

## Solutions

$$1) \text{ a) } P(Z < \frac{400 - 380}{50}) = P(Z < 0.4) = 0.6554$$

$$\text{b) } P(Z > \frac{360 - 380}{50}) = P(Z > -0.4) = 0.6554$$

$$\text{c) } P(\frac{300 - 380}{50} < Z < \frac{400 - 380}{50}) = P(-1.6 < Z < 0.4) = F_Z(0.4) - [1 - F_Z(1.6)] = 0.6554 - 0.0548 = 0.600$$

$$2) \text{ a) } P(Z > \frac{20 - 12.2}{7.2}) = P(Z > 1.08) = 1 - F_Z(1.08) = 0.140$$

$$\text{b) } P(Z < \frac{0 - 12.2}{7.2}) = P(Z < -1.69) = 1 - F_Z(1.69) = 0.045$$

$$\text{c) } P(\frac{5 - 12.2}{7.2} < Z < \frac{15 - 12.2}{7.2}) = P(-1 < Z < 0.39) = F_Z(0.39) - [1 - F_Z(1)] = 0.6517 - 0.1587 = 0.4930$$

$$3) \text{ a) } P(Z > \frac{820 - 720}{120}) = P(Z > 1) = 1 - F_Z(1) = 0.1587$$

$$\text{b) } P(\frac{730 - 700}{120} < Z < \frac{820 - 700}{120}) = P(0.25 < Z < 1) = 0.8413 - 0.5987 = 0.2426$$

Number of students =  $0.2426 * 100 = 24.26$  or 24 students

$$\text{c) } P(Z < -1.645) = 0.05, \quad -1.645 = \frac{X - 700}{120}, \quad X = 502.6$$

$$4) P(Z < -1.28) = 0.1, \quad -1.28 = \frac{X - 18.2}{1.6}, \quad X = 16.152$$

$$5) \text{ a) } P(Z < \frac{60 - 75}{20}) = P(Z < -0.75) = 0.2266$$

$$\text{b) } P(Z > \frac{90 - 75}{20}) = P(Z > 0.75) = 0.2266$$

$$\text{c) } P(Z > 1.28) = 0.1, \quad 1.28 = \frac{X - 75}{20}, \quad X = 100.6$$