Chapter 8

8.1a $P(30 < X < 45) \approx \frac{(45-30)\times 146}{400\times 15} = .365$

b $P(90 < X < 120) \approx \frac{(105-90)\times 11}{400\times 15} + \frac{(120-105)\times 6}{400\times 15} = .0425$

c $P(40 < X < 80) \approx \frac{(45-40)\times 146}{400\times 15} + \frac{(60-45)\times 110}{400\times 15} + \frac{(75-60)\times 68}{400\times 15} + \frac{(80-75)\times 24}{400\times 15} = .5867$

d $P(X > 100) \approx \frac{(105-100)\times 11}{400\times 15} + \frac{(120-105)\times 6}{400\times 15} + \frac{(135-120)\times 3}{400\times 15} + \frac{(150-135)\times 0}{400\times 15} + \frac{(165-150)\times 1}{400\times 15} = .0342$

8.2 a $P(X > 45) \approx \frac{(60-45)\times 2}{50\times 15} + \frac{(75-60)\times 2}{50\times 15} = .0800$

b $P(10 < X < 40) \approx \frac{(15-10)\times 17}{50\times 15} + \frac{(30-15)\times 7}{50\times 15} + \frac{(40-30)\times 6}{50\times 15} = .3333$

c $P(X < 25) \approx \frac{(-15-[-30])\times 6}{50\times 15} + \frac{(0-[-15])\times 10}{50\times 15} + \frac{(15-0)\times 17}{50\times 15} + \frac{(25-15)\times 7}{50\times 15} = .7533$

d $P(35 < X < 65) \approx \frac{(45-35)\times 6}{50\times 15} + \frac{(60-45)\times 2}{50\times 15} + \frac{(65-60)\times 2}{50\times 15} = .1333$

8.3 a $P(55 < X < 80) \approx \frac{(60-55)\times 16}{60\times 10} + \frac{(70-60)\times 5}{60\times 10} + \frac{(80-70)\times 24}{60\times 10} = .6167$

b $P(X > 65) \approx \frac{(70-65)\times 5}{60\times 10} + \frac{(80-70)\times 24}{60\times 10} + \frac{(90-80)\times 7}{60\times 10} + \frac{(100-90)\times 1}{60\times 10} = .5750$

c $P(X < 85) \approx \frac{(50-40)\times 7}{60\times 10} + \frac{(60-50)\times 16}{60\times 10} + \frac{(70-60)\times 5}{60\times 10} + \frac{(80-70)\times 24}{60\times 10} + \frac{(85-80)\times 7}{60\times 10} = .9250$

d $P(75 < X < 85) \approx \frac{(80-75)\times 24}{60\times 10} + \frac{(85-80)\times 7}{60\times 10} = .2583$

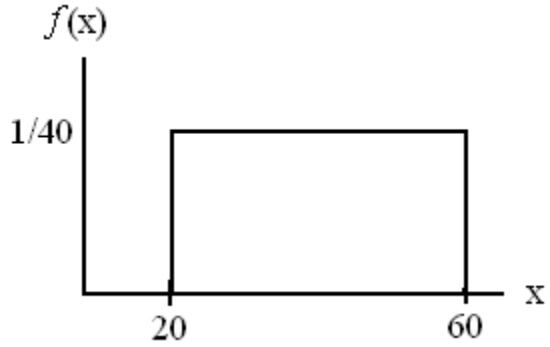
8.4 a

b P(X > 25) = 0

c P(10 < X < 15) = $(15-10)\frac{1}{20}$ = .25

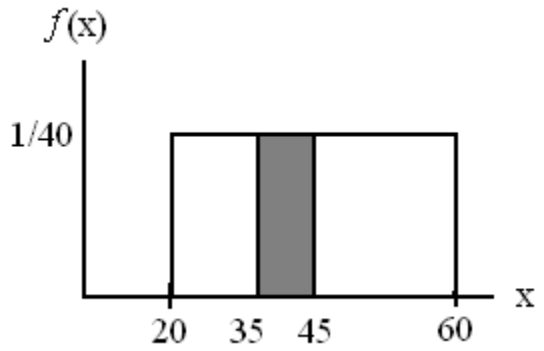
d P(5.0 < X < 5.1) = $(5.1-5)\frac{1}{20}$ = .005

