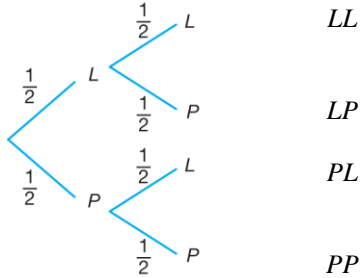


Tingkatan 5 Bab 5
Taburan Kebarangkalian
Penyelesaian Lengkap

Praktis Formatif 5.1

Kesudahan

1 (a)



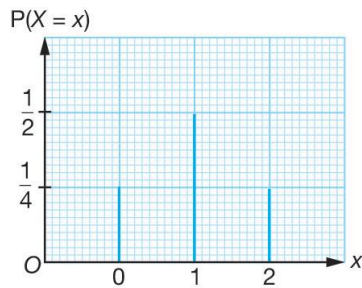
P – Perempuan
L – Lelaki

Kesudahan	LL	LP	PL	PP
$X = x$	0	1	1	2

Nilai-nilai yang boleh diambil oleh X ialah 0, 1 dan 2.

$X = x$	0	1	2
$P(X = x)$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$

(b)



Praktis Formatif 5.2a

- 1 (a) $X = 0, 1, 2, 3, 4$
 (b) $Y = 0, 1, 2, 3$
 (c) $Z = 0, 1, 2$
 (d) $W = 0, 1, 2, 3, 4, 5$

- 2 (a) $X = 0, 1, 2, 3$
 (b) $X \sim B(n, p)$

$$X \sim B\left(3, \frac{1}{2}\right)$$

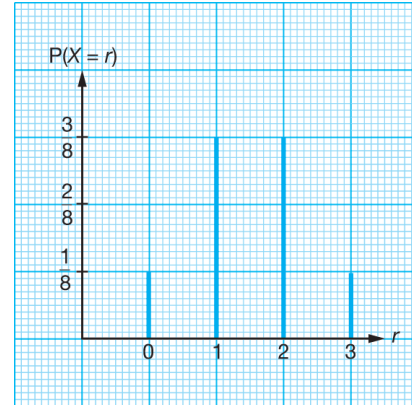
$$P(X = 0) = {}^3C_0 \left(\frac{1}{2}\right)^0 \left(\frac{1}{2}\right)^3 = \frac{1}{8}$$

$$P(X = 1) = {}^3C_1 \left(\frac{1}{2}\right)^1 \left(\frac{1}{2}\right)^2 = \frac{3}{8}$$

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

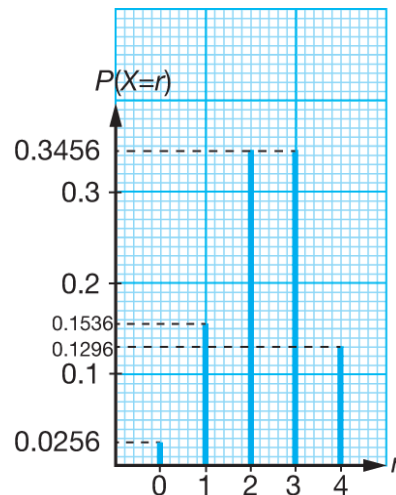
$$P(X = 3) = {}^3C_3 \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right)^0 = \frac{1}{8}$$

(c)



- 3 (a) X – Bilangan murid yang mendapat grad cemerlang
 $X \sim B(4, 0.6)$
 $X = 0, 1, 2, 3, 4$

- (b) $P(X = 0) = {}^4C_0 (0.6)^0 (0.4)^4 = 0.0256$
 $P(X = 1) = {}^4C_1 (0.6)^1 (0.4)^3 = 0.1536$
 $P(X = 2) = {}^4C_2 (0.6)^2 (0.4)^2 = 0.3456$
 $P(X = 3) = {}^4C_3 (0.6)^3 (0.4)^1 = 0.3456$
 $P(X = 4) = {}^4C_4 (0.6)^4 (0.4)^0 = 0.1296$



4 X – Bilangan lelaki

$$X \sim B\left(4, \frac{3}{5}\right)$$

- (a) $P(X = 2)$
 $= {}^4C_2 \left(\frac{3}{5}\right)^2 \left(\frac{2}{5}\right)^2$
 $= 0.3456$

$$\begin{aligned}
\text{(b) } P(X \geq 1) &= 1 - P(X = 0) \\
&= 1 - {}^4C_0 \left(\frac{3}{5}\right)^0 \left(\frac{2}{5}\right)^4 \\
&= 1 - 0.0256 \\
&= 0.9744
\end{aligned}$$

5 X – Bilangan murid yang gagal Matematik

Tambahan

$X \sim B(10, 0.2)$

$$\begin{aligned}
\text{(a) } P(X = 0) &= {}^{10}C_0 (0.2)^0 (0.8)^{10} \\
&= 0.1074 \\
\text{(b) } P(X \leq 2) &= P(X = 0) + P(X = 1) + P(X = 2) \\
&= 0.1074 + {}^{10}C_1 (0.2)^1 (0.8)^9 + {}^{10}C_2 (0.2)^2 (0.8)^8 \\
&= 0.1074 + 0.2684 + 0.3020 \\
&= 0.6778
\end{aligned}$$

$$\begin{aligned}
\text{(c) } P(X \geq 2) &= 1 - P(X = 0) - P(X = 1) \\
&= 1 - 0.1074 - 0.2684 \\
&= 0.6242
\end{aligned}$$

