

$$34. a) P(X > .75) = \frac{X - .3}{.06} > \frac{.75 - .3}{.06}$$

$$P(X > .75) = P(Z > \frac{.75 - .3}{.06}) = P(Z > 1.833)$$

$$1 - \Phi(1.833) = 1 - .96673 = .03327$$

$$b) \frac{X - .3}{.06} \leq \frac{.1 - .3}{.06}$$

$$P(X \leq .1) = P(Z \leq -3.33)$$

$$Z \leq -3.33$$

$$P(X \leq .1) = \Phi(-3.33)$$

$$\Phi(-3.33) = .0004$$

c) Value greater than  $Z_{0.05}$

$$\Phi(Z_{0.05}) = .95$$

$$Z_{0.05} = \frac{1.64 + 1.65}{2} = 1.645$$

$$\frac{X_{0.05} - .3}{.06} = 1.645$$

$$X_{0.05} = .3987$$

$$35a) P(X \geq 10) = P\left(\frac{X-8.8}{2.8} \geq \frac{10-8.8}{2.8}\right)$$

$$1 - \Phi\left(\frac{10-8.8}{2.8}\right) = 0.3341 \quad P(X \geq 10) = 0.3341$$

$$35b) P(X \geq 20) = 1 - \Phi\left(\frac{20-8.8}{2.8}\right) = 3.16 \times 10^{-5}$$

$$35c) P(5 \leq X \leq 10) = \Phi\left(\frac{10-8.8}{2.8}\right) - \Phi\left(\frac{5-8.8}{2.8}\right)$$

$$0.5785$$

$$37a) P(X = 105) = \frac{1}{\sqrt{2\pi}(5)} e^{-\frac{(105-104)^2}{2(5)^2}} = 0.78$$

Equal to

$$\text{Prob}(X \leq 50) = \Phi(1.2) = 0.5793$$

Less than

prob less than 105

$$0.78 - 0.5793 = 0.2007$$

Greater than

37b) Empirical Rule, 68%

$$1 - 0.68 = 0.32$$

These do not depend on the values of  $\mu$  and  $\sigma$

$$37c) 105 + (-3.5 \cdot 5) = 87.5 \text{ mmol/L}$$

$$105 + (3.5 \cdot 5) = 122.5 \text{ mmol/L}$$



$$59) a) E(x) = \frac{1}{\lambda} \quad \lambda = 1 \quad \frac{1}{1} = 1 \quad (E(x) = 1)$$

$$59) b) \sigma = \frac{1}{\lambda} = 1$$

$$59) c) F(x) = 1 - e^{-\lambda x} = 1 - e^{-0.4} = 1 - e^{-4} = .98168$$

$$59) d) F(5) - F(2) = e^{-2} - e^{-5} = .128597$$

$$60) a) i. F(x) = 1 - e^{-\lambda x} \quad P(X \leq 100) = 1 - e^{-\lambda x} = 1 - e^{-(.01386 \cdot 100)} \\ F(x) = 1 - e^{-\lambda x} = 1 - e^{-1.386} = .749926$$

$$60) ii. 1 - e^{-0.01386 \cdot 200} = 1 - e^{-2.772} = .9375$$

$$60) d) iii. F(200) - F(100) = .9375 - .7499 = .1876$$

$$60) b) P(X > \mu + 2\sigma) = P(X > 72.15 + 2\sqrt{5205.63}) \\ = P(X > 72.15 + 144.3) = P(X > 216.45) \\ 1 - P(X \leq 216.45) = 1 - F(216.45) = \\ e^{-2.999999} = .04971$$

$$60) c) P(X \leq m) = .5 = \int_0^m f(x) dx = \int_0^m \lambda e^{-\lambda x} dx = [-e^{-\lambda x}]_0^m \\ 1 - e^{-\lambda m} = .5 \quad \ln(e^{-\lambda m}) = \ln(.5) \Rightarrow -\lambda m = \frac{.639}{\lambda} = \frac{.639}{.01386} = 50.011$$

$$61) a) \quad 1 - e^{(-1/2.725)} =$$

$$i.) P(X > 2) = e^{-2/2.725} = .48$$

$$ii.) P(X < 3) = 1 - e^{(-3/2.725)} = .667$$

$$iii.) P(2 < X < 3) = .48 - .333 = .147$$

$$61) b) i.) e^{(-2)} = .135 =$$

$$ii.) P(X < 0) = 0$$