷$

Masukan ❶ ke dalam ❷,

$q = \frac{2.8}{7}$

$\quad = \frac{2}{5}$

Maka, $p = \frac{3}{5}$.

(b) $P(2 \text{ orang guru}) = \frac{3}{5} \times \frac{3}{5}$

$\quad\quad\quad\quad\quad\quad\quad = \frac{9}{25}$

10. (a) $\quad\quad P(X > 47) = k$

$P\left(Z > \frac{47 - 48}{12}\right) = k$

$\quad P\left(Z > -\frac{1}{12}\right) = k$

$\quad\quad\quad\quad k = 0.5332$

(b) $\quad\quad P(38 < X < 46) = k$

$P\left(\frac{38 - 48}{12} < Z < \frac{46 - 48}{12}\right) = k$

$\quad P\left(-\frac{10}{12} < Z < \frac{-2}{12}\right) = k$

$\quad\quad\quad\quad\quad k = 0.2315$

(c) $\quad\quad P(X \leqslant 49.5) = k$

$P\left(Z \leqslant \frac{49.5 - 48}{12}\right) = k$

$\quad P\left(Z \leqslant \frac{1.5}{12}\right) = k$

$\quad\quad\quad\quad k = 0.5497$

(d) $\quad\quad P(47 < X < 50) = k$

$P\left(\frac{47 - 48}{12} < Z < \frac{50 - 48}{12}\right) = k$
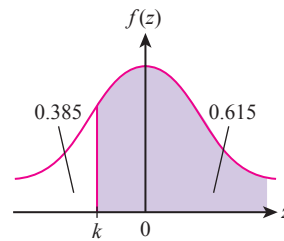
$\quad P\left(-\frac{1}{12} < Z < \frac{2}{12}\right) = k$

$\quad\quad\quad\quad\quad k = 0.0995$

(e)
$$P(X > k) = 0.615$$
$$P\left(Z > \frac{k - 48}{12}\right) = 0.615$$
$$\frac{k - 48}{12} = -0.292$$
$$k = 48 - 12(0.292)$$
$$= 44.5$$

(f)
$$P(45 < X < k) = 0.428$$
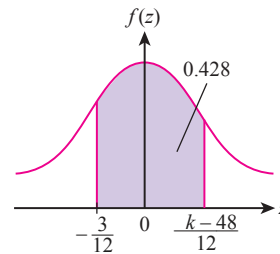$$P\left(\frac{45 - 48}{12} < Z < \frac{k - 48}{12}\right) = 0.428$$
$$P\left(-\frac{3}{12} < Z < \frac{k - 48}{12}\right) = 0.428$$
$$P\left(Z > \frac{k - 48}{12}\right) = 1 - 0.428 - 0.4013$$
$$= 0.1707$$
$$\frac{k - 48}{12} = 0.952$$
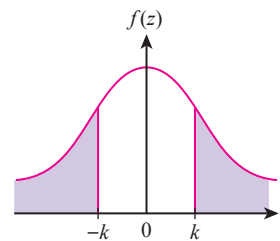$$k = 48 + 0.952(12)$$
$$= 59.42$$

(g)
$$P(X > |k|) = 0.435$$
$$P(X > k) = 0.2175$$
$$P\left(Z > \frac{k - 48}{12}\right) = 0.2175$$
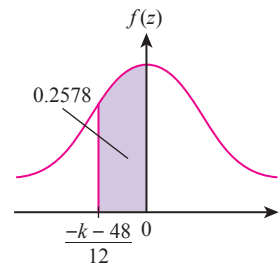$$\frac{k - 48}{12} = 0.781$$
$$k = 48 + 12(0.781)$$
$$= 57.37$$

(h)
$$P(-k < X < 48) = 0.2578$$
$$P\left(\frac{-k - 48}{12} < Z < 0\right) = 0.2578$$
$$P\left(Z < \frac{-k - 48}{12}\right) = 0.2422$$
$$\frac{-k - 48}{12} = -0.699$$
$$k = -39.61$$

11. $\mu = 115, \sigma = 10$

(a) $P(X \geqslant 96) = P\left(Z \geqslant \frac{96 - 115}{10}\right)$
$$= P(Z \geqslant -1.9)$$
$$= 0.9713$$
Bilangan pelajar $= 0.9713 \times 500$
$$= 485$$
Maka, bilangan calon yang tidak berjaya $= 500 - 485$
$$= 15 \text{ orang}$$

(b) $P(X > m) = 0.6$
$$\frac{m - 115}{10} = -0.253$$
$$m = 115 - 10(0.253)$$
$$= 112.47$$

12. $\mu = 65, \sigma^2 = 56.25$

(a) $P(56 < X < 72)$
$$= P\left(\frac{56 - 65}{7.5} < Z < \frac{72 - 65}{7.5}\right)$$
$$= P\left(-\frac{9}{7.5} < Z < \frac{7}{7.5}\right)$$
$$= 0.7096$$

$$\text{Bilangan pekerja} = \frac{250}{0.7096}$$
$$\approx 352$$

(b) $P(X > m) = 0.05$

$$\frac{m - 65}{7.5} = 1.645$$

$$m = 65 + 1.645(7.5)$$

$$= 77.34 \text{ kg}$$

13. $\mu = 260$, $\sigma = 35$

(a) $P(X > 300) = P\left(Z > \dfrac{300 - 260}{35}\right)$

$$= P\left(Z > \frac{40}{35}\right)$$

$$= 0.1266$$

(b) $P(200 < X \leqslant 300) = P\left(\dfrac{200 - 260}{35} < Z \leqslant \dfrac{300 - 260}{35}\right)$

$$= P\left(-\frac{60}{35} < Z \leqslant \frac{40}{35}\right)$$

$$= 0.8302$$

Bilangan oren gred B $= 0.8302 \times 600$

$$\approx 498$$

(c) $\quad P(X > m) = 0.99$

$$P\left(Z > \frac{m - 260}{35}\right) = 0.99$$

$$\frac{m - 260}{35} = -2.326$$

$$m = 178.59$$

$$\approx 179$$