Survey of Mathematics with Applications 11th edition Runde Solutions Manual

SKU: 9780135740460-SOLUTIONS

INSTRUCTOR'S SOLUTIONS MANUAL

JAMES LAPP

A SURVEY OF MATHEMATICS WITH APPLICATIONS

ELEVENTH EDITION

Allen R. Angel

Monroe Community College

Christine D. Abbott

Monroe Community College

Dennis C. Runde

State College of Florida



Survey of Mathematics with Applications 11th edition Runde Solutions Manual



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

The author and publisher of this book have used their best efforts in preparing this book. These efforts include the development, research, and testing of the theories and programs to determine their effectiveness. The author and publisher make no warranty of any kind, expressed or implied, with regard to these programs or the documentation contained in this book. The author and publisher shall not be liable in any event for incidental or consequential damages in connection with, or arising out of, the furnishing, performance, or use of these programs.

Reproduced by Pearson from electronic files supplied by the author.

Copyright © 2021, 2017, 2013 by Pearson Education, Inc. 221 River Street, Hoboken, NJ 07030. All rights reserved.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America.



ISBN-13: 978-0-13-574072-9
ISBN-10: 0-13-574072-X

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

Table of Contents

Chapter 1: Critical Thinking Skills

1.1: Inductive and Deductive Reasoning 1
1.2: Estimation Techniques 3
1.3: Problem-Solving Procedures 5
Review Exercises 11
Chapter Test 14

Chapter 2: Sets

2.1: Set Concepts 17
2.2: Subsets 19
2.3: Venn Diagrams and Set Operations 21
2.4: Venn Diagrams with Three Sets and Verification of Equality of Sets 26
2.5: Applications of Sets 32
2.6: Infinite Sets 35
Review Exercises 37
Chapter Test 40

Chapter 3: Logic

3.1: Statements and Logical Connectives 43
3.2: Truth Tables for Negation, Conjunction, and Disjunction 45
3.3: Truth Tables for the Conditional and Biconditional 54
3.4: Equivalent Statements 65
3.5: Symbolic Arguments 73
3.6: Euler Diagrams and Syllogistic Arguments 80
3.7: Switching Circuits 83
Review Exercises 87
Chapter Test 93

Chapter 4: Systems of Numeration

4.1: Additive, Multiplicative, and Ciphered Systems of Numeration 97
4.2: Place-Value or Positional-Value Numeration Systems 99
4.3: Other Bases 101
4.4: Perform Computations in Other Bases 106
4.5: Early Computational Methods 111
Review Exercises 115
Chapter Test 119

Chapter 5: Number Theory and the Real Number System

5.1: Number Theory 121
5.2: The Integers 125
5.3: The Rational Numbers 128
5.4: The Irrational Numbers 133
5.5: Real Numbers and Their Properties 136
5.6: Rules of Exponents and Scientific Notation 138
5.7: Arithmetic and Geometric Sequences 141
5.8: Fibonacci Sequence 146
Review Exercises 148
Chapter Test 152

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

Chapter 6: Algebra, Graphs, and Functions
6.1: Order of Operations and Solving Equations....153
6.2: Formulas....157
6.3: Applications of Algebra....162
6.4: Variation....167
6.5: Solving Linear Inequalities....171
6.6: Graphing Linear Equations....176
6.7: Solving Systems of Linear Equations....184
6.8: Linear Inequalities in Two Variables and Systems of Linear Inequalities....195
6.9: Solving Quadratic Equations by Using Factoring and by Using the Quadratic Formula....204
6.10: Functions and Their Graphs....210
Review Exercises....217
Chapter Test....227

Chapter 7: The Metric System

7.1: Basic Terms and Conversions Within the Metric System....231
7.2: Length, Area, and Volume....232
7.3: Mass and Temperature....235
7.4: Dimensional Analysis and Conversions to and from the Metric System....237
Review Exercises....241
Chapter Test....243

Chapter 8: Geometry

8.1: Points, Lines, Planes, and Angles....245
8.2: Polygons....248
8.3: Perimeter and Area....252
8.4: Volume and Surface Area....256
8.5: Transformational Geometry, Symmetry, and Tessellations....260
8.6: Topology....265
8.7: Non-Euclidean Geometry and Fractal Geometry....266
Review Exercises....267
Chapter Test....270

Chapter 9: Mathematical Systems

9.1: Groups....273
9.2: Finite Mathematical Systems....274
9.3: Modular Arithmetic....277
9.4: Matrices....282
Review Exercises....288
Chapter Test....290

Chapter 10: Consumer Mathematics

10.1: Percent....293
10.2: Personal Loans and Simple Interest....295
10.3: Compound Interest....300
10.4: Installment Buying....304
10.5: Buying a House with a Mortgage....310
10.6: Ordinary Annuities, Sinking Funds, and Retirement Investments....317
Review Exercises....318
Chapter Test....322

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

Chapter 11: Probability
11.1: Empirical and Theoretical Probabilities 325
11.2: Odds 328
11.3: Expected Value (Expectation) 332
11.4: Tree Diagrams 336
11.5: *OR* and *AND* Problems 340
11.6: Conditional Probability 344
11.7: The Fundamental Counting Principle and Permutations 347
11.8: Combinations 349
11.9: Solving Probability Problems by Using Combinations 351
11.10: Binomial Probability Formula 353
Review Exercises 355
Chapter Test 359

Chapter 12: Statistics

12.1: Sampling Techniques and Misuses of Statistics 361
12.2: Frequency Distributions and Statistical Graphs 363
12.3: Measures of Central Tendency and Position 368
12.4: Measures of Dispersion 374
12.5: The Normal Curve 379
12.6: Linear Correlation and Regression 385
Review Exercises 395
Chapter Test 400

Chapter 13: Graph Theory

13.1: Graphs, Paths, and Circuits 403
13.2: Euler Paths and Euler Circuits 404
13.3: Hamilton Paths and Hamilton Circuits 408
13.4: Trees 411
Review Exercises 415
Chapter Test 417

Chapter 14: Voting and Apportionment

14.1: Voting Methods 419
14.2: Flaws of the Voting Methods 423
14.3: Apportionment Methods 428
14.4: Flaws of the Apportionment Methods 433
Review Exercises 438
Chapter Test 445

