1.1(a) $\dfrac{x_1}{3} + \dfrac{x_2}{5} + \dots + \dfrac{x_{10}}{21} = \sum_{i=1}^{10} \dfrac{x_i}{2i+1}$

1.1(b) $2x_1 + 3x_2 + 4x_3 + 5x_4 = \sum_{i=1}^{4}(i+1)\,x_i$

1.1(c) $x_1 \cdot y_3 + x_2 \cdot y_6 + \dots + x_9 \cdot y_{27} = \sum_{i=1}^{9} x_i \cdot y_{3i}$

1.2(a) $\sum_{i=1}^{12}(5a+8) = 60a + 96$

1.2(b) $\sum_{i=1}^{5}(3i+1) = (3+1) + (3\cdot 2+1) + \dots + (3\cdot 5+1) = 50$

1.2(c) $\dfrac{\sum_{i=1}^{6} ax_i(1+y_i)}{\sum_{i=1}^{6} ax_i} = 1 + \dfrac{\sum_{i=1}^{6} ax_i y_i}{\sum_{i=1}^{6} ax_i}$

1.2(d) $\sum_{i=1}^{4}\sum_{j=1}^{2}\left(x_i + y_{2j}\right) = \sum_{i=1}^{4}[2x_i + y_2 + y_4] = 2\sum_{i=1}^{4} x_i + 4\sum_{i=1}^{2} y_{2i}$

1.3 (a) pdf for rv X

Car sales per day,X	0	1	2	3	4	5	6
f(X)	6/100 = .06	8/100=.08	.22	.20	.15	.16	.13

1.3(b) E(X) = 0*.06 + 1*.08 + 2*.22+3*.2+4*.15+5*.16+6*.13 = 3.3

The expected value is the mean of the distribution of the random variable.

1.3(c) Var(X) = $\sum_{i=0}^{6}(x_i - 3.3)^2 f(x_i)$ = 2.95 and Std Dev(X) = 1.7175

1.3(d) E(Y) = E(5) + 12E(X) = 5 + 12(3.3) = 44.6

Var(Y) = Var(5)+144Var(X) = 144(2.95) = 424.8

1.4 (a) Marginal pdf for X and Y

		Y			
		1	2	3	
	-6	0	.1	.15	.25
X	5	.1	.15	.2	.45
	10	.25	.05	0	.30
		.35	.30	.35	

1.4(b) Conditional pdf

X given Y = 3	-6	5	10
f(X|Y=3)	.15/.35 = 3/7	.2/.35 = 4/7	0

1.4(c) Covariance(X,Y) = ?

E(X) =3.75, E(Y) = 2, Cov(X,Y)=E(X-E(X))(Y-E(Y)) = E(XY)-E(X)E(Y) = 4.6 – 7.5 = -2.9

1.4(d) X and Y are not independent since the product of the marginals is not equal to the probability of the intersection.

1.5(a) P(Z > -.54) = 1-.2946 = .7054

1.5(b) P(0.35<Z<1.67) = P(Z<1.67)-P(Z<.35) = .9525-.6368 = .3157

1.6(a) R~N(7, 64), P(R<0)=P(Z<(0-7)/8) = P(Z<-7/8) ≈(.8078+.8106)/2 =.8092

1.6(b) P(R>10) = 1-P(R<10) = 1-P(Z<(10-7)/8)=1-P(Z<3/8) = 1 – (.6443+.648)/2=.3538