8.5 a f(x) = $\frac{1}{(60-20)} = \frac{1}{40}$ $20 < x < 60$



b P(35 < X < 45) = (45–35) $\frac{1}{40}$ = .25

c



8.6 $f(x) = \frac{1}{(60-30)} = \frac{1}{30}$ $30 < x < 60$

a $P(X > 55) = (60-55)\frac{1}{30} = .1667$

b $P(30 < X < 40) = (40-30)\frac{1}{30} = .3333$

c $P(X = 37.23) = 0$

8.7 $\frac{1}{4} \times (60-30) = 7.5$; The first quartile = 30 + 7.5 = 37.5 minutes

8.8 $.10 \times (60-30) = 3$; The top decile = 60–3 = 57 minutes

8.9 $f(x) = \frac{1}{(175-110)} = \frac{1}{65}$ $110 < x < 175$

a $P(X > 150) = (175-150)\frac{1}{65} = .3846$

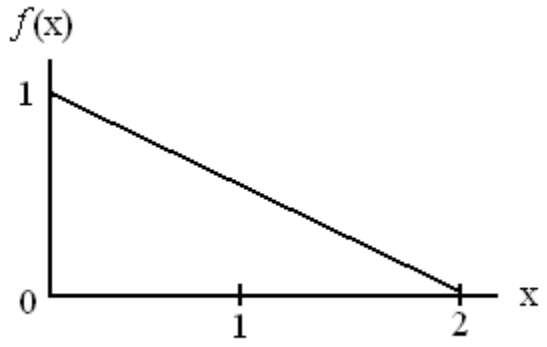
b $P(120 < X < 160) = (160-120)\frac{1}{65} = .6154$

8.10 .20(175–110) = 13. Bottom 20% lie below (110 + 13) = 123

For Exercises 8.11 to 8.14 we calculate probabilities by determining the area in a triangle. That is,

Area in a triangle = (.5)(height)(base)

8.11 a



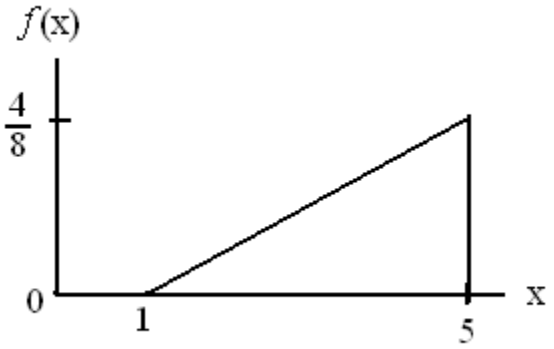
b $P(0 < X < 2) = (.5)(2–0)(1) = 1.0$

c $P(X > 1) = (.5)(2 – 1)(.5) = .25$

d $P(X < .5) = 1 – P(X > .5) = 1 – (.5)(.75)(2–.5) = 1 – .5625 = .4375$

e $P(X = 1.5) = 0$

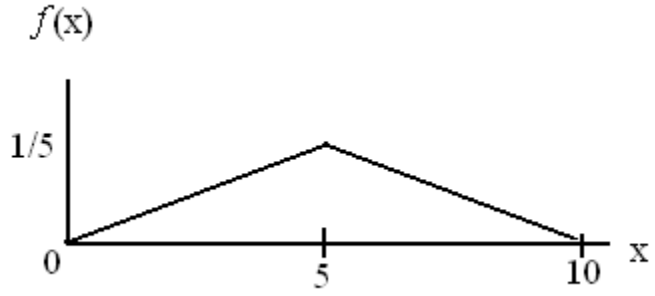
8.12 a



b $P(2 < X < 4) = P(X < 4) – P(X < 2) = (.5)(3/8)(4–1) – (.5)(1/8)(2–1) = .5625 – .0625 = .5$

c $P(X < 3) = (.5)(2/8)(3–1) = .25$

8.13a



b $P(1 < X < 3) = P(X < 3) - P(X < 1) = \frac{1}{2} \times \frac{3}{25} \times (3 - 0) - \frac{1}{2} \times \frac{1}{25} \times (1 - 0) = .18 - .02 = .16$

c $P(4 < X < 8) = P(4 < X < 5) + P(5 < X < 8)$

$P(4 < X < 5) = P(X < 5) - P(X < 4) = \frac{1}{2} \times \frac{5}{25} \times (5 - 0) - \frac{1}{2} \times \frac{4}{25} \times (4 - 0) = .5 - .32 = .18$

