Student Homework and Review Problem Answer Supplement

By Roberta Bloom

to accompany

Applied Finite Mathematics 3rd ed, 2016

by Rupinder Sekhon & Roberta Bloom
De Anza College
Cupertino CA

This answer supplement contains answers to

- most odd numbered homework problems (with a few exceptions that are not included)
- few selected even numbered homework problems in some sections of the textbook
- all end of chapter review problems for all chapters of the textbook

This supplement does not contain complete worked out solutions.

If you find any errors that need to be corrected, please send that information, or any other correspondence, to Roberta Bloom at bloomroberta@deanza.edu or bloomroberta@fhda.edu

Applied Finite Mathematics, 3rd edition, 2016

By Rupinder Sekhon 1995, 1996
Updated by Roberta Bloom 2016

Chapter 1 Linear Models

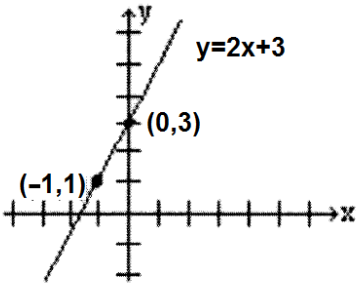
Answers to Odd Numbered Homework Problems at end of sections and Answers to all problems in Chapter Review Section

1.1 Graphing a Linear Equation

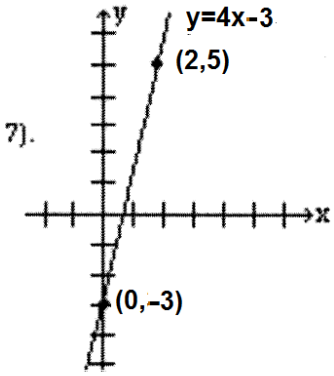
1). Yes

3). (2, –6), (6, 6), (0, –12), (4, 0)

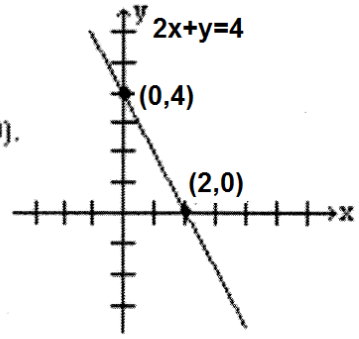
5).



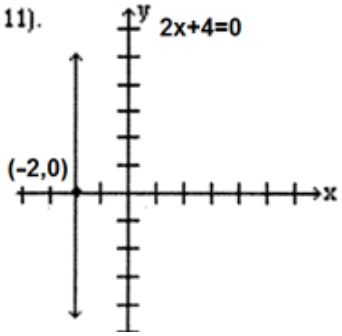
7).



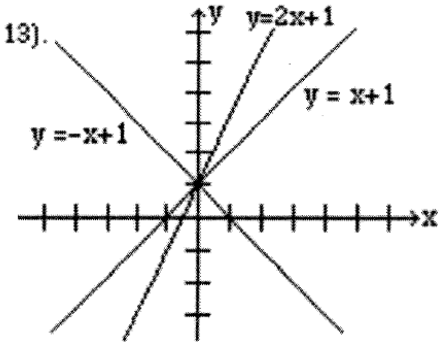
9).



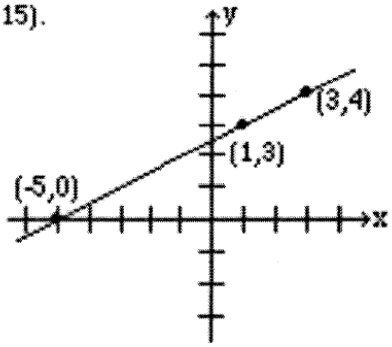
11).



13).



15).



1.2 Slope of a Line

1). m = 2

3). m = 1

5). m = –2

7). m = undefined

9). m = –1

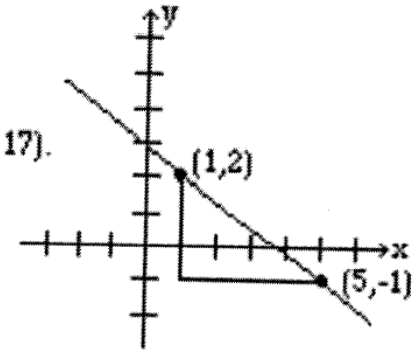
11). m = –2

13). m = 2

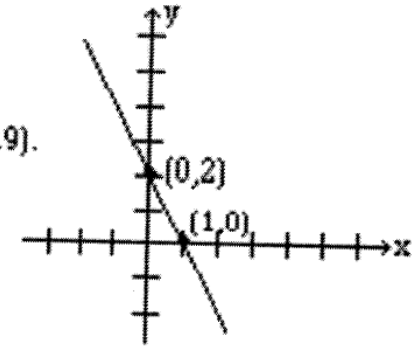
15). m = 3/4

1.2 Slope of a Line

17).



19).



1.3 Determining the Equation of a Line

1). $y = 2x + 4$

3). $y = 6x - 13$

5). $y = 2/5\ x - 4$

7). $y = 7x - 32$

9). $y = 5/2\ x - 10$

11). $y = -4$

13). $x = 3$

15). $2x - y = 7$

17). $3x - 4y = -4$

19). $4x - 3y = 17$

21) $y+3=\frac{4}{3}(x-2)$ OR $y-1=\frac{4}{3}(x-5)$

23) $y+2=-\frac{2}{3}(x-6)$ OR $y-2=-\frac{2}{3}(x-0)$

25) $y-7=-\frac{1}{3}(x+12)$

1.4 Applications

1). $y = 25x + 1200$

3). $y = 20x + 350$

5). $y = 80x + 24000$

7). $y = 2/5\ x$; 68

9). $y = 7x - 338$; 138

11). $F = 9/5\ C + 32$; 77°F

13) $y = .375x + 29.8$; 42.925 million people in 2025

15) $y = 120x + 13200$; 14400 students in 2010

17) $y = .18x + 10$; the cost is \$82 for a home using 400 kwh of electricity per month

19) a) $y = 12x + 110{,}000$ b) $y = \$230{,}000$ c) $x = \$7500$

21 a) $y = 3x + 1000$ b) when \$100 is spent on ads, 1300 cups of coffee are sold.

1.5 More Applications

1) $x = 3, y = 13$

3) $x = \$11.50$ $y = 16500$ items

5) a) Plan I costs \$87; Plan II costs \$99; Plan I is better

b) $x = 150$ miles; both plans cost \$61.50

7) Supply Curve: $y = 400x - 1200$

9) $x = 4000$ cookies; cost = revenue = \$3200

11) $x = 8000$ pairs of socks; cost = revenue = \$36000

13) a) cost function $y = 10x + 700$

b) fixed cost = \$700

c) $x = 140$ pounds d) revenue = cost = \$2100

1.6 Review Problems

1). $y = 0$ 2). $-2/3$ 3). -3

4). $4, -6$ 5). $y = 3x + 5$ 6). $3x + 2y = 6$

7). $y = 3x + 9$ 8). $3x + 2y = 18$ 9). $y = 9/5\,x + 32$

10). $y = 3x - 1$ 11). $(3, -1)$ 12). No

13). $(2,1), (5,-1)$; Answers will vary 14). $(3,0), (3, 1)$; Answers will vary

15). The line through $(-3,0)$ & $(0,2)$ 16). The line through $(0,3)$ & $(1,1)$

17). $y = 4x - 140$; 140 18). $y = 1.35x + 15.2$; 142.5

19). $y = 30x + 2750$ 20). $y = 10x + 1500$; 4500

21). $y = 15x + 1200$; 16200 22). $y = 10000x + 280000$; 580000

22) $y = 5000x - 9670000$ if using x = calendar year

$y = 5000x + 280000$ if using x = years since 1990

In 2020, price of house is \$430,000

1.6 Review Problems

23) $y = 1.5x + 95.4$ if using $x =$ # of years after 1995
$y = 1.5x - 2897.1$ if using $x =$ calendar year