6 $X \sim B(8, 0.25)$

$$\begin{aligned}
\text{(a) } P(X \leq 2) &= P(X = 0) + P(X = 1) + P(X = 2) \\
&= {}^8C_0 (0.25)^0 (0.75)^8 + {}^8C_1 (0.25)^1 (0.75)^7 \\
&\quad + {}^8C_2 (0.25)^2 (0.75)^6 \\
&= 0.1001 + 0.2670 + 0.3115 \\
&= 0.6786
\end{aligned}$$

$$\begin{aligned}
\text{(b) } P(X \geq 2) &= 1 - P(X = 0) - P(X = 1) \\
&= 1 - 0.1001 - 0.2670 \\
&= 0.6329
\end{aligned}$$

Praktis Formatif 5.2b

1 X – Bilangan pekerja yang mengambil cuti

$X \sim B(15, 0.2)$

$$\begin{aligned}
\text{(a) } P(X = 0) &= {}^{15}C_0 (0.2)^0 (0.8)^{15} \\
&= 0.0352
\end{aligned}$$

$$\text{(b) } \text{Min} = np = 15 \times \frac{1}{5} = 3$$

Sisihan piawai

$$\begin{aligned}
&= npq \\
&= \sqrt{15 \times \frac{1}{5} \times \frac{4}{5}} \\
&= 1.55
\end{aligned}$$

2 X – Bilangan calon yang lulus

$X \sim B(5, 0.7)$

$$\begin{aligned}
\text{(a) } P(X \geq 1) &= 1 - P(X = 0) \\
&= 1 - {}^5C_0 (0.7)^0 (0.3)^5 \\
&= 0.99757
\end{aligned}$$

$$\text{(b) } \text{Min} = 100 \times 0.7 = 70$$

Sisihan piawai

$$\begin{aligned}
&= \sqrt{100 \times 0.7 \times 0.3} \\
&= 4.58
\end{aligned}$$

3 $\text{Min} = 2$

$$np = 2 \dots (1)$$

$$\text{Sisihan piawai} = \frac{2\sqrt{2}}{\sqrt{5}}$$

$$\text{Varians} = \frac{4(2)}{5} = 1.6$$

$$npq = 1.6 \dots (2)$$

$$\frac{(2)}{(1)} : \frac{npq}{np} = \frac{1.6}{2}$$

$$q = 0.8$$

$$p = 1 - 0.8$$

$$p = 0.2$$

Daripada (1) :

$$np = 2$$

$$(0.2)n = 2$$

$$n = \frac{2}{0.2}$$

$$n = 10$$

4 Min = 40
 $np = 40 \dots (1)$

Varians = 24
 $npq = 24 \dots (2)$

$$\frac{(2)}{(1)} : \frac{npq}{np} = \frac{24}{40}$$

$$q = \frac{3}{5}$$

$$p = 1 - \frac{3}{5}$$

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

Daripada (1) :
 $np = 40$

$$\frac{2}{5}n = 40$$

$$n = 100$$

Praktis Formatif 5.2c

1 X – Bilangan belimbing yang busuk
 $X \sim B(15, 0.05)$

(a) $P(X \geq 2)$
 $= 1 - P(X = 0) - P(X = 1)$
 $= 1 - {}^{15}C_0(0.05)^0(0.95)^{15} - {}^{15}C_1(0.05)^1(0.95)^{14}$
 $= 1 - 0.4633 - 0.3658$
 $= 0.1709$

(b) $P(X \geq 1) > 0.85$
 $1 - P(X = 0) > 0.85$
 $1 - {}^nC_0(0.05)^0(0.95)^n > 0.85$
 $1 - 0.95^n > 0.85$
 $1 - 0.85 > 0.95^n$
 $0.15 > 0.95^n$
 $0.95^n < 0.15$
 $n \lg 0.95 < \lg 0.15$
 $-0.0223n < -0.8239$
 $n > \frac{-0.8239}{-0.0223}$
 $n > 36.95$
 Bilangan minimum $n = 37$

2 X – Bilangan lampu LED yang rosak
 $X \sim B(n, 0.1)$

(a) Min = $200 \times 0.1 = 20$
 Sisihan piawai
 $= \sqrt{200(0.1)(0.9)}$
 $= 4.24$

(b) $P(X \geq 1) > 0.8$
 $1 - P(X = 0) > 0.8$
 $1 - {}^nC_0(0.1)^0(0.9)^n > 0.8$
 $1 - 0.9^n > 0.8$
 $1 - 0.8 > 0.9^n$
 $0.2 > 0.9^n$
 $0.9^n < 0.2$
 $n \lg 0.9 < \lg 0.2$
 $-0.0458n < -0.6990$
 $n > \frac{-0.6990}{-0.0458}$
 $n > 15.26$
 Bilangan minimum $n = 16$

3 X – Bilangan kali membuat jaringan

$$X \sim B\left(n, \frac{4}{5}\right)$$

$${}^nC_n\left(\frac{4}{5}\right)^n\left(\frac{1}{5}\right)^0 = \frac{256}{625}$$

$$\left(\frac{4}{5}\right)^n = \left(\frac{4}{5}\right)^4$$

$$n = 4$$

4 (a) X – Bilangan kali dapat menyelesaikan teka silang-kata

$$X \sim B\left(7, \frac{3}{5}\right)$$

$P(X \geq 2)$
 $= 1 - P(X = 0) - P(X = 1)$
 $= 1 - {}^7C_0\left(\frac{3}{5}\right)^0\left(\frac{2}{5}\right)^7 - {}^7C_1\left(\frac{3}{5}\right)^1\left(\frac{2}{5}\right)^6$
 $= 0.9812$

(b) $Y \sim B(4, 0.9812)$
 $P(Y = 3)$
 $= {}^4C_3(0.9812)^3(0.0188)^1$
 $= 0.0710$