$P(5 < X < 8) = P(X > 5) - P(X > 8) = \frac{1}{2} \times \frac{5}{25} \times (10 - 5) - \frac{1}{2} \times \frac{2}{25} \times (10 - 8) = .5 - .08 = .42$

$P(4 < X < 8) = .18 + .42 = .60$

d $P(X < 7) = 1 - P(X > 7)$

$P(X > 7) = \frac{1}{2} \times \frac{3}{25} \times (10 - 7) = .18$

$P(X < 7) = 1 - .18 = .82$

e $P(X > 3) = 1 - P(X < 3)$

$P(X < 3) = \frac{1}{2} \times \frac{3}{25} \times (3 - 0) = .18$

$P(X > 3) = 1 - .18 = .82$

8.14 a $f(x) = .10 - .005x \quad 0 \leq x \leq 20$

b $P(X > 10) = (.5)(.05)(20–10) = .25$

c $P(6 < X < 12) = P(X > 6) - PX > 12) = (.5)(.07)(20–6) - (.5)(.04)(20–12) = .49 - .16 = .33$

8.15 $P(0 < Z < 1.6) = .4452$

8.16 $P(0 < Z < 1.61) = .4463$

8.17 $P(0 < Z < 1.65) = .4505$

8.18 $P(0 < Z < 1.69) = .4545$

8.19 $P(0 < Z < 1.5) = .4332$

8.20 $P(0 < Z < 2.3) = .4893$

8.21 $P(-1.4 < Z < 0.6) = P(-1.4 < Z < 0) + P(0 < Z < .6) = P(0 < Z < 1.4) + P(0 < Z < .6)$
$= .4192 + .2257 = .6449$

8.22 $P(Z > -1.24) = P(Z < 1.24) = .5 + P(0 < Z < 1.24) = .5 + .3925 = .8925$

8.23 $P(Z < 1.93) = .5 + P(0 < Z < 1.93) = .5 + .4732 = .9732$

8.24 $P(Z > 1.57) = .5 - P(0 < Z < 1.57) = .5 - .4418 = .0582$

8.25 $P(Z < 2.66) = .5 + P(0 < Z < 2.66) = .5 + .4961 = .9961$

8.26 $P(.34 < Z < 2.06) = P(0 < Z < 2.06) - P(0 < Z < .34) = .4803 - .1331 = .3472$

8.27 $P(-2.04 < Z < -0.57) = P(0.57 < Z < 2.04) = P(0 < Z < 2.04) - P(0 < Z < .57) = .4793 - .2157 = .2636$

8.28 $P(Z > 3.09) = .5 - P(0 < Z < 3.09) = .5 - .4990 = .0010$

8.29 $P(Z > 0) = .5$

8.30 $P(Z > 4.0) = 0$

8.31 $P(0 < Z < z_{.02}) = .5 - .02 = .4800;\ z_{.02} = 2.05$

8.32 $P(0 < Z < z_{.045}) = .5 - .045 = .4550;\ z_{.045} = 1.70$

8.33 $P(0 < Z < z_{.20}) = .5 - .20 = .3000;\ z_{.20} = .84$

8.34 $P(X > 145) = P\left(\frac{X-\mu}{\sigma} > \frac{145-100}{25}\right) = P(Z > 1.80) = .5 - P(0 < Z < 1.80) = .5 - .4641 = .0359$

8.35 $P(0 < Z < z_{.15}) = .5 - .15 = .3500;\ z_{.15} = 1.04;\ z_{.15} = \frac{x-\mu}{\sigma};\ 1.04 = \frac{x-300}{40};\ x = 341.6$

8.36 $P(800 < X < 1100) = P\left(\frac{800-1{,}000}{400} < \frac{X-\mu}{\sigma} < \frac{1{,}100-1{,}000}{400}\right) = P(-.5 < Z > .25)$

$= P(0 < Z < .5) + P(0 < Z < .25) = .1915 + .0987 = .2902$

8.37 $P(-z_{.08} < Z < 0) = .5 - .08 = .4200;\ -z_{.08} = -1.41;\ -z_{.08} = \frac{x-\mu}{\sigma};\ -1.41 = \frac{x-50}{8};\ x = 38.72$

8.38 a $P(5 < X < 10) = P\left(\frac{5-7.2}{1.9} < \frac{X-\mu}{\sigma} < \frac{10-7.2}{1.9}\right) = P(-1.16 < Z > 1.47)$