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

Chapter One: Critical Thinking Skills

Section 1.1: Inductive and Deductive Reasoning

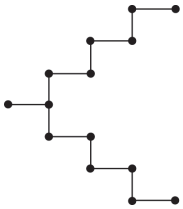
1. Natural
2. Divisible
3. Counterexample
4. Hypothesis
5. Inductive
6. Deductive
7. Deductive
8. Inductive
9. $5 \times 3 = 15$
10. $19 \times 10 = 190$
11. $1 \quad \underset{(1+4)}{5} \quad \underset{(4+6)}{10} \quad \underset{(4+6)}{10} \quad \underset{(1+4)}{5} \quad 1$
12. $100{,}000 = 10^5$
13. 
14. 
15. 
16. 
17. 9, 11, 13 (Add 2 to previous number.)
18. 16, 19, 22 (Add 3 to the previous number.)
19. 5, –5, 5 (Alternate 5 and –5.)
20. 16, –32, 64 (Multiply previous number by –2.)
21. $\frac{1}{5}, \frac{1}{6}, \frac{1}{7}$ (Increase denominator value by 1.)
22. $\frac{1}{9}, \frac{1}{11}, \frac{1}{13}$ (Increase denominator value by 2.)
23. 21, 28, 36 $(15+6=21,\ 21+7=28,\ 28+8=36)$
24. 16, 22, 29 (Add 1, then 2, then 3, ….)
25. 34, 55, 89 (Each number in the sequence is the sum of the previous two numbers.)
26. 76, 123, 199 (Each number in the sequence is the sum of the previous two numbers.)
27. There are three letters in the pattern. $39 \times 3 = 117$, so, the 117th entry is the second R in the pattern. Therefore, the 118th entry is Y.
28. a) Answers will vary.
    b) The sum of the digits is 9.
    c) The sum of the digits in the product when a one- or two-digit number is multiplied by 9 is divisible by 9.
29. a) 36, 49, 64
    b) Square the numbers 6, 7, 8, 9 and 10.
    c) $8 \times 8 = 64,\ 9 \times 9 = 81$; 72 is not a square number since it falls between the two square numbers 64 and 81.
30. a) 28 and 36
    b) To find the 7th triangular number, add 7 to the 6th triangular number.
    To find the 8th triangular number, add 8 to the 7th triangular number.
    To find the 9th triangular number, add 9 to the 8th triangular number.
    To find the 10th triangular number, add 10 to the 9th triangular number.
    To find the 11th triangular number, add 11 to the 10th triangular number.
    c) $36+9=45,\ 45+10=55,\ 55+11=66;\ 66+12=78$; 72 is not a triangular number since it falls between the consecutive triangular numbers 66 and 78.
31. Blue: 1, 5, 7, 10, 12; Purple: 2, 4, 6, 9, 11; Yellow: 3, 8
32. a) 19 (Each new row has two additional triangles.)
    b) $1+3+5+7+9+11+13+15+17+19=100$
33. a) \$3700
    b) We are using observation of specific cases to make a prediction.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

34. a) $410
    b) We are using observation of specific cases to make a prediction.

35. 

36. 

37. a) You should obtain the original number.
    b) You should obtain the original number.
    c) Conjecture: The result is always the original number.
    d) $n \to 3n \to 3n+6 \to \dfrac{3n+6}{3} = \dfrac{3n}{3} + \dfrac{6}{3} = n+2 \to n+2-2 = n$

38. a) You should obtain twice the original number.
    b) You should obtain twice the original number.
    c) Conjecture: The result is always twice the original number.
    d) $n \to 4n \to 4n+6 \to \dfrac{4n+6}{2} = \dfrac{4n}{2} + \dfrac{6}{2} = 2n+3 \to 2n+3-3 = 2n$

39. a) You should obtain the number 5.
    b) You should obtain the number 5.
    c) Conjecture: The result is always the number 5.
    d) $n \to n+1 \to n+(n+1) = 2n+1 \to 2n+1+9 = 2n+10 \to \dfrac{2n+10}{2} = \dfrac{2n}{2} + \dfrac{10}{2} = n+5 \to n+5-n = 5$

40. a) You should obtain the number 0.
    b) You should obtain the number 0.
    c) Conjecture: The result is always the number 0.
    d) $n \to n+10 \to \dfrac{n+10}{5} \to 5\left(\dfrac{n+10}{5}\right) = n+10 \to n+10-10 = n \to n-n = 0$

41. $3 \times 5 = 15$ is one counterexample.

42. $10+11+12=33$, which is not a three digit number.

43. Two is a counting number. The sum of 2 and 3 is 5. Five divided by two is $5/2$, which is not an even number.

44. 900 is a three-digit number. The product of 900 and 900 is 810,000, which is not a five-digit number.

45. One and two are counting numbers. The difference of 1 and 2 is $1-2=-1$, which is not a counting number.

46. The sum of the odd numbers 1 and 5 is 6, which is not divisible by 4.

47. a) The sum of the measures of the interior angles should be $180°$.
    b) Yes, the sum of the measures of the interior angles should be $180°$.
    c) Conjecture: The sum of the measures of the interior angles of a triangle is $180°$.

48. a) The sum of the measures of the interior angles should be $360°$.
    b) Yes, the sum of the measures of the interior angles should be $360°$.
    c) Conjecture: The sum of the measures of the interior angles of a quadrilateral is $360°$.

49. Inductive reasoning: a general conclusion is obtained from observation of specific cases.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

50. Inductive reasoning: a general conclusion is obtained from observation of specific cases.

51. 129; The numbers in the positions of each inner 4×4 square are determined as follows.

$$\begin{matrix} a & b \\ c & a+b+c \end{matrix}$$

52. 1881, 8008, 8118 (They look the same when looked at in a mirror.)

53. c

Section 1.2: Estimation Techniques

Answers in this section will vary depending on how you round your numbers. The answers may differ from the answers in the back of the textbook. However, your answers should be something near the answers given. All answers are approximate.)