24) a) $y = -2x + 230$ b) 80 bowls of soup c) 65°F

25) $y = -50x + 450$ 26) $y = 80x - 400$

27) Price = \$6; number of mugs = 1900

28) Plan I: $y = 16 + .25x$ Plan II $y = 45$
At $x = 200$ miles Plan I costs \$66; Plan II costs \$45
Both cost the same at $x = 116$ miles

29) a) 4500 b) \$20 c) \$15 d) 2750 items

30) \$12; 6900 items 31) \$1700 sales

32) 600 items; revenue = cost = \$15000

33) 4000 CFL bulbs

34) 2500 items

35) 12500 shavers

Applied Finite Mathematics, 3rd edition, 2016
By Rupinder Sekhon 1995, 1996
Updated by Roberta Bloom 2016

Chapter 2 Matrices

Answers to Odd Numbered Homework Problems at end of sections
and
Answers to all problems in Chapter Review Section

2.1 Introduction to Matrices

1) $\begin{bmatrix} 18 & 15 \\ 14 & 13 \\ 12 & 9 \end{bmatrix}$ 3) $\begin{bmatrix} 84 \\ 68 \\ 54 \end{bmatrix}$ 5) $[112.2]$

7) $AB = \begin{bmatrix} 12 & 22 & 19 \\ 10 & 7 & 5 \\ 9 & 15 & 13 \end{bmatrix}$ 9) $AB+BA = \begin{bmatrix} 19 & 35 & 19 \\ 17 & 25 & 20 \\ 20 & 38 & 20 \end{bmatrix}$

11) $2BC = \begin{bmatrix} 10 \\ 30 \\ 16 \end{bmatrix}$ 13) $A^2B = \begin{bmatrix} 105 & 123 & 100 \\ 37 & 52 & 44 \\ 73 & 87 & 71 \end{bmatrix}$

15) $FE = \begin{bmatrix} a & b \\ c & d \end{bmatrix}\begin{bmatrix} m & n \\ p & q \end{bmatrix} = \begin{bmatrix} am+bp & an+bq \\ cm+dp & cn+dq \end{bmatrix}$

17) H is a 3×1 matrix. G is a 3×3 matrix.

HG does not exist because the number of columns in H does not equal the number of rows in G.

19) $\begin{bmatrix} 1 & -2 & 2 \\ 1 & -3 & 4 \\ 1 & -2 & -3 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 7 \\ -12 \end{bmatrix}$

21) $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 1 & -2 & -1 & 0 \\ 0 & 1 & -2 & 4 \\ 1 & 0 & 3 & 3 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \\ w \end{bmatrix} = \begin{bmatrix} 14 \\ -5 \\ 9 \\ 15 \end{bmatrix}$ OR $\begin{bmatrix} 2 & 1 & 2 & 3 \\ 0 & 1 & -2 & -1 \\ 4 & 0 & 1 & -2 \\ 3 & 1 & 0 & 3 \end{bmatrix}\begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 14 \\ -5 \\ 9 \\ 15 \end{bmatrix}$

2.2 System of Linear Equations; Gauss-Jordan Method

1). (4, –1)

3). (2, –1, 3)

5). (0.4, 0.3)

7). (4, 3, 2, 1)

2.3 System of Linear Equations; Gauss – Special Cases

1). (4 – 3t, t)

3). Inconsistent system, no solution

5). (3 – 4/7 t, –1 + 16/7 t, t)

7). No, they are not consistent.

9). (5, 3, 1), (4, 3, 2), (3, 3, 3)

11). (5 – 3s + t, s, t)

2.4 Inverse Matrices

3). $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$

5). $\begin{bmatrix} 1 & 2 & -1 \\ -1 & -3 & 2 \\ -1 & -1 & 1 \end{bmatrix}$

7). (4, 2)

9). (3, 3, 4)

11). If a matrix M has an inverse, then the system of linear equations that has M as its coefficient matrix has a unique solution. If a system of linear equations has a unique solution, then the number of equations must be the same as the number of variables. Therefore, the matrix that represent its coefficient matrix must be a square matrix.

2.5 Application of Matrices in Cryptography

1). $\begin{bmatrix} 71 \\ 24 \end{bmatrix}\begin{bmatrix} 66 \\ 23 \end{bmatrix}\begin{bmatrix} 78 \\ 35 \end{bmatrix}\begin{bmatrix} 87 \\ 36 \end{bmatrix}\begin{bmatrix} 114 \\ 47 \end{bmatrix}$

3). RETURN HOME

5). $\begin{bmatrix} 12 \\ 51 \\ 9 \end{bmatrix}\begin{bmatrix} 11 \\ 67 \\ 2 \end{bmatrix}\begin{bmatrix} 19 \\ 95 \\ 14 \end{bmatrix}\begin{bmatrix} 14 \\ 105 \\ -11 \end{bmatrix}\begin{bmatrix} 15 \\ 87 \\ -3 \end{bmatrix}\begin{bmatrix} 27 \\ 91 \\ 18 \end{bmatrix}\begin{bmatrix} 4 \\ 67 \\ -23 \end{bmatrix}$

7). HEAD FOR THE HILLS

2.6 Applications – Leontief Models

1). (t, –2t, t)3). Chris = \$1250, Ed = \$1,000

5). $\begin{bmatrix} 315.34 \\ 383.52 \\ 440.34 \end{bmatrix}$

7). Farming = \$201,754.38, Building = \$307,017.54

9). $\begin{bmatrix} 30/100 & 10/120 & 20/110 \\ 20/100 & 30/120 & 20/110 \\ 10/100 & 10/120 & 30/110 \end{bmatrix}$

2.7 Chapter Review

1). a. $\begin{bmatrix} 1000 & 400 & 15 \\ 800 & 500 & 20 \end{bmatrix}$ b. $[30 \quad 50]$

2). a. $\begin{bmatrix} 2 & 1 & 1 \\ 2 & 1 & -1 \end{bmatrix}$ b. $\begin{bmatrix} -3 & -9 & 11 \\ 7 & -14 & 9 \end{bmatrix}$

3). a. $\begin{bmatrix} -2 & 8 & 0 \\ -2 & 4 & 6 \\ -4 & 6 & 6 \end{bmatrix}$ b. $\begin{bmatrix} -5 & 10 & 2 \\ -7 & 4 & 7 \\ -8 & 9 & 7 \end{bmatrix}$

4). a. $\begin{bmatrix} 2 & -2 & 4 \\ 14 & 16 & -22 \\ 8 & 10 & -14 \end{bmatrix}$ b. $\begin{bmatrix} 9 & -3 \\ 6 & -3 \end{bmatrix}$

5). a. $\begin{bmatrix} 2a–2c+6e & 2b–2d+6f \\ 6a+4c+2e & 6b+4d+2f \end{bmatrix}$ b. $\begin{bmatrix} a+3b & –a+2b & 3a+b \\ c+3d & –c+2d & 3c+d \\ e+3f & –e+2f & 3e+f \end{bmatrix}$

6). a. (2, 1, –1) b. (3, 2, 1)

7). Apple = \$.50; banana = \$.30; orange = \$.40

8). a. $x = 6 – t, y = 0, z = t$; (5, 0, 1) b. no solution

9). $n = 3t - 12$, $d = -4t + 24$, $q = t$; $n = 3$, $d = 4$, $q = 5$

10). a. $x = 4-2t$, $y = t$, $z = 3$; (4, 0, 3) b. $x = 5-4t$, $y = 2-t$, $z = t$; (1, 1, 1)

11). a. $x = .5t$, $y = t$, $z = 2t$; (1, 2, 2) b. no solution

12. a. $\begin{bmatrix} 5 & -3 \\ -3 & 2 \end{bmatrix}$ b. $\begin{bmatrix} 1 & -2 & 1 \\ -1 & 1 & 0 \\ 1 & 1 & -1 \end{bmatrix}$

13). a. (–1, 4, 2) b. (6, 4, 2, –1)