$= P(0 < Z < 1.16) + P(0 < Z < 1.47) = .3770 + .4292 = .8062$

b $P(X > 7) = P\left(\frac{X-\mu}{\sigma} > \frac{7-7.2}{1.9}\right) = P(Z > -.11) = .5 + P(0 < Z < .11) = .5 + .0438 = .5438$

c $P(X < 4) = P\left(\frac{X-\mu}{\sigma} < \frac{4-7.2}{1.9}\right) = P(Z < -1.68) = .5 - P(0 < Z < 1.68) = .5 - .4535 = .0465$

8.39 $P(0 < Z < z_{.10}) = .5 - .10 = .4000;\ z_{.10} = 1.28;\ z_{.10} = \frac{x-\mu}{\sigma};\ 1.28 = \frac{x-6.3}{2.2};\ x = 9.116$

Calls last at least 9.116 minutes.

8.40 $P(X > 5{,}000) = P\left(\frac{X-\mu}{\sigma} > \frac{5{,}000-5{,}100}{200}\right) = P(Z > -.5) = .5 + P(0 < Z < .5) = .5 + .1915 = .6915$

8.41 $P(-z_{.02} < Z < 0) = .5 - .02 = .4800;\ -z_{.02} = -2.05;\ -z_{.02} = \frac{x-\mu}{\sigma};\ -2.05 = \frac{x-5100}{200};\ x = 4690;$

8.42 a $P(X > 12{,}000) = P\left(\frac{X-\mu}{\sigma} > \frac{12{,}000-10{,}000}{2{,}400}\right) = P(Z > .83) = .5 - P(0 < Z < .83) = .5 - .2967 = .2033$

b $P(X < 9{,}000) = P\left(\frac{X-\mu}{\sigma} < \frac{9{,}000-10{,}000}{2{,}400}\right) = P(Z < -.42) = .5 - P(0 < Z < .42) = .5 - .1628 = .3372$

8.43 $P(0 < Z < z_{.001}) = .5 - .001 = .4990;\ z_{.001} = 3.08;\ z_{.001} = \frac{x-\mu}{\sigma};\ 3.08 = \frac{x-10{,}000}{2{,}400};\ x = 17{,}392$

8.44 a $P(X > 70) = P\left(\frac{X-\mu}{\sigma} > \frac{70-65}{4}\right) = P(Z > 1.25) = .5 - P(0 < Z < 1.25) = .5 - .3944 = .1056$

b $P(X < 60) = P\left(\frac{X-\mu}{\sigma} < \frac{60-65}{4}\right) = P(Z < -1.25) = .5 - P(0 < Z < 1.25) = .5 - .3944 = .1056$

c $P(55 < X < 70) = P\left(\frac{55-65}{4} < \frac{X-\mu}{\sigma} < \frac{70-65}{4}\right) = P(-2.50 < Z < 1.25)$

$= P(0 < Z < 2.50) + P(0 < Z < 1.25) = .4938 + .3944 = .8882$

8.45 a $P(X < 70{,}000) = P\left(\frac{X-\mu}{\sigma} < \frac{70{,}000-82{,}000}{6{,}400}\right) = P(Z < -1.88) = .5 - P(0 < Z < 1.88) = .5 - .4699$

$= .0301$

b $P(X > 100{,}000) = P\left(\frac{X-\mu}{\sigma} > \frac{100{,}000-82{,}000}{6{,}400}\right) = P(Z > 2.81) = .5 - P(0 < Z < 2.81) = .5 - .4975$

$= .0025$

8.46 Top 5%: $P(0 < Z < z_{.05}) = .5 - .05 = .4500$; $z_{.05} = 1.645$; $z_{.05} = \frac{x-\mu}{\sigma}$; $1.645 = \frac{x-80}{4}$; $x = 86.58$

Bottom 5%: $P(-z_{.05} < Z < 0) = .5 - .05 = .4500$; $-z_{.05} = -1.645$; $-z_{.05} = \frac{x-\mu}{\sigma}$; $-1.645 = \frac{x-80}{4}$;

$x = 73.42$

8.47 a $P(X > 36) = P\left(\frac{X-\mu}{\sigma} > \frac{90-80}{4}\right) = P(Z > 2.50) = .5 - P(0 < Z < 2.50) = .5 - .4938 = .0062$

b $P(X < 34) = P\left(\frac{X-\mu}{\sigma} < \frac{85-80}{4}\right) = P(Z < 1.25) = .5 + P(0 < Z < 1.25) = .5 + .3944 = .1056$

c $P(30 < X < 33) = P\left(\frac{80-80}{4} < \frac{X-\mu}{\sigma} < \frac{85-80}{4}\right) = P(0 < Z < 1.25) = .3944$