Praktis Formatif 5.3a

1 (a) $X \sim N(50, 10^2)$

(i) $Z = \frac{60-50}{10} = 1$

(ii) $Z = \frac{25-50}{10} = -2.5$

(b) (i) $Z = 2$
 $\frac{X-50}{10} = 2$
 $X = 70$

(ii) $Z = -1.5$
 $\frac{X-50}{10} = -1.5$
 $X = 35$

2 X – Isi padu, dalam ml, sebotol minuman
 $X \sim N(210, 10^2)$

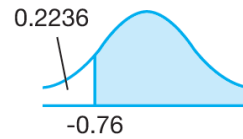
(a) (i) $Z = \frac{220-210}{10} = 1$

(ii) $Z = \frac{200-210}{10} = -1$

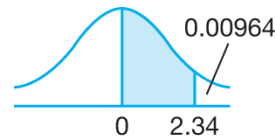
(b) (i) $Z = 1.5$
 $\frac{X-210}{10} = 1.5$
 $X = 225$ ml

(ii) $Z = -0.5$
 $\frac{X-210}{10} = -0.5$
 $X = 205$ ml

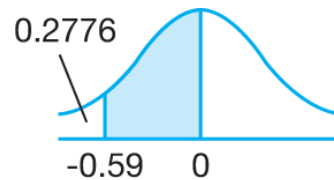
(d) $P(Z > -0.76) = 1 - 0.2236$
 $= 0.7764$



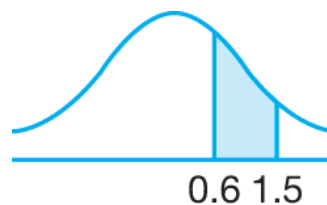
(e) $P(0 < Z < 2.34)$
 $= 0.5 - 0.00964$
 $= 0.49036$



(f) $P(-0.59 < Z < 0)$
 $= 0.5 - 0.2776$
 $= 0.2224$



(g) $P(0.6 < Z < 1.5)$
 $= 0.2743 - 0.0668$
 $= 0.2075$

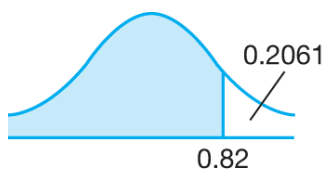


Praktis Formatif 5.3b

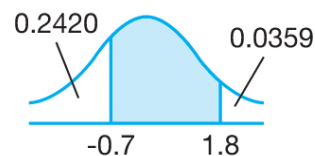
1 (a) $P(Z > 1.284) = 0.0996$

(b) $P(Z < -1.37) = 0.0853$

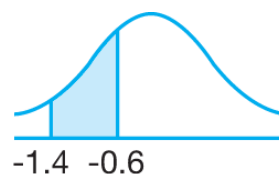
(c) $P(Z < 0.82)$
 $= 1 - 0.2061$
 $= 0.7939$



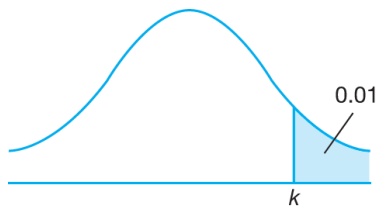
(h) $P(-0.7 < Z < 1.8)$
 $= 1 - 0.2420 - 0.0359$
 $= 0.7221$



(i) $P(-1.4 < Z < -0.6)$
 $= 0.2743 - 0.0808$
 $= 0.1935$

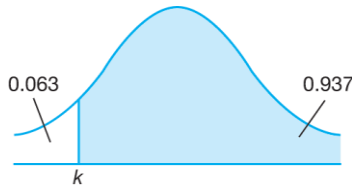


2 (a)



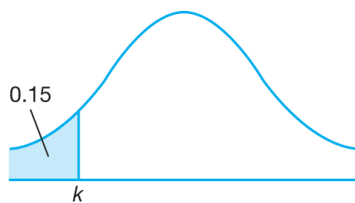
Daripada sifir taburan normal piawai,
 $k = 2.326$.

(b)



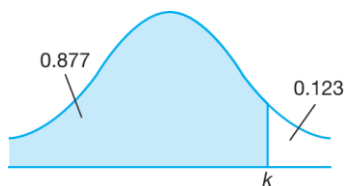
Daripada sifir taburan normal piawai,
 $k = -1.53$.

(c)



Daripada sifir taburan normal piawai,
 $k = -1.037$.

(d)



Daripada sifir taburan normal piawai,
 $k = 1.16$.

Praktis Formatif 5.3c

1 X – Jisim, dalam kg, rod konkrit
 $X \sim N(240, 10^2)$

(a) $P(X > 250)$

$$\begin{aligned}
 &= P\left(Z > \frac{250 - 240}{10}\right) \\
 &= P(Z > 1) \\
 &= 0.1587
 \end{aligned}$$

(b) $P(X < 225)$

$$\begin{aligned}
 &= P\left(Z < \frac{225 - 240}{10}\right) \\
 &= P(Z < -1.5) \\
 &= 0.0668 \\
 &\text{Bilangan rod konkrit} \\
 &= 0.0668 \times 200 \\
 &= 13 \text{ batang}
 \end{aligned}$$

(c) $P(220 < X < 260)$

$$\begin{aligned}
 &= P\left(\frac{220 - 240}{10} < Z < \frac{260 - 240}{10}\right) \\
 &= P(-2 < Z < 2) \\
 &= 1 - 0.0228 - 0.0228 \\
 &= 0.9544 \\
 &= 95.44\%
 \end{aligned}$$

2 X – Tempoh hayat bateri, dalam jam

$$X \sim N(750, 50^2)$$

(a) $P(X < 725)$

$$\begin{aligned}
 &= P\left(Z < \frac{725 - 750}{50}\right) \\
 &= P(Z < -0.5) \\
 &= 0.3085
 \end{aligned}$$

(b) $P(X > 775)$

$$\begin{aligned}
 &= P\left(Z > \frac{775 - 750}{50}\right) \\
 &= P(Z > 0.5) \\
 &= 0.3085 \\
 &\text{Bilangan bateri} \\
 &= 0.3085 \times 800 \\
 &= 247 \text{ biji}
 \end{aligned}$$