14). a. $\begin{bmatrix} 22 \\ 33 \\ 1 \end{bmatrix}\begin{bmatrix} 59 \\ 68 \\ 27 \end{bmatrix}\begin{bmatrix} 74 \\ 75 \\ 27 \end{bmatrix}\begin{bmatrix} 22 \\ 49 \\ 4 \end{bmatrix}\begin{bmatrix} 60 \\ 74 \\ 21 \end{bmatrix}$ b. $\begin{bmatrix} 17 \\ 37 \\ 5 \end{bmatrix}\begin{bmatrix} 57 \\ 78 \\ 15 \end{bmatrix}\begin{bmatrix} 74 \\ 91 \\ 27 \end{bmatrix}\begin{bmatrix} 39 \\ 42 \\ 9 \end{bmatrix}\begin{bmatrix} 65 \\ 92 \\ 27 \end{bmatrix}$

15). a. NO PAIN NO GAIN b. GO FOR THE GOLD

16). $x = 40/33\ t$, $y = 36/33\ t$, $z = t$; Chris = 40 hrs, Bob = 36 hrs, Matt = 33 hrs

17). Chris = 34.1 hrs, Bob = 32.2 hrs, Matt = 35.2 hrs

Applied Finite Mathematics, 3rd ed, 2016 Sekhon/Bloom

Chapter 3: Linear Programming: Geometric approach
Answers to Odd Numbered Homework Problems and Answers to all Problems in the Chapter Review Section

Answers To Odd-numbered Problems

3.1 Maximization Applications

1). 80 acres of wheat and 20 acres of corn should be planted to maximize profit to $8,400.

3). 10 chairs and 15 tables should be manufactured to maximize profit to $650.

5) Maximum value of Z is 40 when $x = 0$ and $y = 4$

3.2 Minimization Applications

1). 30 units of Food A and 45 units of Food B should be purchased to keep costs at a minimum of $105.

3). Cost: $C = 12{,}000\,x + 10{,}000\,y$

I.	$200\,x + 100\,y \geq 800$	high-grade oil
II.	$300\,x + 100\,y \geq 900$	medium-grade oil
III.	$200\,x + 200\,y \geq 1000$	low-grade oil

Refinery A should be operated for 3 days, while Refinery B should be operated for 2 days to keep a minimum cost of $56,000.

3.3 Chapter Review

1). (16000, 4000); $2240
2). (2, 3); $34,500
3). (8, 20); $480
4). (12000, 8000)
5). (72, 180; $5760
6). (165, 35); $21,750
7). (20, 60); $34
8). (20, 20); $2.40
9). (6, 18); $1650
10). (35, 100; $2600
11). (40, 20); $100,000
12). (10, 5): 17.5 minutes
13). (1000, 800); $7400

Applied Finite Mathematics, 3rd edition

Chapter 4: Linear Programming by the Simplex Method Answers to Odd Numbered Homework Problems and Answers to all problems in the Chapter Review Section

4.1 No homework problems

4.2 Maximization by the Simplex Method

1). $x_1 = 0, x_2 = 9, x_3 = 3, z = 27$ 3). Wheat 80 acres, corn 20 acres; Profit $8400

5). 600 boxes; 400 of Box I, 200 of Box II, and none of Box III

4.3 Minimization by the Simplex Method

1) Dual program is Maximize $z = 7y_1 + 9y_2$
Subject to $2y_1+4y_2 \le 6$, $3y_1+5y_2 \le 8$, $y_1 \ge 0$, $y_2 \ge 0$
Answer to minimization problem is $x_1 = 0$, $x_2 = 7/3$, $z = 56/3$

3) Dual program is Maximize $z = 10y_1 + 24y_2$
Subject to $1y_1+3y_2 \le 4$, $1y_1+2y_2 \le 3$, $y_1 \ge 0$, $y_2 \ge 0$
Answer to minimization problem is $x_1 = 4$, $x_2 = 6$, $z = 34$

4.4 Review Problems

1). $x_1 = 4, x_2 = 8, y_1 = 0, y_2 = 0, z = 44$

2). $x_1 = 6, x_2 = 12, y_1 = 0, y_2 = 0, z = 126$

3). $x_1 = 6, x_2 = 4, x_3 = 0, y_1 = 0, y_2 = 0, z = 24$

4). $x_1 = 450, x_2 = 0, x_3 = 1800, y_1 = 750, y_2 = 0, y_3 = 0, z = 14{,}850$

5). $x_1 = 0, x_2 = 200, x_3 = 1600, y_1 = 0, y_2 = 0, y_3 = 1200, z = 9600$

6). $x_1 = 2, x_2 = 4, z = 64$

7). $x_1 = 10, x_2 = 10, x_3 = 0, z = 100$

8). $x_1 = 15/4, x_2 = 35/4, x_3 = 0, z = 570$

9) $x_1 = 0, x_2 = 80, x_3 = 100, y_1 = 0, y_2 = 20, y_3 = 0, z = 23000$

10). $x_1 = 0, x_2 = 30, x_3 = 60, y_1 = 0, y_2 = 0, z = 3300$

11). $x_1 = 60, x_2 = 20, z = 340{,}000$

12). $x_1 = 12, x_2 = 0, x_3 = 10, z = 42$

Applied Finite Mathematics 3rd ed. 2016 by Sekhon/Bloom

Chapter 5 Exponential and Logarithmic Functions

Sections 5.1, 5.2, 5.3, 5.5 Answers to Odd Numbered Homework Questions
Section 5.4 Answers to Homework Questions #6-11
Section 5.6 Chapter Review Questions Answers to all Questions

5.1 Exponential Growth and Decay Models

1) exponential 3) linear 5) linear 7) power

9) decay 11) growth

13) $y = 127(.7047)^t$ $r = -.2953$ 29.53% annual decay rate

15) $y = 17250(1.2712)^t$ $r = .2712$ 27.12% annual growth rate

17) $y = 350000 + 70000t$ At $t=5$ $y = \$385000$

19) $y = 50000(.94)^t$ At $t=10$ $y = \$26930.76$

21) $y = 200 + 10t$ At $t=7$ $y = 270$

23) $y = 300(.93)^t$ At $t=6$ $y = 194$

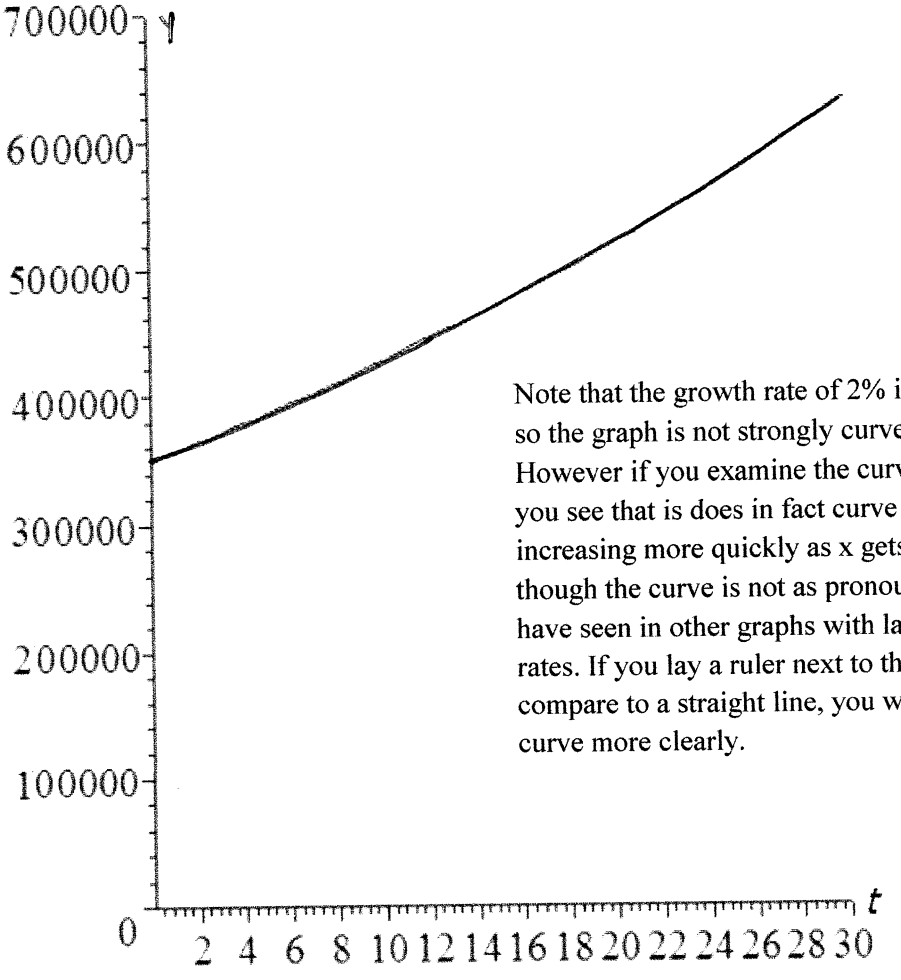
25) $y = 400e^{.26t}$ At $t=7$ $y = 2469$