1. Estimation

2. Equal

3. $26.9+67.3+219+143.3$
$\approx 30+67+220+143=460$

4. $86+47.2+289.8+532.4+12.8$
$\approx 90+50+290+530+10=970$

5. $197{,}500\div4.063\approx200{,}000\div4.000=50{,}000$

6. $\dfrac{405}{0.049}\approx\dfrac{400}{0.05}=8000$

7. $1776\times0.0098\approx1800\times0.01=18$

8. $0.63\times1523\approx0.6\times1500=900$

9. $23.97-7.05\approx24-7=17$

10. $400.15-297.87\approx400-300=100$

11. $22\%\times9116\approx20\%\times9000=0.20\times9000$
$=1800$

12. 11% of $8221\approx10\%$ of $8000=0.10\times8000$
$=800$

13. $\dfrac{\$91.35}{3}\approx\dfrac{\$90}{3}=\$30$

14. $\dfrac{\$210}{8}\approx\dfrac{\$200}{8}=\$25$

15. $12\text{ months}\times\$47\approx12\times\$50=\$600$

16. $19\text{ gallons}\times\$3.11\approx20\times\$3=\$60$

17. $\$7.99+\$4.23+\$16.82+\$3.51+\$20.12\approx\$8+\$4+\$17+\$4+\$20=\$53$

18. $\$1.29+\$6.86+\$12.43+\$25.62+\$8.99\approx\$1+\$7+\$12+\$26+\$9=\$55$

19. $95\,\text{lb}+127\,\text{lb}+210\,\text{lb}\approx100+100+200=400\,\text{lb}$

20. $16.1\text{ lb}+7.9\text{ lb}+21.4\text{ lb}+11.6\text{ lb}+3.7\text{ lb}\approx16+8+21+12+4=61\text{ lb}$

21. 15% of $\$26.32\approx15\%$ of $\$26=0.15\times\$26=\$3.90$

22. $\dfrac{\$400}{\$23}\approx\dfrac{\$400}{\$25}=16$

23. $\$595+\$289+\$120+\$110+230\approx\$600+\$300+\$100+\$100+\$200=\$1300$

24. Team A: $189+172+191\approx190+170+190=550$
Team B: $183+229+167\approx180+230+170=580$
$580-550=30$ lb

25. $11\times8\times\$1.50\approx10\times8\times\$1.50=10\times\$12=\$120$

26. 9 min, 55 sec/mi $\times$ 26.2 mi ≈ 10 min $\times$ 26 mi $=260$ min/mi; $\dfrac{260\text{ min}}{60\text{ min}}\approx4\dfrac{1}{3}$ hours

27. $\dfrac{599\text{ Mexican pesos}}{20.14\text{ Mexican pesos / U.S. dollars}}\approx\dfrac{600}{20}=\$30$

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

28. $\$973+6(\$61)+6(\$97)+6(\$200) \approx \$970+6(\$60)+6(\$100)+6(\$200)$
$= \$970+\$360+\$600+\$1200$
$= \$3130$

29. 90 miles

30. 75 miles

31. a) 23% of $700 \approx 25\%$ of $700 = 0.25 \times 700 = 175$

b) 12% of $700 \approx 10\%$ of $700 = 0.10 \times 700 = 70$

c) 21% of $700 \approx 20\%$ of $700 = 0.20 \times 700 = 140$

32. a) 18% of $2987 \approx 18\%$ of $3000 = 0.18 \times 3000 = 540$

b) 42% of $2987 \approx 42\%$ of $3000 = 0.42 \times 3000 = 1260$

c) 7% of $2987 \approx 7\%$ of $3000 = 0.07 \times 3000 = 210$

33. a) 5 million

b) 98 million

c) 98 million $-$ 33 million = 65 million

d) 19 million + 79 million + 84 million + 65 million + 33 million = 280 million

34. a) 19%

b) 25%

c) 20% of 179 lb $\approx$ 20% of 180 $= 0.2 \times 180 = 36$ lb

35. a) 85%

b) $68\% - 53\% = 15\%$

c) 85% of 70 million acres = 59,500,000 acres

d) No, since we are not given the area of each state.

36. a) $2(410)+4(545) \approx 2(400)+4(500) = 800+2000 = 2800$ calories

b) Running: $4(920) \approx 4(900) = 3600$ calories

Walking: $4(330) \approx 4(300) = 1200$ calories

Difference: $3600 - 1200 = 2400$ calories

c) $3(545)+3(545) \approx 3(550)+3(550) = 1650+1650 = 3300$ calories per week

3300 calories per week $(52 \text{ weeks}) \approx 3000 \times 50 = 150{,}000$ calories

37. 20

38. 25

39. 120 bananas

40. 100 grapes

41. 150°

42. 315°

43. 10%

44. 25%

45. 9 square units

46. 12 square units

47. 160 feet

48. $4(60) = 240$ in. or $\frac{240}{12} \approx 20$ ft

49. – 57. Answers will vary.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

58. Cost of one vitamin C tablet: $\frac{\$24.99}{500} \approx \frac{\$25}{500} = \$0.05$

Cost of one fish oil tablet: $\frac{\$47.99}{120} \approx \frac{\$48}{120} = \$0.40$

Cost of one vitamin D tablet: $\frac{\$17.99}{180} \approx \frac{\$18}{180} = \$0.10$

Cost of one multivitamin tablet: $\frac{\$19.99}{80} \approx \frac{\$20}{80} = \$0.25$

Roberto's daily cost: $5 \times \$0.05 + 4 \times \$0.40 + 1 \times \$0.10 + 1 \times \$0.25 = \$1.40$

59. There are 118 ridges around the edge.

60. a) Answers will vary.

b) 11.6 days. There are $24 \cdot 60 \cdot 60 = 86,400$ seconds in a day, and $1,000,000 / 86,400 = 11.5\overline{740}$.

