1. (a) \( P(X > 2) = P(X = 3) = f(3) = 0.5 \)
   (b) \( \mu = \sum x f(x) = 2.2 \)
   (c) Since \( \sigma^2 = E(X^2) - \mu^2 = 5.7 - (2.2)^2 = 0.86, \quad \sigma = \sqrt{0.86} = 0.927. \)

2. Let \( X \) be the number of correct answers. Then \( X \sim \text{Bin}(25, 0.2). \)
\[
P(3 \leq X \leq 7) = P(X \leq 7) - P(X \leq 2) = 0.891 - 0.098 = 0.793
\]

3.
\[
P(X = 2) = \binom{3}{2}(0.35)^2(0.65) = 3(0.1225)(0.65) = 0.239
\]

4. (a) \( P(Z < 0.53) = 0.7019 \)
   (b) \( P(Z > -1.12) = P(Z < 1.12) = 0.8686 \)
   (c) 1.68

5. \( X \sim N(100, 15) \)
   (a)
\[
P(X > 115) = P\left( Z > \frac{115 - 100}{15} \right) = P(Z > 1) = 1 - P(Z < 1) = 1 - 0.8413 = 0.1587
\]
   (b) \( P(Z < z) = 0.80 \iff z = 0.84 \iff x = 100 + 15(0.84) = 112.6 \)
   (c) \( \bar{X} \sim N\left(100, \frac{15}{\sqrt{9}}\right) = N(100, 5) \)
\[
P\left(90 < \bar{X} < 105\right) = P\left(\frac{90 - 100}{5} < Z < \frac{105 - 100}{5}\right) = P(-2 < Z < 1)
\]
\[
= P(Z < 1) - P(Z < -2) = 0.8413 - 0.0228 = 0.8185
\]
   (d) \( p = P(X > 115) = 0.1587. \) Let \( Y \) denote the number of children who have an IQ score above 115. Then since \( Y \sim \text{Bin}(100, 0.1587), \)
\[
\mu = np = 100(0.1587) = 15.87 \quad \text{and} \quad \sigma = \sqrt{np(1-p)} = \sqrt{100(0.1587)(0.8413)} = 3.654.
\]
Thus
\[
P(Y \leq 17) \approx P\left( Z < \frac{17.5 - 15.87}{3.654} \right) = P(Z < 0.45) = 0.6736
\]