27) $y = 4000e^{-.12t}$ At $t=10$ $y = 1205$

5.2 Graphs and Properties of Exponential Growth and Decay Models

5.2#1: $y=ab^t=350000(1.02)^t$ where t is number of years since 2010

y intercept is the point (0, 350000)

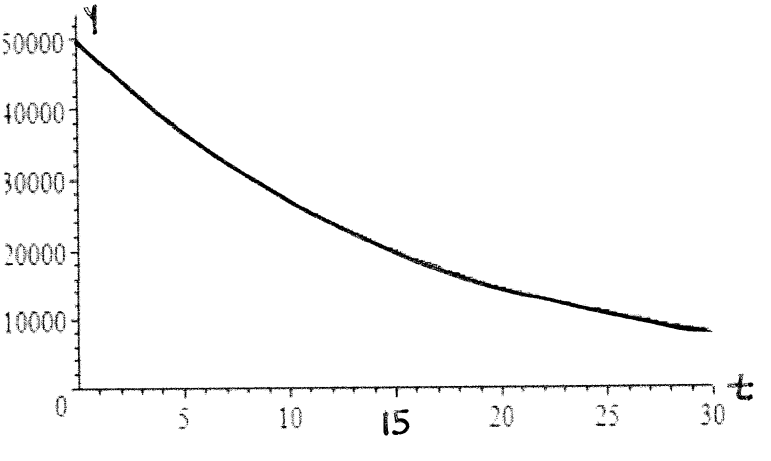


Note that the growth rate of 2% is very small so the graph is not strongly curved. However if you examine the curve carefully you see that is does in fact curve upward, increasing more quickly as x gets larger, even though the curve is not as pronounced as we have seen in other graphs with larger growth rates. If you lay a ruler next to the curve to compare to a straight line, you will see the curve more clearly.

5.2#3:

$y=ab^t= 50000(0.94)^t$

y intercept is the point (0, 50000)

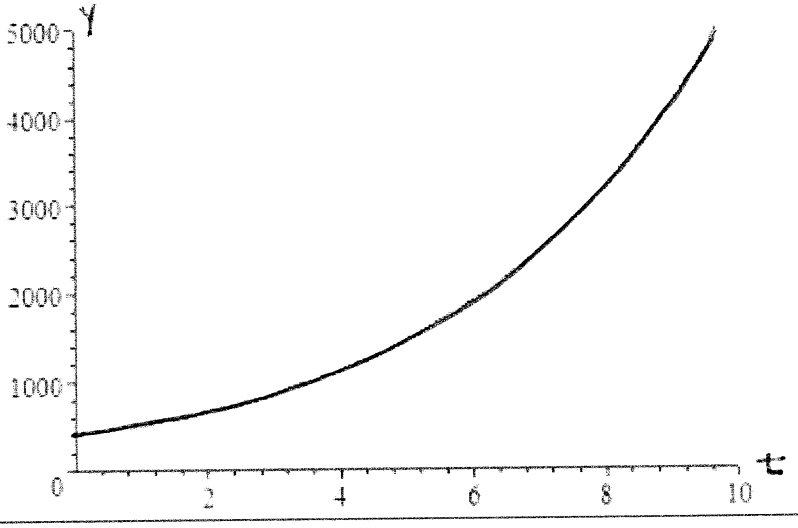


5.2 Graphs and Properties of Exponential Growth and Decay Models

5.2 #5:

$y = ae^{kt} = 400e^{0.26t}$

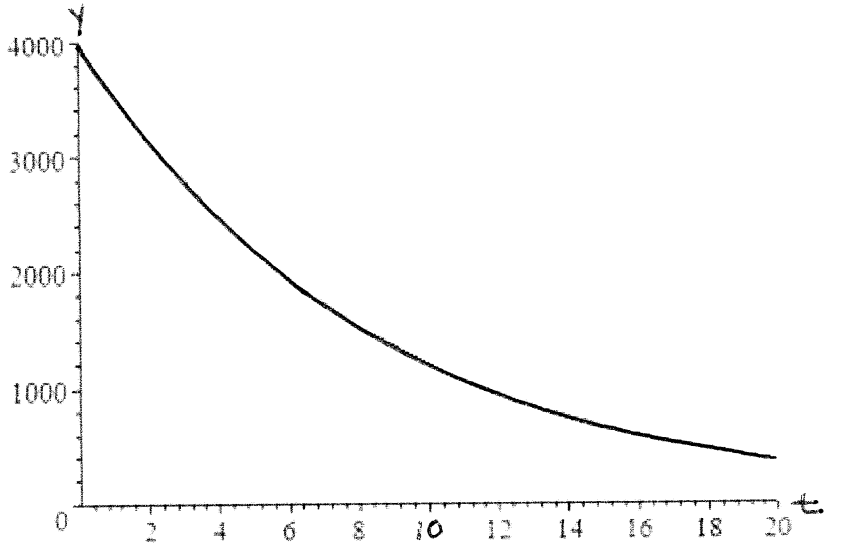
y intercept is (0, 400)



5.2#7

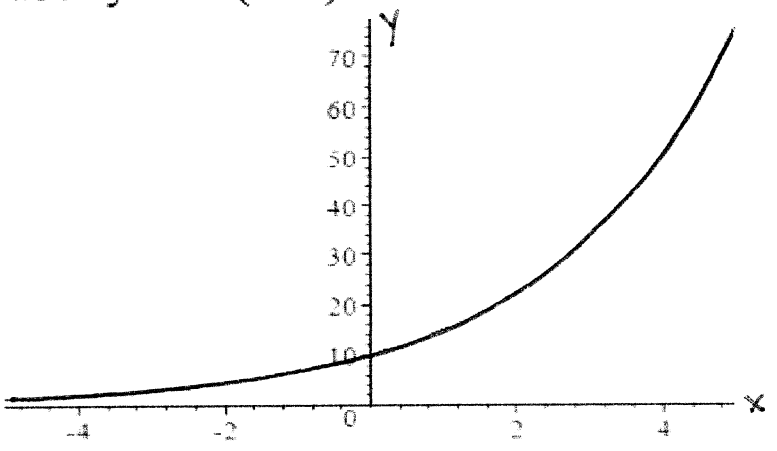
$y = ae^{kt} = 400e^{-0.12t}$

y intercept is (0, 4000)