62. Answers will vary.

63. Answers will vary.

Section 1.3: Problem-Solving Procedures

1. $\frac{1 \text{ in.}}{12 \text{ mi}} = \frac{4.25 \text{ in.}}{x \text{ mi}}$

$x = 12(4.25)$

$x = 51 \text{ mi}$

2. $\frac{1 \text{ in.}}{2.5 \text{ yd}} = \frac{22.4 \text{ in.}}{x \text{ yd}}$

$1x = 2.5(22.4)$

$x = 56 \text{ yd}$

3. $\frac{3 \text{ ft}}{1.2 \text{ ft}} = \frac{x \text{ ft}}{15.36 \text{ ft}}$

$3(15.36) = 1.2x$

$\frac{46.03}{1.2} = \frac{1.2x}{1.2}$

$x = \frac{46.03}{1.2} = 38.4 \text{ ft}$

4. $\frac{1 \text{ bag}}{4000 \text{ ft}^2} = \frac{x \text{ bags}}{35,000 \text{ ft}^2}$

$4000x = 1(35,000)$

$\frac{4000x}{4000} = \frac{35,000}{4000}$

$x = \frac{35,000}{4000} = 8.75 \text{ bags}$

5. $4 \times \$113 = \$452$

9.25% of $\$452 = 0.0925 \times \$452 = \$41.81$

$\$452 + \$41.81 = \$493.81$

6. $2 \times \$187 = \$374$

9.5% of $\$374 = 0.095 \times \$374 = \$35.53$

$\$374 + \$35.53 = \$409.53$

7. a) Entertainment/Miscellaneous: 19.1% of $\$1950 = 0.191 \times \$1950 = \$372.45$

Food: 12.7% of $\$1950 = 0.127 \times \$1950 = \$247.65$

$\$372.45 - \$247.65 = \$124.80$

b) Housing: 34.4% of $\$1950 = 0.344 \times \$1950 = \$670.80$

Transportation: 16% of $\$1950 = 0.16 \times \$1750 = \$312.00$

$\$670.80 - \$312.00 = \$358.80$

8. a) Business: 19% of $2,895,000 = 0.19 \times 2,895,000 = 550,050$

Engineering: 5% of $2,895,000 = 0.05 \times 2,895,000 = 144,750$

$550,050 - 144,750 = 405,300$ degrees

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

8. (continued)

   b) Health Professions: 11% of $2,895,000 = 0.11 \times 2,895,000 = 318,450$
   Psychology: 6% of $2,895,000 = 0.06 \times 2,895,000 = 173,700$
   $318,450 - 173,700 = 144,750$ degrees

9. $43 \text{ rides} \times \$2.00 \text{ per ride} = \$86.00$; In order for the cost of rides with the \$84.50 MetroCard to be less than the cost of the rides without the CharlieCard, Marcelo would have to take 43 bus rides per month.
   Note that $\frac{\$84.50}{43 \text{ rides}} \approx \$1.97 \text{ per ride}$.

10. $45 \text{ rides} \times \$2.75 \text{ per ride} = \$123.75$; In order for the cost of rides with the \$121.50 MetroCard to be less than the cost of the rides without the MetroCard, Karissa would have to take 45 subway rides per month.
    Note that $\frac{\$121.50}{45 \text{ rides}} = \$2.70 \text{ per ride}$

11. $\$250 + \$130(18) = \$250 + \$2340 = \$2590$
    Savings: $\$2590 - \$2500 = \$90$

12. $\$349.72 - \$32.39(4) = \$349.72 - 129.56 = \$220.16$

13. 15-year mortgage: $\$887.63(12)(15) = \$159,773.40$
    30-year mortgage: $\$572.90(12)(30) = \$206,244.00$
    Savings: $\$206,244.00 - \$159,773.40 = \$46,470.60$

14. Points needed for 80 average: $80(5) = 400$ points
    Wallace's points so far: $79 + 93 + 91 + 68 = 331$ points
    Grade needed on fifth exam: $400 - 331 = 69$

15. a) $10 \times 10 \times 10 \times 10 = 10,000$
    b) 1 in 10,000

16. a) $\frac{460}{25} = 18.4 \text{ min}$
    b) $\frac{1550}{50} = 31 \text{ min}$
    c) $\frac{1400}{35} = 40 \text{ min}$
    d) $\frac{1550}{80} + \frac{2200}{80} = \frac{3750}{80} \approx 47 \text{ min}$

17. $38,687.0 \text{ mi} - 38,451.4 \text{ mi} = 235.6 \text{ mi}$; $\frac{235.6 \text{ mi}}{12.6 \text{ gal}} \approx 18.7 \text{ mpg}$

18. a) $40 \times \$8.50 \times 52 = \$17,680$
    b) Each week he makes $40 \times \$8.50 = \$340$, it will take him $\frac{\$1275}{\$340} = 3.75$ weeks.

19. By mail: $(\$52.80 + \$5.60 + \$8.56) \times 4 = \$66.96 \times 4 = \$267.84$
    Tire store: $\$324 + 0.08 \times \$324 = \$324 + \$25.92 = \$349.92$
    Savings: $\$349.92 - \$267.84 = \$82.08$

20. $\$1750 - \$50(15) = \$1750 - \$750 = \$1000$ and $\frac{\$1000}{\$40} = 25 \text{ hours}$

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

21. 15,000 ft − 3000 ft = 12,000 ft decrease in elevation. Temperature increases $2.4°\text{F}$ for every 1000 ft decrease in elevation.
$-6°\text{F} + 28.8°\text{F} = 22.8°\text{F}$ and $-6°\text{F} + 28.8°\text{F} = 22.8°\text{F}$; The precipitation at the airport will be snow.

22. a) $\$620(0.12) = \$74.40$

b) $\$1200(0.22) = \$264$

c) The store lost $\$1200 - \$1000 = \$200$ on the purchase, so the store's profit is $\$264 - \$200 = \$64$.

23. a) Since \$876 is less than $10\% \times \$9525 = \$952.50$, Shenile's tax was 10% of her taxable income. Her taxable income was $\dfrac{\$876}{0.10} = \$8760$.

b) Since \$2017.50 is greater than \$952.50 and less than \$4453.50, Logan's taxable income was in the 12% bracket. Since $\$2017.50 - \$962.50 = \$1065$ was 12% of his taxable income above \$9525, he made an additional $\dfrac{\$1065}{0.12} = \$8875$. His taxable income was $\$9625 + \$8875 = \$18,400$.