(c) $P(730 < X < 740)$

$$\begin{aligned}
 &= P\left(\frac{730 - 750}{50} < Z < \frac{740 - 750}{50}\right) \\
 &= P(-0.4 < Z < -0.2) \\
 &= 0.4207 - 0.3446 \\
 &= 0.0761 \\
 &= 7.61\%
 \end{aligned}$$

3 X – Markah Matematik Tambahan

$$X \sim N(45, 10^2)$$

(a) $P(X < 50)$

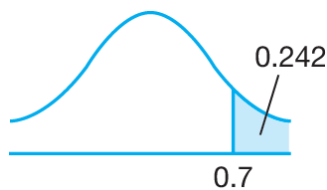
$$\begin{aligned}
 &= P\left(Z < \frac{50 - 45}{10}\right) \\
 &= P(Z < 0.5) \\
 &= 1 - 0.3085 \\
 &= 0.6915
 \end{aligned}$$

(b) $P(45 < X < 55)$
 $= P\left(\frac{45-45}{10} < Z < \frac{55-45}{10}\right)$
 $= P(0 < Z < 1)$
 $= 0.5 - 0.1587$
 $= 0.3413$
 Bilangan murid
 $= 0.3413 \times 200$
 $= 68 \text{ orang}$

(c) $P(X > 38)$
 $= P\left(Z > \frac{38-45}{10}\right)$
 $= P(Z > -0.7)$
 $= 1 - 0.2420$
 $= 0.758$
 $= 75.8\%$

4 X – Panjang, dalam cm, ikan siakap
 $X \sim N(55, 5^2)$

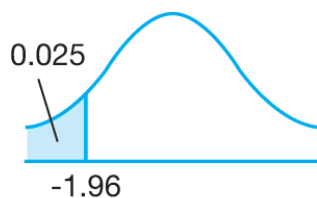
(a) $P(X > h) = 0.242$
 $P\left(Z > \frac{h-55}{5}\right)$



$$\frac{h-55}{5} = 0.7$$

$$h = 58.5$$

(b) $P(X < k) = 0.025$
 $P\left(Z < \frac{k-55}{5}\right) = 0.025$

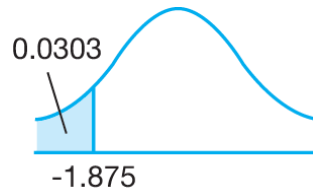


$$\frac{k-55}{5} = -1.96$$

$$k = 45.2$$

5 X – Markah Sains
 $X \sim N(55, 8^2)$

(a) $P(X < m) = 0.0303$
 $P\left(Z < \frac{m-55}{8}\right) = 0.0303$

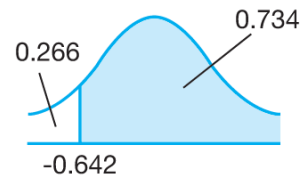


$$\frac{m-55}{8} = -1.875$$

$$m = 40$$

Markah minimum untuk lulus = 40

(b) $P(X > h) = 0.734$
 $P\left(Z > \frac{h-55}{8}\right) = 0.734$



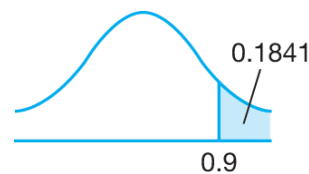
$$\frac{h-55}{8} = -0.642$$

$$h = 49.9$$

Markah minimum untuk mendapat kredit = 50

6 X – Tinggi, dalam cm, murid Tahun 1
 $X \sim N(120, 5^2)$

(a) $P(X > m) = 0.1841$
 $P\left(Z > \frac{m-120}{5}\right) = 0.1841$

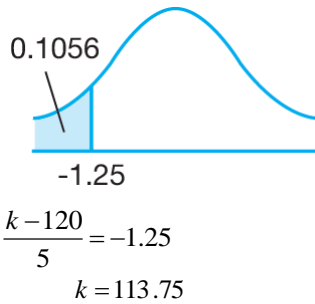


$$\frac{m-120}{5} = 0.9$$

$$m = 124.5$$

(b) $P(X < k) = 0.1056$

$$P\left(Z < \frac{k-120}{5}\right) = 0.1056$$

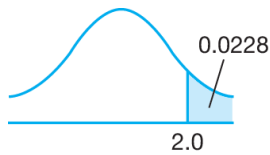


7 X – Jisim, dalam g, dokumen

$$X \sim N(\mu, \sigma^2)$$

$$P(X > 5.4) = 0.0228$$

$$P\left(Z > \frac{5.4 - \mu}{\sigma}\right) = 0.0228$$

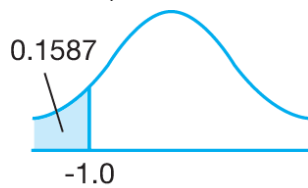


$$\frac{5.4 - \mu}{\sigma} = 2.0$$

$$5.4 - \mu = 2\sigma \dots (1)$$

$$P(X < 4.8) = 0.1587$$

$$P\left(Z < \frac{4.8 - \mu}{\sigma}\right) = 0.1587$$



$$\frac{4.8 - \mu}{\sigma} = -1.0$$

$$4.8 - \mu = -\sigma \dots (2)$$

$$(1) - (2) : 0.6 = 3\sigma$$

$$\sigma = 0.2$$

Daripada (1) :