8.48 $P(X > 8) = P\left(\frac{X-\mu}{\sigma} > \frac{8-7.2}{.667}\right) = P\ Z > 1.2) = .5 - P(0 < Z < 1.2) = .5 - .3849 = .1151$

8.49 $P(0 < Z < z_{.25}) = .5 - .25 = .2500$; $z_{.25} = .67$; $z_{.25} = \frac{x-\mu}{\sigma}$; $.67 = \frac{x-7.2}{.667}$; $x = 7.65$ hours

8.50 a $P(X > 9) = P\left(\frac{X-\mu}{\sigma} > \frac{9-7.5}{1.8}\right) = P\ Z > .83) = .5 - P(0 < Z < .83) = .5 - .2967 = .2033$

b $P(6 < X < 9) = P\left(\frac{6-7.5}{1.8} < \frac{X-\mu}{\sigma} < \frac{9-7.5}{1.8}\right) = P(-.83 < Z < .83)$

= 2P(0 < Z < .83) = 2(.2967) = .5934

c $P(X < 4) = P\left(\frac{X-\mu}{\sigma} < \frac{4-7.5}{1.81}\right)$ = P Z < –1.94) = .5 – P(0 < Z < 1.94) = .5 – .4738 = .0262

d $P(-z_{.10} < Z < 0) = .5 - .10 = .4000$; $-z_{.10} = -1.28$; $-z_{.10} = \frac{x-\mu}{\sigma}$; $-1.28 = \frac{x-7.5}{1.8}$; x = 5.20 hours

8.51 a $P(X > 12{,}500) = P\left(\frac{X-\mu}{\sigma} > \frac{12{,}500-11{,}500}{800}\right)$ = P Z > 1.25) = .5 – P(0 < Z < 1.25) = .5 – .3944

= .1056

b $P(X < 9{,}500) = P\left(\frac{X-\mu}{\sigma} < \frac{9{,}500-11{,}500}{800}\right)$ = P(Z < –2.5) = .5 –P(0 < Z < 2.5) = .5 – .4938 = .0062

8.52 $P(-z_{.01} < Z < 0) = .5 - .01 = .4900$; $-z_{.05} = -2.33$; $-z_{.01} = \frac{x-\mu}{\sigma}$; $-2.33 = \frac{x-11{,}500}{800}$; x = 9,636

8.53 a $P(28 < X < 32) = P\left(\frac{28-30}{2.5} < \frac{X-\mu}{\sigma} < \frac{32-30}{2.5}\right)$ = P(–.8 < Z < .8) = 2P(0 < Z < .8)

= 2(.2881) = .5762

b $P(X > 32) = P\left(\frac{X-\mu}{\sigma} > \frac{32-30}{2.5}\right)$ = P(Z > .8) = .5 – P(0 < Z < .8) = .5 – .2881 = .2119

c $P(X < 28) = P\left(\frac{X-\mu}{\sigma} < \frac{28-30}{2.5}\right)$ = P(Z < –.8) = .5 – P(0 < Z < .8) = .5 – .2881 = .2119

8.54 a $P(X > 30) = P\left(\frac{X-\mu}{\sigma} > \frac{30-27}{7}\right)$ = P(Z > .43) = .5 – P(0 < Z < .43)

= .5 – .1664 = .3336

b $P(X > 40) = P\left(\frac{X-\mu}{\sigma} > \frac{40-27}{7}\right)$ = P(Z > 1.86) = .5 – P(0 < Z < 1.86)

= .5 – .4686 = .0314

c $P(X < 15) = P\left(\frac{X-\mu}{\sigma} < \frac{15-27}{7}\right)$ = P(Z < –1.71) = .5 – P(0 < Z < 1.71)

= .5 – .4564 = .0436

d $P(0 < Z < z_{.20}) = .5 - .20 = .3000$; $z_{.20} = .84$; $z_{.20} = \frac{x-\mu}{\sigma}$; $.84 = \frac{x-27}{7}$; x = 32.88