5.2 Graphs and Properties of Exponential Growth and Decay Models

5.2 #9: $y = 10\,(1.5^{x})$



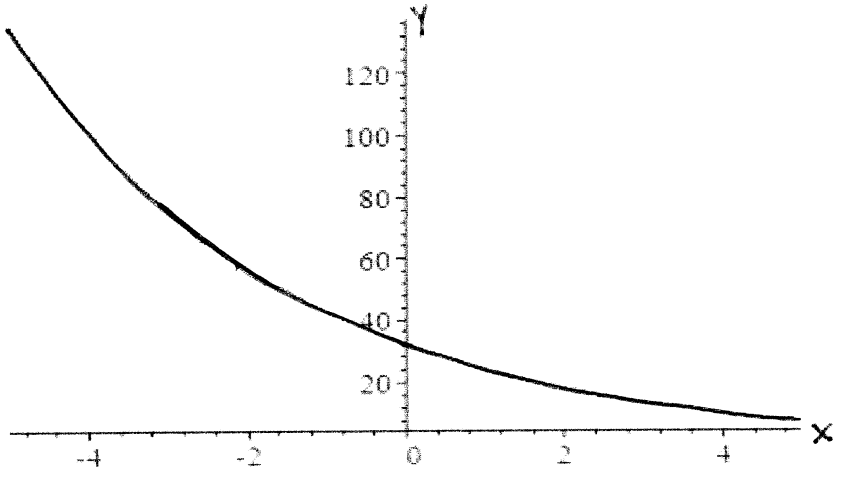
b. y intercept is (0, 10)

c. Horizontal asymptote is the x axis
which is the line y = 0.
The function approaches the asymptote as $x \to -\infty$

d. Domain – all real numbers

Range – all positive real numbers

5.2 #11: $y = 32(0.75^{x})$



b. y intercept is (0, 32)

c. Horizontal asymptote is the x axis
which is the line y = 0.
The function approaches the asymptote as $x \to \infty$

d. Domain – all real numbers

Range – all positive real numbers

5.3 Logarithms and Logarithmic Functions

1) $\log_3 81 = 4$ 3) $\log_5 .04 = -2$

7) $\log_{16} 2 = \frac{1}{4}$ 9) $5^4 = 625$ 9) $11^3 = 1331$

11) $64^{1/3} = 4$ 13) $\log_5 15625 = x$ 15) $5^x = 125$

17) $10^4 = y$ 19) $x = e^{-1}$ or $x = \frac{1}{e}$ (equivalent answers)

21) $x = 5^3$ so $x = 125$ 23) $x = 10^{-3}$ so $x = \frac{1}{1000} = .001$

25) $x = 25^{1/2}$ so $x = \sqrt{25} = 5$

27) 1/3 29) 10 31) 1.30103 33) 1.06471

35) 2.58496 37) 25.676548

5.4 Graphs and Properties of Logarithmic Functions

Answers to matching graphs questions #6-11

6) $y = 3e^{-.6x}$ 7) $y = \log_2 x$ 8) $y = 3(2^x)$

9) $y = \log_{1/2} x$ 10) $y = 5e^{.8x}$ 11) $y = 5(.4^x)$

5.5 Applications of Exponential and Logarithmic Functions

(1) a) $y = 20000(1.05^t)$ b) At $t = 12$, $y = \$35917.13$

c) $y = 30000$ at $t =$ **8.31 years**

(3) $a =$ **$55974.13**

(5) $y = 5000$ at $t =$ **13.8 months**

(7) $y = 100000$ at $t =$ **9.35 years**

(9) $r = .0227$ 2.27% annual growth rate

(11) $r = -.0543$ 5.43% annual decay rate

(13) a) $y = 7900(1.603)^t$

b) $y = 4567e^{-.4005t}$

c) $y = 18720e^{.38526t}$

d) $y = 1200(.925)^t$

5.6 Chapter Review

① a) $a = \$45503$ b) $t = 9.6$ years c) $\$35202$

② a) $y = 40000(.973)^t$ b) $\$30422$ c) $t = 25.32$ years

③ a) $y = 25000(1.064)^t$ b) $\$86451.51$

④ a) $a = 146512$ b) $t = 16.96$ years c) 188500

⑤ a) 2998 b) $t = 7.2$ years

⑥ a) $r = -.2323$ Hourly decay rate is 23.23%

b) $t = 3.31$ hours c) 36.2 mg

⑦ $r = .165$ Annual growth rate is 16.5%

⑧ @ $y = 375000e^{.1178t}$

ⓑ $y = 5400(1.13542)^t$

ⓒ $y = 230(.53794)^t$

ⓓ $y = 3600e^{-.8675t}$

Applied Finite Mathematics 3rd ed. 2016 by Sekhon/Bloom
Chapter 6 Financial Calculations
Answers to Odd Numbered Homework Problems and all Chapter Review Problems

6.1 Simple Interest and Discount

1). $600 3). $3048 5). $1800

7). $872 9). 11%

11). Discount $240, Proceeds $1,760

13). $7,440 15). $2,790.70

6.2 Compound Interest

1). $11,542.52 3). $5,647.77

5). Bank B pays more. Bank A $r_{EFF} = 0.0513$ Bank B $r_{EFF} = 0.0523$

7). $12,702.00 9). 8.66 years 11). $151,257.12

13). 7.3967% 15) 17.38 million people

6.3 Annuities and Sinking Funds

1). $13,954.01 3). $15,904.47

5). $20,578.36 7). $6,438.02

9). A lump sum of $25,000 is better. A = $38002.64
For $400 paid monthly A = $35872.42

11). $112,552.26

6.4 Present Value of an Annuity and Installment Payment

1). $1,177,953.55 3). $12,043.34

5). $2,149.21 7). $1,976.80 11). $3,645.04

9). Leasing is better P = $37,908 if payments are assumed made at the end of each year as is the general assumption in this book.

However: if #9 is considered with payments made at the beginning of each year, then the present value is $41699 = 37,908(1+0.10), which is greater than $40,000.

In this case, buying would be better assuming payments at the beginning of each year, which more realistically represents the stiuation in practice in the real world.

6.5 Miscellaneous Application Problems

1) $m = \$1123.06$ 3) $P = \$ 171907.63$

5) $P = \$5579.64$ 7) $P = \$11680.01$

9) $m = \$333.85/\text{month}$ 10) $m = \$2177.77/\text{month}$

11) $A = \$305421.70$ 12) $m = \$2479.37$

13) $P = P_1 + P_2 = 447.70 + 471.48 = \$919.18$

15) $P = P_1 + P_2 = 435.48 + 806.45 = \$1241.94$

17) a) $A = \$30535.40$ b) $m = \$720.63/\text{month}$

6.6 Classification of Finance Problems

1). D 3). F 5). E

7). D 9a). B 9b). F 11). F

13). A 15). B 17). A

19). B

6.7 Chapter Review

1) $870 = A 2) 81,596 3) $1180.50 = m
4) $1755.93 = m 5) P = $12156.72
6) $160383.25 7) m = $289.28
8) P = 16290.63 loan so value = $19290.63
9) P = $2085.33 10) P = $688,675.54
11) $497897.83
12) $928.94 if r = .07 or $1077.95 if r = .05
13) A = $3447.31
14) a) m = $1643.90 b) $128451.61
15) $9898.48
16) PV = P = $1213539.16 FV = A = $5745936.31
17) $6669.70 = m 18) $767123287.67
19) m = $2375.25 20) 109,619
21) $5805.92 = A 22) P = $2138.67
23) $1523.33 24) $276.68 = m
25) If leasing P = $7835.35, and the down payment of $750 brings the present value to $8585.33 Purchasing for $8000 is cheaper.
26) Cost in 5 years is $20615.73
Sinking fund deposit m = $833.79 / quarter
27) Western Bank r_{EFF} = .0597 or 5.97%
City Bank is better
28) m = $404.57
29) $300 per month for 5 years: P = $14900.82
$500 per month for 3 years: P = $16026.59 is better
30) 10.19 years = t
31) $177692.68 = A
32) $20000 + $500/month for 10 years: P = $61210.74
$12000 + $1000/month for 5 years: P = $61318.43 better
33) P = $16384.77
34) Monthly payment $2204.21
Total paid $793515.60 = (2204.21)(360)
Interest $368515.6 = 793515.60 - 425000
35) 15.58 years

Applied Finite Mathematics 3rd ed. 2016 by Sekhon/Bloom
Chapter 6 Financial Calculations
Answers to Odd Numbered Homework Problems and all Chapter Review Problems

6.1 Simple Interest and Discount

1). $600 3). $3048 5). $1800

7). $872 9). 11%

11). Discount $240, Proceeds $1,760

13). $7,440 15). $2,790.70

6.2 Compound Interest

1). $11,542.52 3). $5,647.77

5). Bank B pays more. Bank A $r_{EFF} = 0.0513$ Bank B $r_{EFF} = 0.0523$

7). $12,702.00 9). 8.66 years 11). $151,257.12

13). 7.3967% 15) 17.38 million people

6.3 Annuities and Sinking Funds

1). $13,954.01 3). $15,904.47

5). $20,578.36 7). $6,438.02

9). A lump sum of $25,000 is better. A = $38002.64
For $400 paid monthly A = $35872.42

11). $112,552.26

6.4 Present Value of an Annuity and Installment Payment

1). $1,177,953.55 3). $12,043.34

5). $2,149.21 7). $1,976.80 11). $3,645.04

9). Leasing is better P = $37,908 if payments are assumed made at the end of each year as is the general assumption in this book.