$$5.4 - \mu = 2(0.2)$$

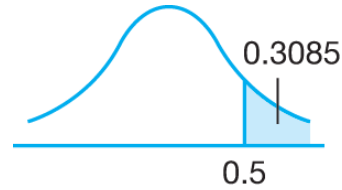
$$\mu = 5$$

8 X – Jisim, dalam g, telur

$$X \sim N(\mu, \sigma^2)$$

$$P(X > 55) = 0.3085$$

$$P\left(Z > \frac{55 - \mu}{\sigma}\right) = 0.3085$$

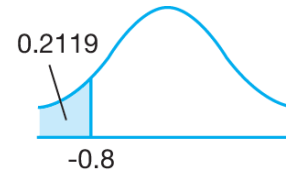


$$\frac{55 - \mu}{\sigma} = 0.5$$

$$55 - \mu = 0.5\sigma \dots (1)$$

$$P(X < 42) = 0.2119$$

$$P\left(Z < \frac{42 - \mu}{\sigma}\right) = 0.2119$$



$$\frac{42 - \mu}{\sigma} = -0.8$$

$$42 - \mu = -0.8\sigma \dots (2)$$

$$(1) - (2) : 13 = 1.3\sigma$$

$$\sigma = 10 \text{ g}$$

Daripada (1) :

$$55 - \mu = 0.5(10)$$

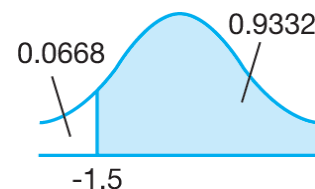
$$\mu = 50 \text{ g}$$

9 X – Diameter, dalam cm, bola polisterin

$$X \sim N(\mu, \sigma^2)$$

$$P(X > 37) = 0.9332$$

$$P\left(Z > \frac{37 - \mu}{\sigma}\right) = 0.9332$$

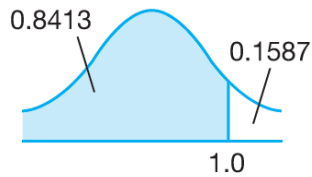


$$\frac{37 - \mu}{\sigma} = -1.5$$

$$37 - \mu = -1.5\sigma \dots (1)$$

$$P(X < 42) = 0.8413$$

$$P\left(Z < \frac{42 - \mu}{\sigma}\right) = 0.8413$$



$$\frac{42 - \mu}{\sigma} = 1.0$$

$$42 - \mu = \sigma \dots (2)$$

$$(2) - (1) : 5 = 2.5\sigma$$

$$\sigma = 2$$

Daripada (2) :

$$42 - \mu = 2$$

$$\mu = 40$$

10 (a) $X \sim N(52, 3^2)$

$$Z = \frac{X - \mu}{\sigma}$$

$$-\frac{2}{3} = \frac{k - 52}{3}$$

$$k = 50$$

(b) $P(50 < X < 58)$

$$= P\left(\frac{50 - 52}{3} < Z < \frac{58 - 52}{3}\right)$$

$$= P(-0.667 < Z < 2)$$

$$= 1 - 0.2523 - 0.0228$$

$$= 0.7249$$

(c) $P(X < 55)$

$$= P\left(Z < \frac{55 - 52}{3}\right)$$

$$= P(Z < 1)$$

$$= 1 - 0.1587$$

$$= 0.8413$$

Bilangan murid

$$= 0.8413 \times 200$$

$$= 168 \text{ orang}$$

11 X – Umur guru (dalam tahun)

$$X \sim N(38, 4^2)$$

$$P(30 < X < 44)$$

$$= P\left(\frac{30 - 38}{4} < Z < \frac{44 - 38}{4}\right)$$

$$= P(-2 < Z < 1.5)$$

$$= 1 - 0.0228 - 0.0668$$

$$= 0.9104$$

$$0.9104N = 102$$

$$N = 112$$

Maka, jumlah bilangan guru ialah 112 orang.

Praktis Sumatif 5

1 X – Bilangan calon yang lulus

$$X \sim B(8, 0.7)$$

$$(a) P(X = 3) = {}^8C_3(0.7)^3(0.3)^5 \\ = 0.04668$$

$$(b) P(X \leq 3) \\ = P(X = 0) + P(X = 1) + P(X = 2) \\ + P(X = 3) \\ = {}^8C_0(0.7)^0(0.3)^8 + {}^8C_1(0.7)^1(0.3)^7 \\ + {}^8C_2(0.7)^2(0.3)^6 + 0.04668 \\ = 0.05797$$

2 X – Bilangan murid yang tahu berenang

$$X \sim B\left(5, \frac{1}{6}\right)$$

$$(a) P(X \geq 2) \\ = 1 - P(X = 0) - P(X = 1) \\ = 1 - {}^5C_0\left(\frac{1}{6}\right)^0\left(\frac{5}{6}\right)^5 - {}^5C_1\left(\frac{1}{6}\right)^1\left(\frac{5}{6}\right)^4 \\ = 0.1962$$

$$(b) \text{Min} = np = 1200 \times \frac{1}{6} = 200$$

$$\text{Sisihan piawai} = \sqrt{5 \times \frac{1}{6} \times \frac{5}{6}} = 12.91$$

3 X – Bilangan pesakit gastrik yang sembuh

$$(a) \text{Min} = 90 \\ np = 90 \\ 150p = 90 \\ p = \frac{3}{5}$$

$$(b) \text{Sisihan piawai} \\ = \sqrt{150 \times \frac{3}{5} \times \frac{2}{5}} \\ = 6$$

$$(c) P(X = 0) = {}^5C_0\left(\frac{3}{5}\right)^0\left(\frac{2}{5}\right)^5 = 0.01024$$

4 X – Bilangan murid yang menunggang motosikal ke sekolah

$$X \sim B\left(8, \frac{1}{5}\right)$$

$$(a) P(X \geq 2) \\ = 1 - P(X = 0) - P(X = 1) \\ = 1 - {}^8C_0\left(\frac{1}{5}\right)^0\left(\frac{4}{5}\right)^8 - {}^8C_1\left(\frac{1}{5}\right)^1\left(\frac{4}{5}\right)^7 \\ = 0.4967$$

$$(b) \text{Min} = np = 1500 \times \frac{1}{5} = 300$$

$$\text{Sisihan piawai} \\ = \sqrt{1500 \times \frac{1}{5} \times \frac{4}{5}} \\ = 15.49$$