8.55 $P(X > 70{,}000) = P\left(\frac{X-\mu}{\sigma} > \frac{70{,}000-61{,}823}{17{,}301}\right) = P(Z > .47) = .5 - P(0 < Z < .47) = .5 - .1808 = .3192$

8.56 $P(X < 45{,}000) = P\left(\frac{X-\mu}{\sigma} < \frac{45{,}000-41{,}825}{13{,}444}\right) = P(Z < .24) = .5 + P(0 < Z < .24) = .5 + .0948 = .5948$

8.57 $P(-z_{.01} < Z < 0) = .5 - .01 = .4900;\ -z_{.01} = -2.33;\ -z_{.01} = \frac{x-\mu}{\sigma};\ -2.33 = \frac{x-75}{8};\ x = 56.36$

8.58 a $P(X < 4) = P\left(\frac{X-\mu}{\sigma} < \frac{4-7.5}{1.2}\right) = P(Z < -2.92) = .5 - P(0 < Z < 2.92) = .5 - .4982 = .0018$

b $P(7 < X < 10) = P\left(\frac{7-7.5}{1.2} < \frac{X-\mu}{\sigma} < \frac{10-7.5}{1.2}\right) = P(-.42 < Z < 2.08) = P(0 < Z < .42) + P(0 < Z < 2.08)$

$= .1628 + .4812 = .6440$

8.59 a $P(X < 10) = P\left(\frac{X-\mu}{\sigma} < \frac{10-17.90}{3.55}\right) = P(Z < -2.23) = .5 - P(0 < Z < 2.23) = .5 - .4871 = .0129$

b $P(-z_{.10} < Z < 0) = .5 - .10 = .4000;\ -z_{.10} = -1.28;\ -z_{.10} = \frac{x-\mu}{\sigma};\ -1.28 = \frac{x-17.90}{3.55};\ x = 13.36$

8.60 A: $P(0 < Z < z_{.10}) = .5 - .10 = .4000;\ z_{.10} = 1.28;\ z_{.10} = \frac{x-\mu}{\sigma};\ 1.28 = \frac{x-70}{10};\ x = 82.8$

B: $P(0 < Z < z_{.40}) = .5 - .40 = .1000;\ z_{.40} = .25;\ z_{.40} = \frac{x-\mu}{\sigma};\ .25 = \frac{x-70}{10};\ x = 72.5$

C: $P(-z_{.20} < Z < 0) = .5 - .20 = .3000;\ -z_{.20} = -.84;\ -z_{.20} = \frac{x-\mu}{\sigma};\ -.84 = \frac{x-70}{10};\ x = 61.6;$

D: $P(-z_{.05} < Z < 0) = .5 - .05 = .4500;\ -z_{.05} = -1.645;\ -z_{.05} = \frac{x-\mu}{\sigma};\ -1.645 = \frac{x-70}{10};\ x = 53.55$

8.61 $P(0 < Z < z_{.02}) = .5 - .02 = .4800;\ z_{.02} = 2.05;\ z_{.02} = \frac{x-\mu}{\sigma};\ 2.05 = \frac{x-100}{16};\ x = 132.80$

(rounded to 133)

8.62 $P(x > 150{,}000) = P\left(\frac{X-\mu}{\sigma} < \frac{150{,}000-99{,}700}{30{,}000}\right) = P(Z > 1.68) = .5 - P(0 < Z < 1.68) = .5 - .4535$

$= .0465$

8.63 $P(0 < Z < z_{.06}) = .5 - .06 = .4400$; $z_{.06} = 1.55$; $z_{.06} = \frac{ROP - \mu}{\sigma}$; $1.55 = \frac{ROP - 200}{30}$; ROP = 246.5

(rounded to 247)

8.64 $P(0 < Z < z_{.20}) = .5 - .20 = .3000$; $z_{.20} = .84$; $z_{.20} = \frac{x - \mu}{\sigma}$; $.84 = \frac{x - 150}{25}$; x = 171

8.65 $P(0 < Z < z_{.30}) = .5 - .30 = .2000$; $z_{.30} = .52$; $z_{.30} = \frac{x - \mu}{\sigma}$; $.52 = \frac{x - 850}{90}$; x = 896.8

(rounded to 897)

8.66 $P(0 < Z < z_{.40}) = .5 - .40 = .1000$; $z_{.40} = .25$; $z_{.40} = \frac{x - \mu}{\sigma}$; $.25 = \frac{x - 850}{90}$; .x = 872.5

(rounded to 873)