24. a) Since \$4541.50 is greater than \$4453.50 and less than \$14,089.50, Lewis' taxable income was in the 22% bracket. Since $\$4541.50 - \$4453.50 = \$88$ was 22% of his taxable income above \$38,700, he made an additional $\dfrac{\$88}{0.22} = \$400$. His taxable income was $\$38,700 + \$400 = \$39,100$.

b) Since \$14,593.50.50 is greater than \$14,089.50 and less than \$32,089, Leticia's taxable income was in the 24% bracket. Since $\$14,593.50 - \$14,089.50 = \$504$ was 24% of his taxable income above \$82,500, she made an additional $\dfrac{\$504}{0.24} = \$2100$. Her taxable income was $\$82,500 + \$2100 = \$84,600$.

25. a) $1 \times 60 \times 24 \times 365 = 525,600$ oz and $\dfrac{525,600 \text{ oz}}{128} = 4106.25$ gal

b) $\dfrac{4106.25}{1000} \times \$11.20 = 4.10625 \times \$11.20 = \$45.99$

26. a) $0.1 \times 60 \times 60 \times 24 \times 365 = 3,153,600 \text{ cm}^3$

b) $\dfrac{\text{Volume of basin}}{\text{Daily water loss}} = \dfrac{(30 \text{ cm})(20 \text{ cm})(20 \text{ cm})}{0.1 \times 60 \times 60 \times 24} = \dfrac{12,000 \text{ cm}^3}{8640 \text{ cm}^3} \approx 1.4$; It would take about 1.4 days.

27. a) $\dfrac{20,000}{20.8} - \dfrac{20,000}{21.6} \approx 961.538 - 925.926 = 35.612 \approx 35.61$ gal

b) $35.61 \times \$3.00 = \$106.83$

c) $140,000,000 \times 35.61 = 4,985,400,000$ gal

28. a) Parking: $\$30 \times 6 = \$180$
Tax: 9.5% of $\$180 = 0.095 \times \$180 = \$17.10$
Total: $\$180 + \$17.10 = \$197.10$

b) Parking: $\$17.95 \times 6 = \$107.70$
Tax: 8.75% of $\$107.70 = 0.0875 \times \$107.70 \approx \$9.42$
Total: $\$107.70 + \$9.42 = \$117.12$

c) She can save $\$197.10 - \$117.12 = \$79.98$.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

29. Cost after 1 year: $\$999 + 0.02(\$999) = \$999 + \$19.98 = \$1018.98$

Cost after second year: $\$1018.98 + 0.02(\$1018.98) = \$1018.98 + \$20.38 = \$1039.36$

30. Value after first year: $\$1000 + 0.10(\$1000) = \$1000 + \$100 = \$1100$

Value after second year: $\$1100 - 0.10(\$1100) = \$1100 - \$110 = \$990$

$990 is less than the initial investment of $1000.

31. After paying the $100 deductible, Yungchen must pay 20% of the cost of x-rays.

First x-ray: $\$100 + 0.20(\$620) = \$100 + \$124 = \$224$

Second x-ray: $0.20(\$980) = \$196$

Total: $\$224 + \$196 = \$420$

32. $3000 is the difference between one-fourth of the cost and one-fifth of the cost.

$\frac{1}{4} - \frac{1}{5} = \frac{1}{20}$ and $20 \times \$3000 = \$60,000$

33. a) water/milk: $3(1) = 3$ cups

salt: $3\left(\frac{1}{8}\right) = \frac{3}{8}$ tsp

Cream of wheat: $3(3) = 9$ tbsp $= \frac{9}{16}$ cup (because 16 tbsp = 1 cup)

b) water/milk: $\frac{2 + 3\frac{3}{4}}{2} = \frac{\frac{23}{4}}{2} = \frac{23}{8} = 2\frac{7}{8}$ cups

salt: $\frac{\frac{1}{4} + \frac{1}{2}}{2} = \frac{\frac{3}{4}}{2} = \frac{3}{8}$ tsp

cream of wheat: $\frac{\frac{1}{2} + \frac{3}{4}}{2} = \frac{\frac{5}{4}}{2} = \frac{5}{8}$ cups =5 tbsp

c) water/milk: $3\frac{3}{4} - 1 = \frac{15}{4} - \frac{4}{4} = \frac{11}{4} = 2\frac{3}{4}$ cups

salt: $\frac{1}{2} - \frac{1}{8} = \frac{4}{8} - \frac{1}{8} = \frac{3}{8}$ tsp

cream of wheat: $\frac{3}{4} - \frac{3}{16} = \frac{12}{16} - \frac{3}{16} = \frac{9}{16}$ cup = 9 tbsp

d) Differences exist in water/milk because the amount for 4 servings is not twice that for 2 servings.

Differences also exist in Cream of Wheat because $\frac{1}{2}$ cup is not twice 3 tbsp.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

34. a) rice: $\frac{1}{2}(4) = 2$ cups

water: $1\frac{1}{3}(4) = \frac{4}{3}(4) = \frac{16}{3} = 5\frac{1}{3}$ cups

salt: $\frac{1}{4}(4) = 1$ tsp

butter/margarine: $1(4) = 4$ tsp

b) rice: $1(2) = 2$ cups

water: $2\frac{1}{4}(2) = \frac{9}{4}(2) = \frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$ cups

salt: $\frac{1}{2}(2) = 1$ tsp

butter/margarine: $2(2) = 4$ tsp

c) rice: $\frac{1}{2} + 1\frac{1}{2} = \frac{1}{2} + \frac{3}{2} = \frac{4}{2} = 2$ cups

water: $1\frac{1}{3} + 3\frac{1}{3} = \frac{4}{3} + \frac{10}{3} = \frac{14}{3} = 4\frac{2}{3}$ cups

salt: $\frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1$ tsp

butter/margarine: $1 \text{ tsp} + 1 \text{ tbsp} = 1 \text{ tsp} + 3 \text{ tsp} = 4 \text{ tsp}$

d) rice: $3 - 1 = 2$ cups

water: $6 - 2\frac{1}{4} = \frac{24}{4} - \frac{9}{4} = \frac{15}{4} = 3\frac{3}{4}$ cups

salt: $1\frac{1}{2} - \frac{1}{2} = 1$ tsp

butter/margarine: $2 \text{ tbsp} - 2 \text{ tsp} = 2(3\text{tsp}) - 2 \text{ tsp} = 6 \text{ tsp} - 2 \text{ tsp} = 4 \text{ tsp}$

e) Differences exist in water because the amount for 4 servings is not twice that for 2 servings.

