

Chapter 3 Answers

3.1 Discrete; continuous; continuous; discrete; discrete; continuous.

3.2

Sample Space	x
NNN	0
NNB	1
NBN	1
BNN	1
NBB	2
BNB	2
BBN	2
BBB	3

3.3

Sample Space	w
HHH	3
HHT	1
HTH	1
THH	1
HTT	-1
THT	-1
TTH	-1
TTT	-3

3.4 $S = \{HHH, THHH, HTHHH, TTHHH, TTTHHH, HTTHHH, THTHHH, HHTHHH, \dots\}$; The sample space is discrete containing as many elements as there are positive integers.

3.5 (a) $c = 1/30$

(b) $c = 1/10$ since

3.6 (a) $1/9$

(b) 0.1020

3.7 (a) 0.68

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(b) 0.375

3.8

w	-3	-1	1	3
$P(W = w)$	$1/27$	$2/9$	$2/9$	$8/27$

3.9 (a) =1

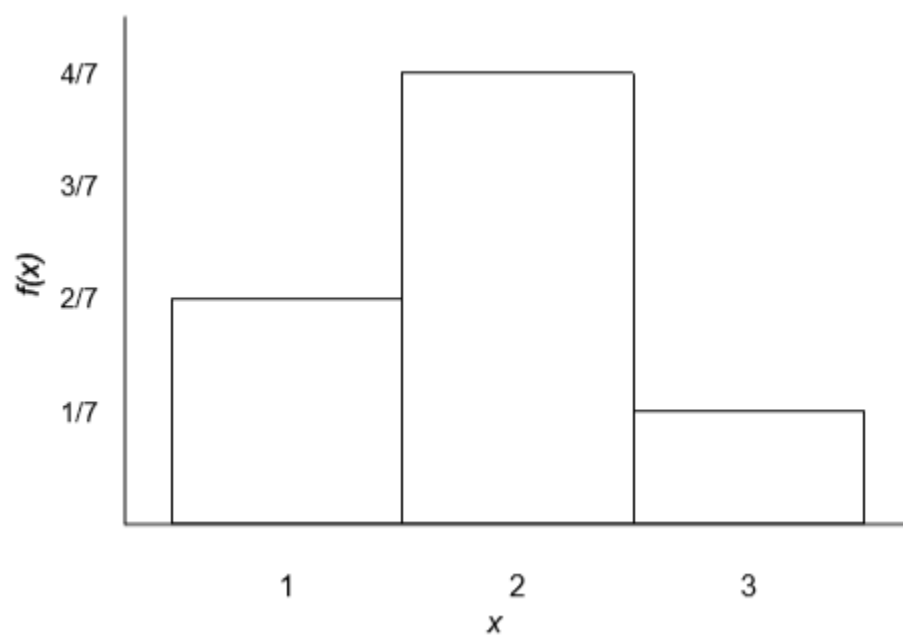
(b) = 19/80

3.10 $1/6$

3.11

x	0	1	2
$f(x)$	$2/7$	$4/7$	$1/7$

The probability histogram:



3.12 (a) = 1/4

(b) = 1/2

(c) = 1/2

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3.13

$$F(x) = \begin{cases} 0, & \text{for } x < 0, \\ 0.41, & \text{for } 0 \leq x < 1, \\ 0.78, & \text{for } 1 \leq x < 2, \\ 0.94, & \text{for } 2 \leq x < 3, \\ 0.99, & \text{for } 3 \leq x < 4, \\ 1, & \text{for } x \geq 4. \end{cases}$$

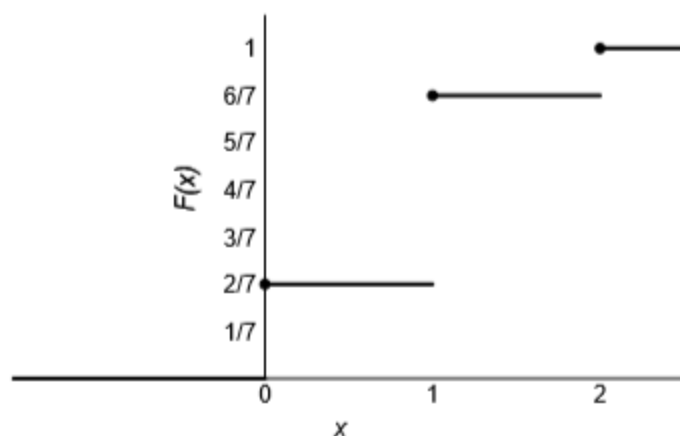
3.14 (a) = 0.7981

(b) = 0.7981

3.15 (a) = 4/7

(b) = 5/7

3.16



3.17 (a) = 1

(b) = 1/4

(c) = 0.3

3.18 (a) = 16/27

(b) = 1/3

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3.19 $1/4$

3.20 $1/3$

3.21 (a) ($k = 3/2$)

(b) $= 0.3004$.