However: if #9 is considered with payments made at the beginning of each year, then the present value is $41699 = 37,908(1+0.10), which is greater than $40,000.

In this case, buying would be better assuming payments at the beginning of each year, which more realistically represents the stiuation in practice in the real world.

6.5 Miscellaneous Application Problems

1) $m = \$1123.06$ 3) $P = \$ 171907.63$

5) $P = \$5579.64$ 7) $P = \$11680.01$

9) $m = \$333.85/\text{month}$ 10) $m = \$2177.77/\text{month}$

11) $A = \$305421.70$ 12) $m = \$2479.37$

13) $P = P_1 + P_2 = 447.70 + 471.48 = \$919.18$

15) $P = P_1 + P_2 = 435.48 + 806.45 = \$1241.94$

17) a) $A = \$30535.40$ b) $m = \$720.63/\text{month}$

6.6 Classification of Finance Problems

1). D 3). F 5). E

7). D 9a). B 9b). F 11). F

13). A 15). B 17). A

19). B

6.7 Chapter Review

1) $870 = A 2) 81,596 3) $1180.50 = m
4) $1755.93 = m 5) P = $12156.72
6) $160383.25 7) m = $289.28
8) P = 16290.63 loan so value = $19290.63
9) P = $2085.33 10) P = $688,675.54
11) $497897.83
12) $928.94 if r = .07 or $1077.95 if r = .05
13) A = $3447.31
14) a) m = $1643.90 b) $128451.61
15) $9898.48
16) PV = P = $1213539.16 FV = A = $5745936.31
17) $6669.70 = m 18) $767123287.67
19) m = $2375.25 20) 109,619
21) $5805.92 = A 22) P = $2138.67
23) $1523.33 24) $276.68 = m
25) If leasing P = $7835.35, and the down payment of $750 brings the present value to $8585.33 Purchasing for $8000 is cheaper.
26) Cost in 5 years is $20615.73
Sinking fund deposit m = $833.79 / quarter
27) Western Bank r_{EFF} = .0597 or 5.97%
City Bank is better
28) m = $404.57
29) $300 per month for 5 years: P = $14900.82
$500 per month for 3 years: P = $16026.59 is better
30) 10.19 years = t
31) $177692.68 = A
32) $20000 + $500/month for 10 years: P = $61210.74
$12000 + $1000/month for 5 years: P = $61318.43 better
33) P = $16384.77
34) Monthly payment $2204.21
Total paid $793515.60 = (2204.21)(360)
Interest $368515.6 = 793515.60 - 425000
35) 15.58 years

APPLIED FINITE MATHEMATICS 3rd Edition, 2016, Sekhon/Bloom
Chapter 7: Sets and Counting
Answers to Odd Numbered Homework Problems and Answers to all Problems in the Chapter Review Section

7.1 Sets

1). {Al, Bob}, {Al}, {Bob}, ∅

3). {Bob, Chris, Dave}

5). {a, e, i, f, h, c, g}

7). {b, d, j}

9). {1, 2, 3, 4, 5, 6}

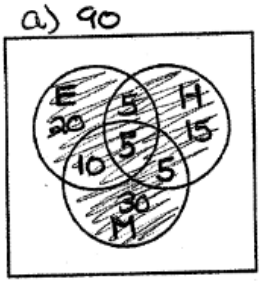
11). ∅

13). 9 students

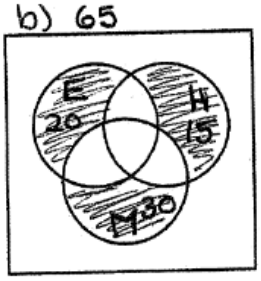
15). 65

17). a. 30 b. 60 c. 10

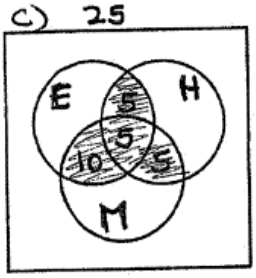
(19) a) 90



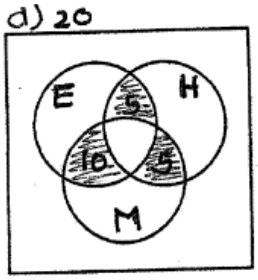
b) 65



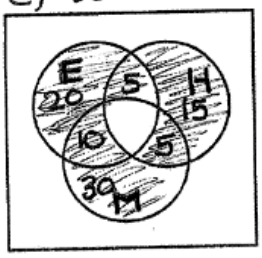
c) 25



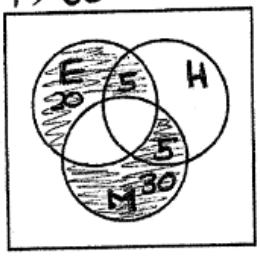
d) 20



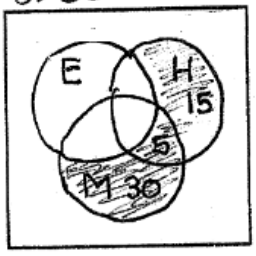
e) 85



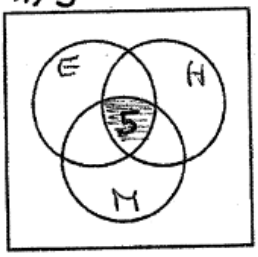
f) 60



g) 50



h) 5



7.2 Tree Diagrams and the Multiplication Axiom

1). 6 3). 8 5). 12

7). 15,600,000 9). 6,400,000 11). BB, BG, GB, GG

13). 16 15). 27,000 **17) 10,000**

7.3 Permutations

1). 60 3). 210 5). 362,880 7). 25,200

9). 900 11). 48 13). 72 15). 2,400

17) 15,120 19) 5,040 21) 720

7.4 Circular Permutations and Permutations with Similar Elements

1). 24 3). 120 5). 120 7). 64,864,800

9). 210 11). 6 13). 10 15). 210

17) 15,120 19) 5,040 21) 720

7.5 Combinations

1). 120 3). 10 5). 2,598,960

7). 66 9). 10 11). 20

13). 6 15). 924 **17) 35 19) 84**

7.6 Combinations Involving Several Sets

1). 24 3). 25 5). 14,400

7). 4 9). 60 11). 80

13). 51 15). 7 17). 1,410

19). 171,600 21). 22,308 23). 24

25) $({}_{44}C_4)({}_{54}C_5)({}_2C_1) \approx 8.586 \times 10^{11}$

27) $({}_{80}C_6)({}_{20}C_6) \approx 1.1647 \times 10^{13}$

29) $({}_6C_2)({}_7C_2)({}_4C_2) = 1890$

31) $({}_6C_3)({}_7C_2)({}_4C_1) = 1680$

7.7 Binomial Theorem

1). $a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$

3). $x^5 - 10x^4y + 40x^3y^2 - 80x^2y^3 + 80xy^4 - 32y^5$

5). $2160x^4y^2$ 7). 280 9). 10 11). 64

7.8 Chapter Review

1). 1,000

2). 20; 135; 15

3). 12

4). 144

5). 3,024

6). 11,639,628,000

7). 84

8). 60

9). 24

10). 126; 336; 210

11). 5,184

12). 1,048,576

13). 46,200

14). 60

15). 120

16). 20

17). 10

18). 1296

19). 27,720

20). 720

21). 194,594,400

22). a. 5148 b. 58,656 c. 123,552 d. 10,240 or 9216

23). 17,576

24). 4500

25). 5040; 720

26). 3003; 371; 210; 191; 435

27). 10

28). 35

29). 72

30). 72,000

31). $-48384\ x^5y^3$

32). $2016\ a^5b^4$

APPLIED FINITE MATHEMATICS 3rd Edition, 2016, Sekhon/Bloom
Chapter 8: Probability
Answers to Odd Numbered Homework Problems and Answers to all Problems in the Chapter Review Section

8.1 Sample Spaces and Probability

1). {1, 2, 3, 4, 5, 6}

3). {1H,2H,3H,4H 5H,6H,1T,2T,3T,4T,5T,6T}

5).