35. a)

20 DVDs	12 DVDs	Total Number of DVDs
1	1	$20 + 12 = 32$
0	2	$12 + 12 = 24$

b) $\$240 + \$180 = \$420$

36. Mark will win.

37. $1 \text{ ft}^2 = 12 \text{ in.} \times 12 \text{ in.} = 144$ square inches

38. $1 \text{ ft}^3 = 12 \text{ in.} \times 12 \text{ in.} \times 12 \text{ in.} = 1728$ cubic inches

39. Area of original rectangle: lw

Area of new rectangle: $(2l)(2w) = 4(lw)$

Thus, if the length and width of a rectangle are doubled, the area is 4 times as large.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

40. $20\,\text{ft} \times 20\,\text{ft} = 400\,\text{ft}^2$; $5\,\text{ft} \times 5\,\text{ft} = 25\,\text{ft}^2$; $\dfrac{400\,\text{ft}^2}{25\,\text{ft}^2} = 16\,\text{squares}$

41. Volume of original cube: lwh

Volume of new cube: $(2l)(2w)(2h) = 8(lwh)$

Thus, if the length, width, and height of a cube are doubled, the volume is 8 times as large.

42. 11 ft is one-sixth of the pole, so the length is $6 \times 11\,\text{ft} = 66\,\text{ft}$.

43. $$\frac{10 \text{ pieces}}{x} = \frac{1000 \text{ pieces}}{\$10}$$
$$1000x = 10(10)$$
$$\frac{1000x}{1000} = \frac{100}{1000}$$
$$x = \frac{100}{1000} = \$0.10 = 10¢$$

44.

Left side	Right side
$1(-6) = -6$	$1(2) = 2$
$2(-2) = -4$	$1(3) = 3$
	$(6) = 6$
$-6 + (-4) = -10$	$2 + 3 + 6 = 11$

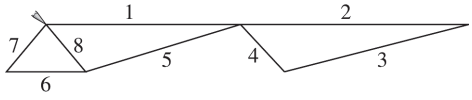
Place it at –1, so the left side would total $-10 + (-1) = -1$.

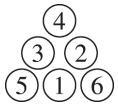
45. You have three ties, each a different color.

46. There are 10 palindromes: 2002, 2112, 2222, 2332, 2442, 2552, 2662, 2772, 2882, 2992.

47. a) refresh
b) workout

48. Answers will vary.



49. 

50. Eight pieces

51.

8	6	16
18	10	2
4	14	12

52.

10	5	6
3	7	11
8	9	4

53. $8 + 6 + 2 + 4 = 20$; $3 + 7 + 5 + 1 = 16$; $10 + 14 + 12 + 8 = 44$

The sum of the four corner entries is 4 times the number in the center of the middle row.

54. 15,12,33; Multiply the number in the center of the middle row by 3.

55. 45,36,99; Multiply the number in the center of the middle row by 9.

56. $35 - 15 = 20$ cubes

57. $3 \times 2 \times 1 = 6$ ways

58. Each salesperson shakes hands with four people.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

59. Other answers are possible, but 1 and 8 must appear in the center.

	7	
3	1	4
5	8	6
	2	

60. The diagram shows the number of times each part is used.

	8	
6	7	8
④		⑨
	6	

61. Other answers are possible.

1	2	3	4	5
2	3	4	5	1
3	4	5	1	2
4	5	1	2	3
5	1	2	3	4

62. With umbrella policy:

Mustang reduced premium: $\$1648 - \$90 = \$1558$

Focus reduced premium: $\$1530 - 0.12(\$1530) = \$1530 - \$183.60 = \$1346.40$

Total for umbrella policy: $\$1558 + \$1346.40 + \$450 = \$3354.40$

Without umbrella policy: $\$1648 + \$1530 = \$3178$

Net amount for umbrella policy: $\$3354.40 - \$3178 = \$176.40$

63. Mark plays the drums.

64. $16 + 16 + 4 + 4 + 4 = 44$

65. The areas of the colored regions are 1×1, 1×1, 2×2, 3×3, 5×5, 8×8, 13×13, 21×21.

$1 + 1 + 4 + 9 + 25 + 64 + 169 + 441 = 714$ square units

66. Let x be the amount Samantha had to start.

After first store: $x - \frac{1}{2}x - 20 = \frac{1}{2}x - 20$

After second store: $\frac{1}{2}\left(\frac{1}{2}x - 20\right) - 20 = \frac{1}{4}x - 30$

$$\frac{1}{4}x - 30 = 0$$

$$x = 120$$

The original amount was $120.

67. Thomas would have opened the box labeled *grapes and cherries*. Because all the boxes are labeled incorrectly, whichever fruit he pulls from the box of grapes and cherries, will be the only fruit in that box. If he pulled a grape, he labeled the box *grape*. If he pulled a cherry, he labeled the box *cherries*. That left two boxes whose original labels were incorrect. Because all labels must be changed, there was only one way for Thomas to assign the two remaining labels.

Review Exercises

1. 23, 28, 33 (Add 5 to previous number.)
2. 16, 13, 10 (Subtract 3 from previous number)
3. 64, –128, 256 (Multiply previous number by –2.)
4. 25, 32, 40 $(19 + 6 = 25,\ \ 25 + 7 = 32,\ \ 32 + 8 = 40)$
5. 10, 4, –3 (Subtract 1, then 2, then 3, …)
6. $\frac{3}{8}, \frac{3}{16}, \frac{3}{32}$ (Multiply previous number by $\frac{1}{2}$.)

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

7. 

8. 

9. c

10. a) The final number is twice the original number.
    b) The final number is twice the original number.
    c) Conjecture: The final number is twice the original number.
    d) $n \to 10n \to 10n+5 \to \dfrac{10n+5}{5} = \dfrac{10n}{5} + \dfrac{5}{5} = 2n+1 \to 2n+1-1 = 2n$

11. This process will always result in an answer of 3.
    $n \to n+5 \to 6(n+5) = 6n+30 \to 6n+30-12 = 6n+18$
    $\to \dfrac{6n+18}{2} = \dfrac{6n}{2} + \dfrac{18}{2} = 3n+9 \to \dfrac{3n+9}{3} = \dfrac{3n}{3} + \dfrac{9}{3} = n+3 \to,\ n+3-n = 3$

12. $1^2 + 2^2 = 5$ and 5 is an odd number. Other answers are possible.

