Tutorial Sheet 28
(Answers)

1.   a) 0.1736

        b) 0.2061

        c) 0.5318

        d) 0.1896

        e) 0.1896

        f) 0.63

2.   0.7357

3.   0.7823

4.   a) 0.0668

        b) 134

5.   a) 0.9772

        b) 0.7486

        c) 0.8629

Tutorial Sheet 28
(Solutions)

1.   a) P(x ≤ 35,000) = P[Z ≤ (35,000 – 43,000)/8500]
                        = P(Z ≤ - 0.941)
                        = 1 – 0.8264
                        = 0.1736
        b) P(x > 50,000) = P[Z > (50,000 – 43,000)/8500]
                        = P(Z > 0.8235)
                        = 1 – 0.7939
                        = 0.2061
        c) P(30,000 < x < 45,000) = P[(30,000 – 43,000)/8500 < Z < (45,000 – 43,000)/8500]
                        = P(-1.529 < Z < 0.2353)
                        = 0.5948 – (1 – 0.937)
                        = 0.5318
        d) P(35,000 < x < 40,000) = P[(35,000 – 43,000)/8500 < Z < (40,000 – 43,000)/8500]
                        = P(-0.941 < Z < -0.353)
                        = 0.8264 – 0.6368
                        = 0.1896
        e) P(41,000 < x < 45,000) = P[(41,000 – 43,000)/8500 < Z < (45,000 – 43,000)/8500]
                        = P(-0.235 < Z < 0.235)
                        = (0.5948 – 0.5)x2
                        = 0.1896
        f) P(x ≤ 30,000) = P[Z ≤ (30,000 – 43,000)/8500]
                        = P(Z ≤ - 1.529)
                        = 1 – 0.937
                        = 0.063

2.   P(x < 50) = P[Z < (50 – 45)/8] =P(Z < 0.625) = 0.7357

3.   P(candidate passes) = P(X ≥ 50) = $P(Z \geq \dfrac{50-58.3}{10.7})$ = P(Z ≥ -0.78) = P(Z ≤ 0.78) = 0.7823

4. a) P(x < 700) = P[Z < (700 – 1000)/200] = P(Z < -1.5) = 1 – 0.9332 = 0.0668
    b) Expected lamps = 2000 x P(x < 700) = 2000 x 0.0668 = 134

5. a) P(a zero is received correctly) = P(X < 0.8) = $P(Z < \dfrac{0.8-0}{0.4})$ = P(Z < 2) = 0.9772

    b) P(a one is received correctly) = P(Y ≥ 0.8) = $P(Z \geq \dfrac{0.8-1}{0.3})$ = P(Z ≥ -0.67) = 0.7486

    c) P(a digit is received correctly)
       = P(digit is zero)P(a zero is received correctly)
             + P(digit is one)P(a one is received correctly)
       = (0.5)(0.9772) + (0.5)(0.7486)
       = 0.8629