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

7). 4/52

9). 13/52

11). 16/52

13). 6/20

15). 13/20

17). 3/8

19). 6/8

21) 2/8

23) 4/36

25) 7/36

27) 6/36

29) 8/12

31) 6/12

33) 1/16

8.2 Mutually Exclusive Events and Addition Rule

1). Yes

3). No

5). No

7). 16/52

9). 13/36

11). 40%

13) 30/100

15) 94/100

17) 68/100

19) not mutually exclusive

21) 0

23) .5

25) .40

8.3 Probability Using Trees and Counting

1). 20/56 3). 6/56 5). 1/6

7). 3/10 9). 10/220 11). 56/220

13). 45/1365 15). 21/1365 17). 324/1365

19). 79092/2,598,960 = 0.03043 21). 24/2,598,960 =0.000009234

23). 1,584/2,598,960 = 0.006 25) 1890/12376 = 0.1527

27) 1680/12376=0.1357 29) 180/792 = 0.227

31) 21/792=0.0265 33) 0.972864

8.4 Conditional Probability

1). 4/12 3). 1/3 5). 30/44

7). 6/54 9). a. 1/6 b. 1/4 11) 0.12

13). 0.4 15). 0.696 17) 1/2

19) 3/4 21) 84/528 23) 84/2096

25) 188/796

8.5 Independent Events

1). 2/3 3). 50/150

5). a. 3/4 b. 2/4 c. 2/4 d. no

7). 0.12 9). 0.36 11). yes

13). a. 28/100 b. 82/100 15). a. 7/8 b. 6/8 c. 6/8 d. no

17) a) yes b) 0.175 19) a) no b) 0.081

8.6 Chapter Review

1). 3/36; 4/36

2). 8/12; 7/12

3). 8/52; 16/52

4). 3/5; 9/10

5). 3/20; 1/20; 5/6; 1/6

6). 1/16; 1/4

7). 3/4; 0

8). 0.72

9). 40%

10). independent

11). 3/4; 0.45

12). 0.8144

13). 0.22

14). 0.45278

15). a. 111540/2598960; b. 949104/2598960; c. 1349088/2598960 d. 36/2598960

16). 9/20; 10/27; 15/33; 11/20; no; yes

17). 0.40

18). 3/14; 37/42; 2/7; 35/84

19). no

20). 0

21). 0.65

22). 0.36

23). 5/6

24). 0.2

25). 0.5

26). 0.3

APPLIED FINITE MATHEMATICS 3rd Edition, 2016, Sekhon/Bloom
Chapter 9: Probability
Answers to Odd Numbered Homework Problems and Answers to all Problems in the Chapter Review Section

9.1 Binomial Probability

1). 0.2051 3). 0.0322 5). 0.9421

7). 0.2305 9). 0.5 11). 0.6778

13a) 0.0875 13b) 0.000097

15a) 0.2785 15b) 0.613

9.2 Bayes' Formula

1). a. 0.6458 b. 0.4706 c. 0.625

3). the Republican party

5). 0.7787

7). a. 0.045 b. 0.2667 c. 0.03

9a) 0.02 9b) 0.111

9.3 Expected Value

1). No; you can expect to lose $3,000. 3). 50 cents

5). 1.7 7). - 83 cents 9). 39,000

11). - 96 cents **13a) 1.35 13b) 405**

9.4 Probability Using Tree Diagrams

1). 3/5 3). 0.94 5). 0.448

7). 0.6127 9). 125/1296 11). 0.776

9.5 Chapter Review

1). 0.3125; 0.1875
2). 0.088
3). 0.21094
4). 0.33696
5). 0.74432
6). 0.512
7). 0.52559
8). 4
9). 7/18; 2/3; 6/11
10). 0.37975
11). 14/17
12). 4.4%; 35/44; 0.05
13). 0.62; 54/62
14). 0.036; 28/36
15). 69%
16). $7
17). –$5.26
18). 25
19). 10%
20). $60,000
21). 29.167
22). $5
23). 3/8
24). 0.45
25). 0.957125
26). 0.027
27). 5/9
28). 5/8

APPLIED FINITE MATHEMATICS 3rd Edition, 2016, Sekhon/Bloom
Chapter 10: Markov Chains
Answers to Odd Numbered Homework Problems and Answers to all Problems in the Chapter Review Section

10.1 Markov Chains

1). a. No b. No

3). a. $\begin{bmatrix} 0 & 1 \\ 1/2 & 1/2 \end{bmatrix}$ b. 1/2 c. 1/2 d. 3/4

5). a. 0.3 b. 0.38 c. 0.15 d. 0.175

10.2 Applications of Markov Chains

1) a) .93 b) .1 c) .1 d) .20

3) a) .2 b) .3 c) 0 d) .5

5) a)

$$T = \begin{array}{c} \\ A \\ B \\ C \\ D \end{array} \begin{array}{c} \begin{array}{cccc} A & B & C & D \end{array} \\ \begin{bmatrix} 0 & .3 & .5 & .2 \\ .5 & 0 & 0 & .5 \\ 0 & .1 & .7 & .2 \\ .2 & .4 & .1 & .3 \end{bmatrix} \end{array}$$

b) .20 c) .25

d) .27 e) .7

f) 0

10.3 Regular Markov Chains

1) a) No b) No

3) a) .876 b) [.875 .125]

5) a) .548

b) [.14 .38 .48] after n=2 transitions

[.125 .312 .563] after n=5 transitions

c) [.125 .30 .575] long run distribution

d) same as (c)

7) a) See 10.2 #5 part (a) for T b) $m = (4-1)^2 + 1 = 16$

c) Yes

d) 15.67% visit site A, 19.8% site B, 35.71% site C, 28.82% site D

e) Highest to Lowest: C, D, B, A

10.4 Absorbing Markov Chains

1). a. 1 and 3 b).

	1	3
2	1/2	1/2
4	2/3	1/3

c). 2/3 d). 1/2

3). a).

	0	1	2	3	4
0	1	0	0	0	0
1	.6	0	.4	0	0
2	0	.6	0	.4	0
3	0	0	.6	0	.4
4	0	0	0	0	1

b). Andre's solution matrix

	0	4
1	57/65	8/65
2	9/13	4/13
3	27/65	38/65

c). 27/65 d). 27/65

5). a).