5 X – Bilangan murid yang memilih aliran Sains

$$X \sim B(10, 0.6)$$

$$(a) P(X = 4) = {}^{10}C_4(0.6)^4(0.4)^6 = 0.1115$$

$$(b) P(X \geq 9) \\ = P(X = 9) + P(X = 10) \\ = {}^{10}C_9(0.6)^9(0.4)^1 + {}^{10}C_{10}(0.6)^{10}(0.4)^0 \\ = 0.0403 + 0.0060 \\ = 0.0463$$

$$6 (a) \text{Min} = 15 \\ np = 15 \dots (1)$$

$$\text{Sisihan piawai} = \frac{3\sqrt{6}}{2} \\ \sqrt{npq} = \frac{3\sqrt{6}}{2} \\ npq = \frac{9(6)}{4} \\ npq = 13.5 \dots (2)$$

$$\frac{(2)}{(1)} : \frac{npq}{np} = \frac{13.5}{15} \\ q = 0.9 \\ p = 1 - 0.9 \\ p = 0.1$$

$$\text{Daripada (1) :} \\ n(0.1) = 15 \\ n = 150$$

$$(b) P(X \geq 1) = 1 - P(X = 0) \\ = 1 - {}^{10}C_0(0.1)^0(0.9)^{10} \\ = 0.6513$$

7 X – Bilangan guli kuning yang dicabut

$$X \sim B\left(8, \frac{2}{5}\right)$$

$$(a) P(X = 2) = {}^8C_2 \left(\frac{2}{5}\right)^2 \left(\frac{3}{5}\right)^6 \\ = 0.2090$$

$$(b) P(X \geq 1) = 1 - P(X = 0) \\ = 1 - {}^8C_0 \left(\frac{2}{5}\right)^0 \left(\frac{3}{5}\right)^8 \\ = 0.9832$$

8 (a) P(kejayaan)

$$= P(\text{semua kepala}) + P(\text{semua ekor}) \\ = \left(\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}\right) \\ = \frac{1}{4}$$

(b) $X \sim B(10, 0.25)$

$$P(X \geq 2) \\ = 1 - P(X = 0) - P(X = 1) \\ = 1 - {}^{10}C_0 (0.25)^0 (0.75)^{10} - {}^{10}C_1 (0.25)^1 (0.75)^9 \\ = 1 - 0.05631 - 0.18771 \\ = 0.7560$$

(c) $\text{Min} = np = 10(0.25) = 2.5$

$$\text{Sisihan piawai} \\ = \sqrt{npq} = \sqrt{10(0.25)(0.75)} = 1.369$$

9 (a) P(sekurang-kurangnya satu ekor dan sekurang-kurangnya satu kepala diperoleh)

$$= 1 - P(\text{semua ekor atau semua kepala}) \\ = 1 - \left(\frac{1}{2}\right)^3 - \left(\frac{1}{2}\right)^3 = \frac{3}{4}$$

(b) $X \sim B(20, 0.75)$

$$\text{Min} = np = 20(0.75) = 15 \\ \text{Sisihan piawai} \\ = \sqrt{npq} = \sqrt{20(0.75)(0.25)} = 1.936$$

10 X – Bilangan botol yang retak

$$X \sim B(10, 0.08)$$

$$(a) P(X \geq 2) \\ = 1 - P(X = 0) - P(X = 1) \\ = 1 - {}^{10}C_0 (0.08)^0 (0.92)^{10} \\ \quad - {}^{10}C_1 (0.08)^1 (0.92)^9 \\ = 0.1879$$

$$(b) P(X \geq 1) > 0.95 \\ 1 - P(X = 0) > 0.95$$

$$1 - {}^n C_0 (0.08)^0 (0.92)^n > 0.95$$

$$1 - (0.92)^n > 0.95$$

$$0.05 > (0.92)^n$$

$$(0.92)^n < 0.05$$

$$n \lg 0.92 < \lg 0.05$$

$$-0.0362n < -1.3010$$

$$n > \frac{-1.3010}{-0.0362}$$

$$n > 35.94$$

Maka, bilangan botol = 36 biji

11 X – Bilangan graduan yang mendapat pekerjaan

$$X \sim B(8, 0.7)$$

$$(a) P(X \geq 7) = P(X = 7) + P(X = 8) \\ = {}^8C_7 (0.7)^7 (0.3)^1 + \\ \quad {}^8C_8 (0.7)^8 (0.3)^0 \\ = 0.2553$$

(ii) Let Y – Bilangan graduan yang tidak mendapat pekerjaan

$$Y \sim B(8, 0.3)$$

$$P(Y \leq 2)$$

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

$$= {}^8C_0 (0.3)^0 (0.7)^8 + {}^8C_1 (0.3)^1 (0.7)^7 +$$

$${}^8C_2 (0.3)^2 (0.7)^6$$

$$= 0.5094$$

12 (a) X – Bilangan soalan diteka betul

$$X \sim B\left(75, \frac{1}{5}\right)$$

$$(i) \text{Min} = np = 75 \times \frac{1}{5} = 15$$

(ii) Sisihan piawai

$$= \sqrt{npq}$$

$$= \sqrt{75 \times \frac{1}{5} \times \frac{4}{5}}$$

$$= 3.464$$

(b) Y – Bilangan soalan diteka betul bagi baki 15 soalan

$$Y \sim B\left(15, \frac{1}{5}\right)$$

$$(i) P(Y = 6) = {}^{15}C_6 \left(\frac{1}{5}\right)^6 \left(\frac{4}{5}\right)^9 = 0.04299$$