8.67 From Exercise 7.57: $\mu = 65$, $\sigma^2 = 21$, and $\sigma = 4.58$

$P(X > 60) = P\left(\frac{X - \mu}{\sigma} > \frac{60 - 65}{4.58}\right) = P(Z > -1.09) = .5 + P(0 < Z < .109) = .5 + .3621 = .8621$

8.68 $P(X < 150) = P\left(\frac{X - \mu}{\sigma} < \frac{150 - 145}{5.57}\right) = P(Z < .90) = .5 + P(0 < Z < .90) = .5 + .3159 = .8159$

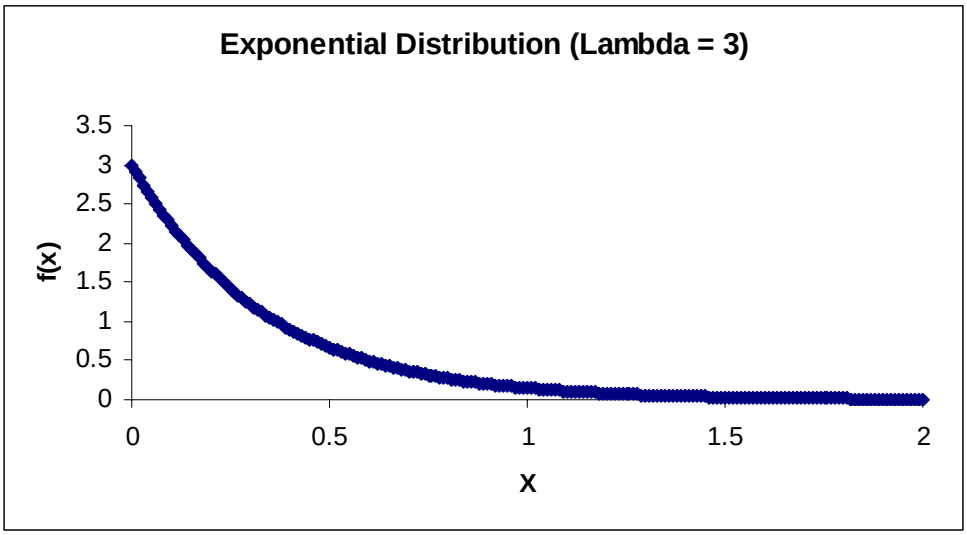
8.69 a. $P(X > 25) = P\left(\frac{X - \mu}{\sigma} > \frac{25 - 14}{18}\right) = P(Z > .61) = .5 - P(0 < Z < .61) = .5 - .2291 = .2709$

b. $P(X < 0) = P\left(\frac{X - \mu}{\sigma} < \frac{0 - 14}{18}\right) = P(Z < -.78) = .5 - P(0 < Z < .78) = .5 - .2823 = .2177$

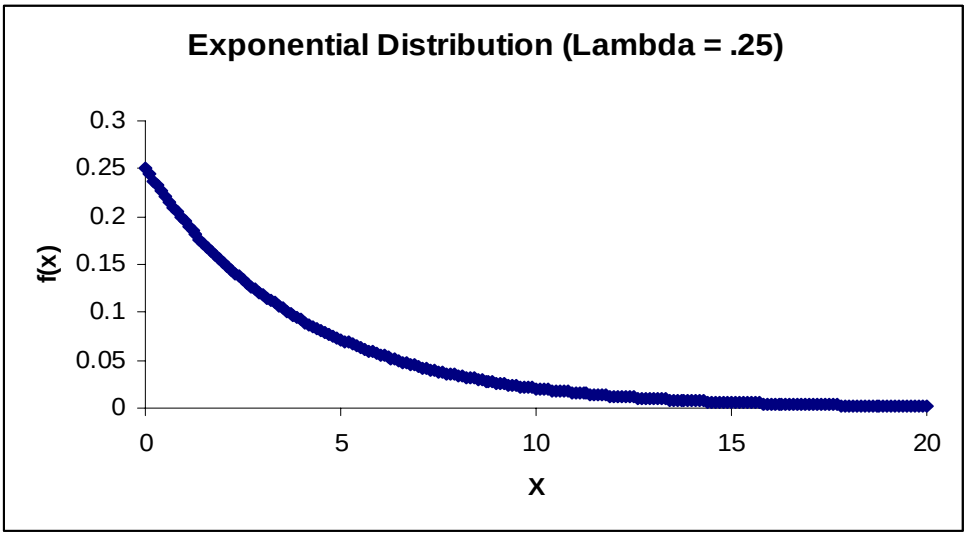
8.70 a. $P(X < 0) = P\left(\frac{X - \mu}{\sigma} < \frac{0 - 21.1}{10.67}\right) = P(Z < -1.98) = .5 - P(0 < Z < 1.98) = .5 - .4761 = .0239$