Answers for Exercises 13–25 will vary depending on how you round your numbers. The answers may differ from the answers in the back of the textbook. However, your answers should be something near the answers given. All answers are approximate.

13. $205{,}123 \times 4002 \approx 200{,}000 \times 4000$
    $= 800{,}000{,}000$

14. $215.9 + 128.752 + 3.6 + 861 + 792$
    $\approx 200 + 100 + 0 + 900 + 800 = 2000$

15. 21% of $2095 \approx 20\%$ of 2000
    $= 0.20 \times 2000 = 400$

16. Answers will vary.

17. $48 \text{ bricks} \times \$3.97 \approx 50 \times 4 = \$200$

18. 8% of $\$21{,}000 \approx 8\%$ of 20,000
    $= 0.08 \times 20{,}000 = \$1600$

19. $\dfrac{1.1 \text{ mi}}{22 \text{ min}} \approx \dfrac{1 \text{ mi}}{20 \text{ min}} = \dfrac{3 \text{ mi}}{60 \text{ min}} = 3 \text{ mph}$

20. $\$2.49 + \$0.79 + \$1.89 + \$0.10 + \$2.19 + \$6.75$
    $\approx \$2 + \$1 + \$2 + \$0 + \$2 + \$7 = \$14.00$

21. $5 \text{ in.} = \dfrac{20}{4} \text{ in.} = 20\left(\dfrac{1}{4}\right) \text{ in.} = 20(0.1) \text{ mi}$
    $= 2 \text{ mi}$

22. Approximately $70°\text{F} - 30°\text{F} = 40°\text{F}$

23. Approximately $90°\text{F} - 80°\text{F} = 10°\text{F}$

24. 13 square units

25. Length: 1.75 in., $1.75(1.25) = 21.875 \approx 22$ ft
    Height: 0.625 in., $0.625(12.5) = 7.8125 \approx 8$ ft

26. $\$50 + \$40(12) = \$530$
    Savings: $\$530 - \$500 = \$30$

27. $4(\$1.99) = \$7.96$ for four six-packs
    Savings: $\$7.96 - \$4.99 = \$2.97$

28. Freemac: $\$15 \times 4 \times 2 = \$120$
    Sylvan: $\$25 \times 4 \text{ hours} = \$100$
    $\$120 - \$100 = \$20$
    Sylvan Rental is less expensive by \$20.

29. Cost per person with 5 people: $\dfrac{\$445}{5} = \$89$
    Cost per person with 5 people: $\dfrac{\$510}{6} = \$85$
    Savings: $\$89 - \$85 = \$4$

30. a) $\dfrac{30 \text{ lb}}{2500 \text{ ft}^2} = \dfrac{x}{24{,}000 \text{ ft}^2}$
    $x = \dfrac{30 \times 24{,}000}{2500}$
    $x = 288 \text{ lb}$
    b) $\dfrac{150 \text{ lb}}{30 \text{ lb/bag}} = 5 \text{ bags};\ 5 \times 2500 = 12{,}500 \text{ ft}^2$

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

31. 10% of $\$1030 = 0.10 \times \$1030 = \$103$

$7 \times \$103 = \$721$

Savings: $\$721 - \$60 = \$661$

32. $\dfrac{1.5 \text{ mg}}{10 \text{ lb}} = \dfrac{x \text{ mg}}{52 \text{ lb}}$

$10x = 52(1.5)$

$\dfrac{10x}{10} = \dfrac{78}{10}$

$x = 7.8$ mg

33. $\$5500 - 0.30(\$5500) = \$5500 - \$1650 = \$3850$ take-home; 28% of $\$3850 = 0.28 \times \$3850 = \$1078$

34. 9 A.M. Eastern is 6 A.M. Pacific, from 6 A.M. Pacific to 1:35 P.M. Pacific is 7 hr 35 min, 7 hr 35 min $-$ 50 min stop = 6 hr 45 min.

35. 3 P.M. $-$ 4 hr = 11 A.M.; July 26, 11:00 A.M.

36. a) $\dfrac{65\,\text{mi}}{1\,\text{hr}} \times \dfrac{1.6\,\text{km}}{\text{mi}} = \dfrac{104\,\text{km}}{1\,\text{hr}} \approx 104\,\text{km/hr}$

b) $\dfrac{90\,\text{km}}{1\,\text{hr}} \times \dfrac{1\,\text{mi}}{1.6\,\text{km}} = \dfrac{90\,\text{mi}}{1.6\,\text{km}} \approx 56.25\,\text{mi/hr}$

37. Each figure has an additional two dots. To get the hundredth figure, 97 more figures must be drawn, $97(2) = 194$ dots added to the third figure. Thus, $194 + 7 = 201$.

38.

21	7	8	18
10	16	15	13
14	12	11	17
9	19	20	6

39.

23	25	15
13	21	29
27	17	19

40. 59 min 59 sec; Since it doubles every second, the jar was half full 1 second earlier than 1 hour.

41. 6

42. Nothing. Each friend paid \$9 for a total of \$27; \$25 to the hotel, \$2 to the clerk. \$25 for the room + \$3 for each friend + \$2 for the clerk = \$30

43. Let x = the score on the fifth exam

$$\frac{93+88+81+86+x}{5} = 80$$

$$\frac{348+x}{5} = 80,$$

$$348 + x = 400,$$

$$x = 52$$

44. Yes; 3 quarters and 4 dimes, or 1 half dollar, 1 quarter and 4 dimes, or 1 quarter and 9 dimes.

45. $6 \text{ cm} \times 6 \text{ cm} \times 6 \text{ cm} = 216 \text{ cm}^3$

46. Place six coins in each pan with one coin off to the side. If it balances, the heavier coin is the one on the side. If the pan does not balance, take the six coins on the heavier side and split them into two groups of three. Select the three heavier coins and weigh two coins. If the pan balances, it is the third coin. If the pan does not balance, you can identify the heavier coin.

