

$$(c) P(T > 8) = P\left(Z > \frac{8-5}{2}\right) \\ = P(Z > 1.5) = 0.0668$$

$$(d) P(2 < T < 7) = P(T > 2) - P(T > 7) \\ = P\left(Z > \frac{2-5}{2}\right) - P\left(Z > \frac{7-5}{2}\right) \\ = P(Z > -1.5) - P(Z > 1) \\ = P(Z < 1.5) - 0.1587 \\ = (1 - 0.0668) - 0.1587 = 0.7745$$

$$(e) P(6 < T < 9) = P(T > 6) - P(T > 9) \\ = P\left(Z > \frac{6-5}{2}\right) - P\left(Z > \frac{9-5}{2}\right) \\ = P(Z > 0.5) - P(Z > 2) \\ = 0.3085 - 0.0228 = 0.2857$$

$$(f) 5\% = 0.05 \quad P(T > a)$$

$$a = 1.645$$

$$= 5 + 1.645 \times 2$$

$$= 8.29$$

Q5

$$W \sim N(120, 10^2)$$

$$(a) P(W < 110) = P\left(Z < \frac{110-120}{10}\right) \\ = P(Z < -1) \\ = P(Z > 1) = 0.1587$$

$$(b) P(W > 107) = P\left(Z > \frac{107-120}{10}\right) \\ = P(Z > -1.3) \\ = P(Z < 1.3) \\ = 1 - 0.0968 = 0.9032$$

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$$(e) \quad 99\% \quad a = 2.575 \quad P(W > a) = 0.99$$

$$W = \text{mean} + a \times SD$$

$$= 1000 + 2.575 \times 20$$

$$= 1051.5$$

Q8

$$W \sim N(60, 1.5^2)$$

$$P(W < 56) = P\left(Z < \frac{56 - 60}{1.5}\right)$$

$$= P(Z < -2.67)$$

$$= P(Z > 2.67)$$

$$= 0.0038$$

$$Y \sim N(60, 2.25^2)$$

$$P(Y < 56) = P\left(Z < \frac{56 - 60}{2.25}\right)$$

$$= P(Z < -1.78)$$

$$= P(Z > 1.78)$$

$$= 0.0375$$

Q9

$$W \sim N(255, 1.5^2)$$

$$(a) (i) P(W > 255) = P\left(Z > \frac{255 - 255}{1.5}\right)$$

$$= P(Z > 0)$$

$$= 0.5 \quad \text{i.e. } 50\%$$

$$(ii) P(W < 253) = P\left(Z < \frac{253 - 255}{1.5}\right)$$

$$= P(Z < -1.33)$$

$$= P(Z > 1.33)$$

$$= 0.0918 \quad \text{i.e. } 9.18\%$$

$$(iii) P(W < 256) = P\left(Z < \frac{256 - 255}{1.5}\right)$$

$$= P(Z < 0.67)$$

$$= 1 - 0.2544 = 0.7456 \quad \text{i.e. } 74.56\%$$

$$(iv) P(252 < W < 258) = P(W > 252) - P(W > 258)$$

$$= P\left(Z > \frac{252 - 255}{1.5}\right) - P\left(Z > \frac{258 - 255}{1.5}\right)$$

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

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

$$= (1 - 0.0228) - 0.0228 = 0.9544$$

$$\text{i.e. } 95.44\%$$

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