b. $P(X > 20) = P\left(\frac{X - \mu}{\sigma} > \frac{20 - 21.1}{10.67}\right) = P(Z > -.10) = .5 + P(0 < Z < .10) = .5 + .0398 = .5398$

8.71



8.72



8.73 a $P(X > 1) = e^{-.5(1)} = e^{-.5} = .6065$

a $P(X > .4) = e^{-.5(.4)} = e^{-.2} = .8187$

c $P(X < .5) = 1 - e^{-.5(.5)} = 1 - e^{-.25} = 1 - .7788 = .2212$

d $P(X < 2) = 1 - e^{-.5(2)} = 1 - e^{-1} = 1 - .3679 = .6321$

8.74 a $P(X > 2) = e^{-.3(2)} = e^{-.6} = .5488$

b $P(X < 4) = 1 - e^{-.3(4)} = 1 - e^{-1.2} = 1 - .3012 = .6988$

c $P(1 < X < 2) = e^{-.3(1)} - e^{-.3(2)} = e^{-.3} - e^{-.6} = .7408 - .5488 = .1920$

d $P(X = 3) = 0$

8.75 $\lambda = 6$ kilograms/hour = .1 kilogram/minute

$P(X > 15) = e^{-.1(15)} = e^{-1.5} = .2231$

8.76 $\mu = 1/\lambda = 25$ hours; λ = .04 breakdowns/hour

$P(X > 50) = e^{-.04(50)} = e^{-2} = .1353$

8.77 $\lambda = 10$ trucks/hour = .167 truck/minute

$P(X > 15) = e^{-.167(15)} = e^{-2.5} = .0821$

8.78 $\mu = 1/\lambda = 5$ minutes; λ = .2 customer/minute

$P(X < 10) = 1 - e^{-.2(10)} = 1 - e^{-2} = 1 - .1353 = .8647$

8.79 $\mu = 1/\lambda = 2.7$ minutes; λ = .37 service/minute

$P(X < 3) = 1 - e^{-.37(3)} = 1 - e^{-1.11} = 1 - .3296 = .6704$

8.80 $\mu = 1/\lambda = 7.5$ minutes; λ = .133 service/minute

$P(X < 5) = 1 - e^{-.133(5)} = 1 - e^{-.665} = 1 - .5143 = .4857$

8.81 $\mu = 1/\lambda = 125$ seconds; λ = .008 transactions/second = .48 transactions/minute

$P(X > 3) = e^{-.48(3)} = e^{-1.44} = .2369$

8.82 $\mu = 1/\lambda = 6$ minutes; λ = .167 customers/minute

$P(X > 10) = e^{-.167(10)} = e^{-1.67} = .1889$

8.83	a 1.341	b 1.319	c 1.990	d 1.653
8.84	a 2.724	b 1.282	c 2.132	d 2.528
8.85	a 1.3406	b 1.3195	c 1.9890	d 1.6527
8.86	a 1.6556	b 2.6810	c 1.9600	d 1.6602

8.87	a .0189	b .0341	c .0927	d .0324
8.88	a .1744	b .0231	c .0251	d .0267
8.89	a 9.23635	b 135.807	c 9.39046	d 37.4848
8.90	a 17.2919	b 50.8922	c 2.70554	d 53.5400
8.91	a 73.3441	b 102.946	c 16.3382	d 24.7690
8.92	a 33.5705	b 866.911	c 24.3976	d 261.058
8.93	a .2688	b 1.0	c .9903	d 1.0
8.94	a .4881	b .9158	c .9988	d .9077
8.95	a 4.35	b 8.89	c 3.29	d 2.50
8.96	a 2.84	b 1.93	c 3.60	d 3.37
8.97	a 1.4857	b 1.7633	c 1.8200	d 1.1587
8.98	a 1.5204	b 1.5943	c 2.8397	d 1.1670
8.99	a .0510	b .1634	c .0222	d .2133
8.100	a .1050	b .1576	c .0001	d .0044