(ii) $P(Y \geq 3)$

$$= 1 - P(Y = 0) - P(Y = 1) - P(Y = 2)$$

$$= 1 - {}^{15}C_0 \left(\frac{1}{5}\right)^0 \left(\frac{4}{5}\right)^{15}$$

$$- {}^{15}C_1 \left(\frac{1}{5}\right)^1 \left(\frac{4}{5}\right)^{14} - {}^{15}C_2 \left(\frac{1}{5}\right)^2 \left(\frac{4}{5}\right)^{13}$$

$$= 1 - 0.0352 - 0.1319 - 0.2309 = 0.6020$$

13 X – Ketebalan buku, dalam cm

$$X \sim N(5, 0.2^2)$$

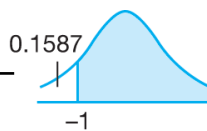
(a) $P(X > 4.8)$

$$= P\left(Z > \frac{4.8 - 5}{0.2}\right)$$

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

$$= 1 - 0.1587$$

$$= 0.8413$$



(b) $P(X < 5.1)$

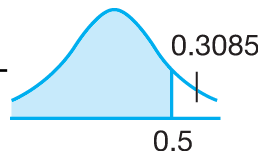
$$= P\left(Z < \frac{5.1 - 5}{0.2}\right)$$

$$= P(Z < 0.5)$$

$$= 1 - 0.3085$$

$$= 0.6915$$

$$= 69.15\%$$



(c) $P(4.6 < X < 5.4)$

$$= P\left(\frac{4.6 - 5}{0.2} < Z < \frac{5.4 - 5}{0.2}\right)$$

$$= P(-2 < Z < 2)$$

$$= 1 - 0.0228 - 0.0228$$

$$= 0.9544$$

Bilangan buku

$$= 0.9544 \times 10\,000$$

$$= 9\,544 \text{ buah}$$

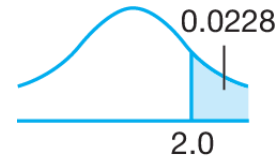
14 X – Jisim kotak, dalam g

$$X \sim N(30, \sigma^2)$$

(a) $P(X > 40) = 0.0228$

$$P\left(Z > \frac{40 - 30}{\sigma}\right) = 0.0228$$

$$P\left(Z > \frac{10}{\sigma}\right) = 0.0228$$



$$\frac{10}{\sigma} = 2.0$$

$$\sigma = 5$$

(b) $P(X < 32)$

$$= P\left(Z < \frac{32 - 30}{5}\right)$$

$$= P(Z < 0.4)$$

$$= 1 - 0.3446$$

$$= 0.6554$$

15 X – Jisim ubi kentang, dalam g

$$X \sim N(100, 5^2)$$

(a) $P(90 < X < 105)$

$$= P\left(\frac{90 - 100}{5} < Z < \frac{105 - 100}{5}\right)$$

$$= P(-2 < Z < 1)$$

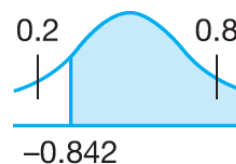
$$= 1 - 0.0228 - 0.1587$$

$$= 0.8185$$

$$= 81.85\%$$

(b) $P(X > m) = 0.8$

$$P\left(Z > \frac{m - 100}{5}\right) = 0.8$$



$$\frac{m - 100}{5} = -0.842$$

$$m = 95.79$$

16 X – Jisim murid, dalam kg

$$X \sim N(50, 8^2)$$

(a) $P(45 < X < 60)$

$$= P\left(\frac{45-50}{8} < Z < \frac{60-50}{8}\right)$$

$$= P(-0.625 < Z < 1.25)$$

$$= 1 - 0.2660 - 0.1056$$

$$= 0.6284$$

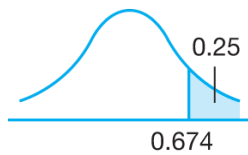
Bilangan murid

$$= 0.6284 \times 1500$$

$$= 943 \text{ orang}$$

(b) $P(X > m) = 0.25$

$$P\left(Z > \frac{m-50}{8}\right) = 0.25$$



$$\frac{m-50}{8} = 0.674$$

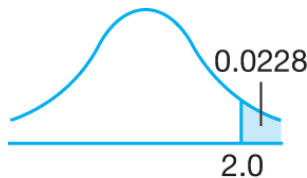
$$m = 55.39$$

17 X – Jisim sabun, dalam g

$$X \sim N(\mu, \sigma^2)$$

$$P(X > 150) = 0.0228$$

$$P\left(Z > \frac{150-\mu}{\sigma}\right) = 0.0228$$

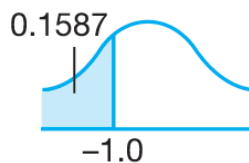


$$\frac{150-\mu}{\sigma} = 2.0$$

$$150-\mu = 2\sigma \dots (1)$$

$$P(X < 142.5) = 0.1587$$

$$P\left(Z < \frac{142.5-\mu}{\sigma}\right) = 0.1587$$



$$\frac{142.5-\mu}{\sigma} = -1.0$$

$$142.5-\mu = -\sigma \dots (2)$$

$$150-\mu = 2\sigma$$

$$142.5-\mu = -\sigma$$

$$(1) - (2) : 7.5 = 3\sigma$$

$$\sigma = 2.5$$

Daripada (1) :