3.22

x	0	1	2	3
$f(x)$	$703/1700$	$741/1700$	$117/850$	$11/850$

3.23 (a) $= 20/27$

(b) $= 2/3$

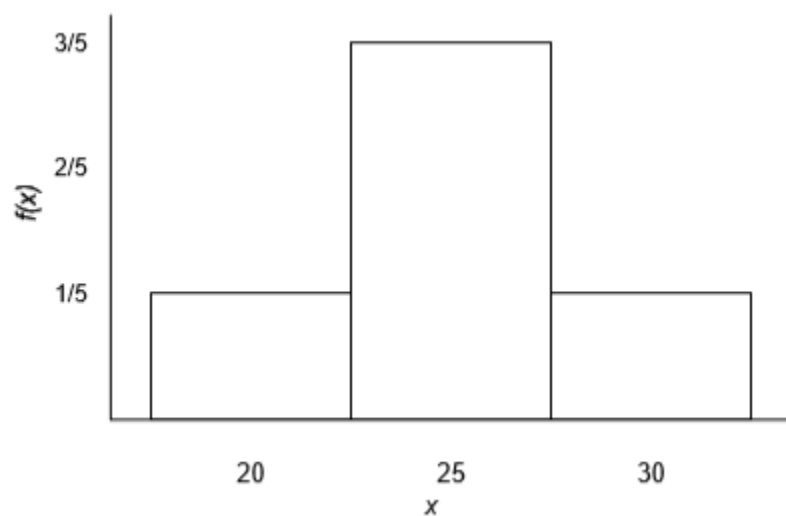
3.24

$$f(x) = \frac{\binom{5}{x} \binom{5}{4-x}}{\binom{10}{4}}$$

3.25

t	20	25	30
$P(T = t)$	$1/5$	$3/5$	$1/5$

The probability histogram



3.26

x	0	1	2	3
$P(X = x)$	$8/27$	$4/9$	$2/9$	$1/27$

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3.27 (b) = 0.6065

(c) = 0.6321

3.28 (a) = 1

(b) = 0.1

(c) = 0.1

3.29 (a) = 1

(b)

$$F(x) = \begin{cases} 0, & x < 1, \\ 1 - x^{-3}, & x \geq 1. \end{cases} =$$

(c) = 0.0156

3.30 (a) (k= 3/16)

(b) = 99/128

(c) = 0.164

3.31 (a) = 0.2231

(b) = 0.2212

3.32 (a) = 1

(b) = 0.4095

(c) = 0.03125

3.33 (a) = (k = 280).

(b) = 0.3633.

(c) = 0.0563.

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3.34 (b) = 9.8×10^{-6}

3.35 (a) = 0.1528.

(b) = 0.0446

3.36 (a) = $5/9$

(b) = $1/4$

(c) = $3/4$

3.37 (a) $1/36$

(b) $1/15$

3.38 (a) = $1/5$

(b) = $7/30$

(c) = $3/5$

(d) = $4/15$

3.39 (a)

$$f(x, y) = \frac{\binom{3}{x} \binom{2}{y} \binom{3}{4-x-y}}{\binom{8}{4}}, \quad x = 0, 1, 2, 3; \quad y = 0, 1, 2; \quad 1 \leq x + y \leq 4.$$

(b) $1/2$

3.40 (c) $5/12$

3.41 (a) = $1/16$

(c) = $1/4$

3.42 0.6321

3.43 $1/2$

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3.44 (a) ($k = 3/392 * 10^{-4}$)

(b) 49/196.

(c) 37/196

3.45 0.6534

3.46 (a)

x	0	1	2	3
$g(x)$	1/10	1/5	3/10	2/5

(b)

y	0	1	2
$h(y)$	1/5	1/3	7/15

3.47 (a) X and Y are not independent

(b) = 1/3

3.48 (a)

y	0	1	2
$f(y 2)$	3/10	3/5	1/10

(b) 3/10

3.49 (a)

x	1	2	3
$g(x)$	0.10	0.35	0.55

(b)

y	1	2	3
$h(y)$	0.20	0.50	0.30

(c) 0.5714.

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3.50 (a)

x	2	4
$g(x)$	0.40	0.60

(b)

y	1	3	5
$h(y)$	0.25	0.50	0.25

3.51 (a) $f(0,1) = 8/36 = 2/9$, $f(0,0) = 16/36 = 4/9$, $f(0,2) = 1/36$, $f(1,0) = 2/9$, $f(2,0) = 1/36$, and $f(1,1) = 1/18$.

(b) $= 11/12$

3.53 (a) $f(1,2) = 6/55$

(b) $42/55$

3.54 (d) $= 0.64$

3.55 $5/8$

3.56 the variables are not independent

3.57 X and Y are independent

3.58 (a) X and Y are not independent

(b) 0.64

3.59 (a) $(k = 3)$.

(b) $= 21/512$

3.60 X and Y are independent.

3.61 X and Y are not independent

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3.62 (a) $2/9 YZ^2$

(b) $= 2Y$

(c) $= 7/162$

(D) $= 1/4$

3.63 (a) $= 0.3125$.

(b) $= 12 y (1-y)^2$

(c) $= 0.25$

3.64 (b) $= 0.4$

3.65 (b) $= 1/(3e^6)$

3.66 (a) $= 1/16$

(b) $= 53/128$

3.68 (b) $3/8$

3.70 (b) $= NO$

(c) $= 2/3$

3.71 (b) $= 0.2466$

3.72 (a) $f(x) = 1/10$

3.73 0.2231

3.74 (a) $= 1$

(b) $= 0.7$

3.75 (a) $= 1$

(b) $= 0.0001$

3.76 (a) 0.1353

(b) $= 0.6321$

3.77 (c) $= 0.2$

(d) $= 1/X^2$

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3.78 (a) $f_{X_1}(x_1)$ is a density function

$$(b) = 25/49$$

3.79 (a) X and Y are independent.

$$(b) = 63/64$$

3.80 0.86526

3.81 0.999991

3.82 0.9955