	G	B	I
G	1	0	0
B	0	1	0
I	.60	.20	.20

b. I and II c. [0.75 0.25] d. 0.75

7) a) .445 b) .245 c) .26

9) .6691 11) 30.22% drop out, 69.78% graduate

12) 10/19

10.5 Chapter Review – Markov Chains

1). No; no

2). 0.2: 0.3: 0.475

3). a. $\begin{bmatrix} 0 & 1 \\ 2/3 & 1/3 \end{bmatrix}$ b. 1 c. 2/3

4) a) No b) Yes

5) a) .3 b) .31 c) .28

6) a) .32 b) [2/3 1/3]

7) a) [.36 .34 .30]

b) [3/7 9/28 1/4]

8). a. S1 and S2 b). $\begin{array}{c} \\ S3 \\ S4 \end{array}\begin{array}{c} \begin{array}{cc} S1 & S2 \end{array} \\ \begin{bmatrix} 16/35 & 19/35 \\ 26/35 & 9/35 \end{bmatrix} \end{array}$ c). 26/35 d). 19/35

9). 2/7

10). 3/7

Applied Finite Mathematics 3rd ed. 2016 Sekhon/Bloom
Chapter 11 Game Theory
Answers to Odd Numbered Homeowrkk Questions and all Chapter Review Problems

11.1 Strictly Determined Games

1). a. The game is strictly determined. Optimal strategy for the row player is to always play row 1 and never row 2. In other words, his strategy is $\begin{bmatrix} 1 & 0 \end{bmatrix}$. The optimal strategy for the column player is to always to play column 1 and never to play column 2. We write it as $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$. When both players play their optimal strategy, the value of the game is 1.

c. The game has no saddle point, therefore, it is not strictly determined.

e. The game is strictly determined. The optimal strategy for the row player is to always play row 4, and never play any other row. We write his strategy as $\begin{bmatrix} 0 & 0 & 0 & 1 \end{bmatrix}$. The column player's strategy is $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$. The value of the game is 2.

3). a. $\begin{bmatrix} .05 & .10 \\ -.08 & -.12 \end{bmatrix}$

b. The optimal strategy for the mayor is $\begin{bmatrix} 1 & 0 \end{bmatrix}$ and for his opponenent is $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$.

In other words, both candidates should oppose abortion rights.

11.2 Non-Strictly Determined Games

1). a. The optimal strategy for the row player is $\begin{bmatrix} 1/2 & 1/2 \end{bmatrix}$. The optimal strategy for the column player is $\begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix}$. The value of the game is 0.

c. Optimal strategy for the row player is $\begin{bmatrix} 2/7 & 5/7 \end{bmatrix}$. The optimal strategy for the column player is $\begin{bmatrix} 6/7 \\ 1/7 \end{bmatrix}$. The value of the game is 16/7.

3). a. $\begin{bmatrix} 2 & -3 \\ -3 & 4 \end{bmatrix}$

b. Optimal strategy for the row player is $\begin{bmatrix} 7/12 & 5/12 \end{bmatrix}$ The optimal strategy for the column player is $\begin{bmatrix} 7/12 \\ 5/12 \end{bmatrix}$. The value of the game is –1/12.

11.3 Reduction by Dominance

1). $\begin{bmatrix} 2 & -1 \\ 0 & 3 \end{bmatrix}$, R = $\begin{bmatrix} 1/2 & 1/2 & 0 \end{bmatrix}$, C = $\begin{bmatrix} 2/3 \\ 1/3 \end{bmatrix}$, The value = 1

3). $\begin{bmatrix} 1 & -2 \\ -2 & 4 \end{bmatrix}$, R = $\begin{bmatrix} 2/3 & 1/3 & 0 \end{bmatrix}$, C = $\begin{bmatrix} 2/3 \\ 0 \\ 1/3 \end{bmatrix}$, The value = 0

5). $\begin{bmatrix} 0 & -4 \\ -2 & 4 \end{bmatrix}$, R = $\begin{bmatrix} .6 & 0 & .4 & 0 \end{bmatrix}$, C = $\begin{bmatrix} 0 \\ .8 \\ .2 \\ 0 \end{bmatrix}$, The value = –0.8

7). $\begin{bmatrix} 2 & -8 \\ 1 & 5 \end{bmatrix}$, R = $\begin{bmatrix} 0 & 2/7 & 5/7 & 0 \end{bmatrix}$, C = $\begin{bmatrix} 0 \\ 0 \\ 13/14 \\ 1/14 \end{bmatrix}$, The value = 9/7

11.4 Chapter Review

1). a. R = $\begin{bmatrix} 0 & 1 \end{bmatrix}$, C = $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$, value = 3 b. R = $\begin{bmatrix} 1 & 0 & 0 \end{bmatrix}$, C = $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ v = –1

c. R = $\begin{bmatrix} 0 & 1 \end{bmatrix}$, C = $\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$, value= 3 d. R = $\begin{bmatrix} 0 & 0 & 1 & 0 \end{bmatrix}$, C = $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$ v = 3

2). a. $\begin{bmatrix} -5 & 10 \\ 5 & 10 \end{bmatrix}$ b. R = $\begin{bmatrix} 0 & 1 \end{bmatrix}$, C = $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$, value = 5 cents

3). a. $\begin{bmatrix} 5 & 30 \\ -5 & 0 \end{bmatrix}$ b. R = $\begin{bmatrix} 1 & 0 \end{bmatrix}$ C = $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$, value = 5%

4). a. $\begin{bmatrix} .14 & .08 & .11 \\ .12 & .11 & .11 \\ .06 & .09 & .10 \end{bmatrix}$ b. $\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$, or $\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$, value= .11

5). a. $\begin{bmatrix} -.02 & .03 \\ .01 & -.01 \end{bmatrix}$ b. stocks = 2/7, CD's = 5/7

11.4 Chapter Review

6). a. $\begin{bmatrix} 1/2 & 1/2 \end{bmatrix}$, $\begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix}$, value = 0 b. $\begin{bmatrix} 5/9 & 4/9 \end{bmatrix}$, $\begin{bmatrix} 2/9 \\ 7/9 \end{bmatrix}$, value = 10/9

c. $\begin{bmatrix} 5/7 & 2/7 \end{bmatrix}$, $\begin{bmatrix} 6/7 \\ 1/7 \end{bmatrix}$, value = 23/7 d. $\begin{bmatrix} 1/2 & 1/2 \end{bmatrix}$, $\begin{bmatrix} 4/7 \\ 3/7 \end{bmatrix}$, value = 1

7). 19/8; 14/9 8). \$11,000 9). $\begin{bmatrix} 1/2 & 1/2 \end{bmatrix}$, $\begin{bmatrix} 2/3 \\ 1/3 \end{bmatrix}$, v = 0

10). Pass = 9/25, Run = 16/25 11). $\begin{bmatrix} 10/19 & 9/19 \end{bmatrix}$, payoff = 9.58 fish

12). $\begin{bmatrix} 1 & 0 \end{bmatrix}$, payoff = 2 points

13). a. $\begin{bmatrix} -3 & 3 \\ 2 & -1 \end{bmatrix}$, $\begin{bmatrix} 0 & 1/3 & 2/3 \end{bmatrix}$, $\begin{bmatrix} 4/9 \\ 0 \\ 5/9 \end{bmatrix}$, value = 1/3

b. $\begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$, $\begin{bmatrix} 0 & 1/4 & 3/4 & 0 \end{bmatrix}$, $\begin{bmatrix} 1/2 \\ 1/2 \\ 0 \end{bmatrix}$, value = 5/2

c. $\begin{bmatrix} 4 & 3 \\ -1 & 4 \end{bmatrix}$, $\begin{bmatrix} 5/6 & 0 & 1/6 & 0 \end{bmatrix}$, $\begin{bmatrix} 1/6 \\ 5/6 \\ 0 \\ 0 \end{bmatrix}$, value = 19/6

d. $\begin{bmatrix} 2 & 1 \\ -2 & 1 \end{bmatrix}$, $\begin{bmatrix} 3/4 & 1/4 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \end{bmatrix}$, value = 1

e. $\begin{bmatrix} 0 & 3 \\ 4 & -7 \end{bmatrix}$, $\begin{bmatrix} 11/14 & 0 & 0 & 3/14 \end{bmatrix}$, $\begin{bmatrix} 10/14 \\ 4/14 \\ 0 \\ 0 \end{bmatrix}$, value = 6/7

f. $\begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$, $\begin{bmatrix} 1/2 & 1/2 & 0 & 0 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 1/2 \\ 1/2 \\ 0 \end{bmatrix}$, value = 1