$$150-\mu = 2(2.5)$$

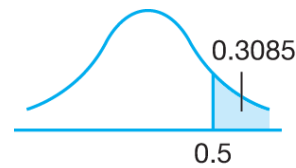
$$\mu = 145$$

18 X – Tinggi pokok, dalam m

$$X \sim N(\mu, \sigma^2)$$

$$P(X > 32.5) = 0.3085$$

$$P\left(Z > \frac{32.5-\mu}{\sigma}\right) = 0.3085$$

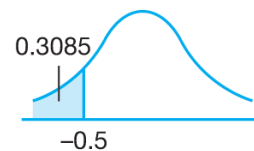


$$\frac{32.5-\mu}{\sigma} = 0.5$$

$$32.5-\mu = 0.5\sigma \dots (1)$$

$$P(X < 22.5) = 0.0668$$

$$P\left(Z < \frac{22.5-\mu}{\sigma}\right) = 0.3085$$



$$\frac{22.5-\mu}{\sigma} = -0.5$$

$$22.5-\mu = -0.5\sigma \dots (2)$$

$$(1) - (2) : \sigma = 10$$

Daripada (1) :

$$32.5-\mu = 0.5(10)$$

$$\mu = 27.5 \text{ m}$$

19 X – Jisim nanas, dalam kg

$$X \sim N(1.3, 0.2^2)$$

(a) $P(\text{gred A})$

$$= P(X > 1.4)$$

$$= P\left(Z > \frac{1.4-1.3}{0.2}\right)$$

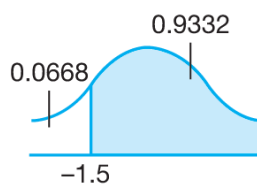
$$= P(Z > 0.5)$$

$$= 0.3085$$

$$\begin{aligned}
 \text{(b) } P(\text{gred } B) &= P(1.2 < x \leq 1.4) \\
 &= P\left(\frac{1.2-1.3}{0.2} < Z < \frac{1.4-1.3}{0.2}\right) \\
 &= P(-0.5 < Z < 0.5) \\
 &= 1 - 0.3085 - 0.3085 \\
 &= 0.383
 \end{aligned}$$

Maka, bilangan nanas gred B
 $= 0.383 \times 1\,000$
 $= 383$ biji

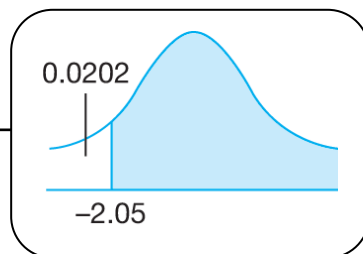
$$\begin{aligned}
 \text{(c) } P(X > m) &= 93.32\% \\
 P\left(Z > \frac{m-1.3}{0.2}\right) &= 0.9332
 \end{aligned}$$



$$\begin{aligned}
 \frac{m-1.3}{0.2} &= -1.5 \\
 m &= 1.0
 \end{aligned}$$

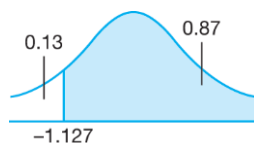
20 (a) X – Jisim buah naga, dalam g
 $X \sim N(550, 40^2)$

$$\begin{aligned}
 P(X > 468) &= P\left(Z > \frac{468-550}{40}\right) \\
 &= P(Z > -2.05) \\
 &= 1 - 0.0202 \\
 &= 0.9798
 \end{aligned}$$



(b) (i) Bilangan buah naga yang mempunyai jisim melebihi 468 g
 $= 0.9798 \times 400$
 $= 391.92$
 $= 392$ (betul kepada integer terdekat)

$$\begin{aligned}
 \text{(ii) } P(X > m) &= \frac{348}{400} \\
 P\left(Z > \frac{m-550}{40}\right) &= 0.87
 \end{aligned}$$

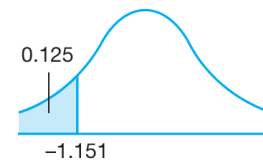


$$\begin{aligned}
 \frac{m-550}{40} &= -1.127 \\
 m &= 504.92
 \end{aligned}$$

21 X – Masa, dalam minit, yang diambil dalam merentas desa
 $X \sim N(24, 12^2)$

$$\begin{aligned}
 \text{(a) } P(X > 36) &= P\left(Z > \frac{36-24}{12}\right) \\
 &= P(Z > 1) \\
 &= 0.1587
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } P(X < t) &= \frac{100}{800} \\
 P\left(Z < \frac{t-24}{12}\right) &= 0.125
 \end{aligned}$$



$$\begin{aligned}
 \frac{t-24}{12} &= -1.151 \\
 t &= 10.188
 \end{aligned}$$

22 X – Nilai Gred Purata Terkumpul

$$X \sim N(2.7, 0.25^2)$$

(a) $P(X > 3.1)$

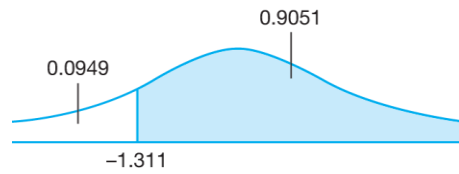
$$= P\left(Z > \frac{3.1 - 2.7}{0.25}\right)$$

$$= P(Z > 1.6)$$

$$= 0.0548$$

(b) $P(X > k) = 90.51\%$

$$P\left(Z > \frac{k - 2.7}{0.25}\right) = 0.9051$$



$$\frac{k - 2.7}{0.25} = -1.311$$

$$k = 2.372$$

23 X – Masa perjalanan

$$X \sim N(15, 4^2)$$

(a) $P(X \leq 20)$

$$= P\left(Z \leq \frac{20 - 15}{4}\right)$$

$$= P(Z \leq 1.25)$$

$$= 1 - 0.1056$$

$$= 0.8944$$



(b) Y – Bilangan hari tidak lewat tiba di sekolah

$$Y \sim N(5, 0.8944)$$

$$P(Y = 5) = {}^5C_5 (0.8944)^5 (0.1056)^0$$

$$= 0.5723$$