47. $1 + 500 = 501$, $2 + 499 = 501$, … ; There are 250 such pairs and $250(501) = 125,250$.

48. 4 green weigh the same as 8 blue, 2 yellow weigh the same as 5 blue, 2 white weigh the same as 3 blue, $8 + 5 + 3 = 16$ blue

Copyright © 2021 Pearson Education, Inc.

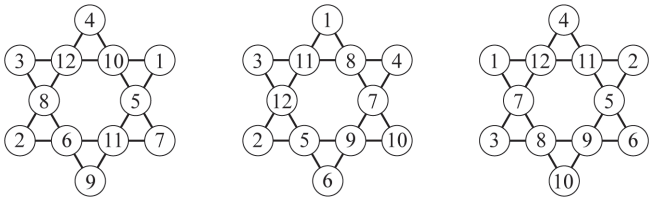
Survey of Mathematics with Applications 11th edition Runde Solutions Manual

49. There are 90 such numbers: 101, 111, 121, 131, 141, 151, 161, 171, 181, 191, 202,h …, 292, 303, …, 393, 404, …, 494, 505, …, 595, 606, …, 696, 707, …, 797, 808, …, 898, 919, …, 999.

50. The fifth figure will be an octagon with sides of equal length. Inside the octagon will be a seven-sided figure with sides of equal length. The figure will have one antenna.

51. 61 orange tiles will be required. The sixth figure will have 6 rows of 6 tiles and 5 rows of 5 tiles $(6\times 6+5\times 5=36+25=61)$.

52. Some possible answers are given below. There are other possibilities.



53. a) 2
    b) There are 3 choices for the first spot. Once that person is standing, there are 2 choices for the second spot and 1 for the third. Thus, $3\times 2\times 1=6$.
    c) $4\times 3\times 2\times 1=24$
    d) $5\times 4\times 3\times 2\times 1=120$
    e) $n(n-1)(n-2)\cdots 1$, (or $n!$), where $n=$ the number of people in line.

Chapter Test

1. 26, 32, 38 (Add 6 to previous number.)

2. $\frac{1}{5}, \frac{1}{6}, \frac{1}{7}$ (Add 1 to the denominator of the previous number.)

3. a) The result is the original number plus 1.
   b) The result is the original number plus 1.
   c) Conjecture: The result will always be the original number plus 1.
   d) $n\to 5n\to 5n+10\to \frac{5n+10}{5}=\frac{5n}{5}+\frac{10}{5}=n+2\to n+2-1=n+1$

4. $0.51\times 96{,}000\approx 0.5\times 100{,}000=50{,}000$

5. $\frac{188{,}000}{0.11}\approx \frac{200{,}000}{0.1}\approx 2{,}000{,}000$

6. 9 square units

7. a) $\frac{130\text{ lb}}{63\text{ in.}}\approx 2.0635$; $\frac{2.0635}{63\text{ in.}}=0.032754$; $0.032754\times 703\approx 23.03$
   b) He is in the at-risk range.

8. a) 325,000 visitors
   b) 100,000 visitors

9. $\$50.40-\$35.00=\$15.40$; $\frac{\$15.40}{\$0.20}=77$ miles

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

10. Since $\frac{\$15}{\$2.59} \approx 5.79$, a maximum of 5 six-packs can be purchased. There will be $\$15.00 - (5 \times \$2.59)$ $= \$15.00 - \$12.95 = \$2.05$ remaining, so $\frac{\$2.05}{\$0.80} = 2.5625$, or two additional individual cans can be purchased.

The following table was created using similar calculations for the other possible number of six-packs.

Six-packs	Individual cans	Number of cans
5	2	$6 \times 5 + 2 = 32$
4	5	$6 \times 4 + 5 = 29$
3	9	$6 \times 3 + 9 = 27$
2	12	$6 \times 2 + 12 = 24$
1	15	$6 \times 1 + 15 = 21$
0	18	$6 \times 0 + 18 = 18$

The maximum number of cans is 32.

11. $3 \text{ cuts} \times \frac{2.5 \text{ min}}{1 \text{ cut}} = 7\frac{1}{2} = 7.5 \text{ min}$

12. $10 \times \frac{3}{4} = 10 \times 0.75 = 7.5 \text{ miles}$

13. $\$12.75 \times 40 = \$510$

$\$12.75 \times 1.5 \times 10 = \$191.25$

$\$510 + \$191.25 = \$701.25$

$\$652.25 - \$701.25 = -\$49.00$

She was underpaid by $49.00.

14.

40	15	20
5	25	45
30	35	10

15. Mary drove the first 15 miles at 60 mph which took $\frac{15}{60} = \frac{1}{4}$ hour and drove the second 15 miles at 30 mph took $\frac{15}{30} = \frac{1}{2}$ hour for a total time of $\frac{3}{4}$ hour, or 45 minutes. If she drove the entire 30 miles at 45 mph, the trip would take $\frac{30}{45} = \frac{2}{3}$ hour, or 40 minutes, which is less than $\frac{3}{4}$ hour.

16. $\frac{6 \text{ lb}}{2 \text{ lb}} = 3$; $3 \times \frac{1}{2} \text{ tsp} = \frac{3}{2} \text{ tsp}$ or $1\frac{1}{2} \text{ tsp} = \frac{1}{2}$ tbsp

17. Area of lawn including walkway: $(10+2) \times (12+2) = 12 \times 14 = 168 \text{ m}^2$

Area of lawn only: $10 \times 12 = 120 \text{ m}^2$

Area of walkway: $168 - 120 = 48 \text{ m}^2$

18. 243 jelly beans; $260 - 17 = 243$, $234 + 9 = 243$, and $274 - 31 = 243$

19. a) $3 \times \$3.99 = \$11.97$

b) $9(\$1.75 \times 0.75) = 11.8125 \approx \$11.81$

c) $\$11.97 - \$11.81 = \$0.16$; Using the coupon is least expensive by $0.16.

20. $4 \times 3 \times 2 \times 1 = 24$; The first position can hold any of four letters, the second any of the three remaining letters, and so on.

Copyright © 2021 Pearson Education, Inc.

Survey of Mathematics with Applications 11th edition Runde Solutions Manual

Survey of Mathematics with Applications 11th edition Runde Solutions Manual