EXERCISE SHEET 26 <SELECTED QUESTION>

⑩ $M = 33$

$\sigma = 2$

$$\frac{X - M}{\sigma} = \frac{35-33}{2}$$

$$= 1$$

$$Pr(X > 35) = 1 - Pr(z \leq 1)$$

$$= 1 - 0.8413$$

$$= 0.1587 //$$

⑪ a) $Pr(Z < z) = 0.1020$

$z = -2.3 //$

b) $Pr(Z \geq c) = 0.0102$

$c = -2.32 //$

c) $Pr(-2 \leq Z \leq 2) = Pr(Z \leq 2) - Pr(Z \leq -2)$

$= 0.9772 - 0.0228$

$= 0.9544 //$

d) $Pr(-z \leq Z \leq z) = 0.4108$

$0.4108 = Pr(Z \leq z) - Pr(Z \leq -z)$

BTAE $z = 0.54 //$

⑬ a) $\mu = 1000$, $\sigma = 200$

$$\frac{X - \mu}{\sigma} = \frac{700 - 1000}{200}$$

$$= -1.5$$

$Pr(z \leq -1.5) = 0.0668$

$= 6.68\% //$

b) $Pr(z \leq h) = 0.1003$

$h = -1.28$

$$\frac{x-1000}{200} = -1.28$$

$$x = 744 \text{ hours} //$$

⑤ a) $\mu = 5$, $Pr(X > 7) = 0.1056$

$$\frac{7-5}{\sigma} = 1.25$$

$$\sigma = \frac{2}{1.25}$$

$$\sigma = 1.6 //$$

b) $Pr(X < 3.992)$

$$\frac{3.992-5}{1.6} = -0.63$$

$$Pr(z < -0.63) = 0.2643$$

c) $Pr(X < 3.992 \mid X < 7) = \frac{Pr(X < 3.992)}{Pr(X < 7)}$

$$= \frac{0.2643}{1 - Pr(X < 7)}$$

$$= \frac{0.2643}{1 - 0.1056}$$

$$= 0.2955 //$$

⑥ $\mu = 30 \quad \sigma = 6$

cost: \$40

sell: \$60

refund: \$30 (< 24 months)

Let X = lifetime of car battery

If $X < 24$:

\$60 − \$40 − \$30 = − \$10

If $X \geq 24$:

\$60 − \$40 = \$20

$$Pr(X < 24) = Pr\left(\frac{X-30}{6} < \frac{24-30}{6}\right)$$

$$= Pr(z < -1)$$

$$= 0.1587$$

$Pr(X \geq 24) = 1 - Pr(X < 24)$

$= 1 - 0.1587$

$= 0.8413$

Mean profit $= 0.1587 \times (-10) + 0.8413 \times 20$

$= \$15.24$ <2dp> //

⑥ ~~d)~~ $Pr(X > x) = 0.8023$

$0.8023 = 1 - Pr(X \leq x)$

$Pr(X \leq x) = 0.1977 = Pr(Z \leq z)$

$z = -0.85$

$\frac{x - 5}{1.6} = -0.85$

$x = 3.64$ //