

PART ONE Mathematics Fundamentals and Business Applications

Chapter 1 Review of Arithmetic

Exercise 1.1

- | | | | |
|-----------------------|-----------------------------|-----------------------|----------------------------|
| A. 1. $\boxed{14}$ | 3. $\boxed{\frac{7}{12}}$ | 6. $\boxed{0.7}$ | 4. $\boxed{\$423}$ |
| 2. $\boxed{9}$ | 4. $\boxed{\frac{11}{12}}$ | 7. $\boxed{1.085}$ | 5. $\boxed{\$22\,0364.90}$ |
| 3. $\boxed{53}$ | 5. $\boxed{\frac{8}{5}}$ | 8. $\boxed{1.26}$ | 6. $\boxed{\$2250}$ |
| 4. $\boxed{23}$ | 6. $\boxed{\frac{8}{7}}$ | C. 1. $\boxed{3.375}$ | 7. $\boxed{34\,426.47022}$ |
| 5. $\boxed{4}$ | 7. $\boxed{\frac{2}{5}}$ | 2. $\boxed{3.4}$ | 8. $\boxed{1734.832204}$ |
| 6. $\boxed{24}$ | 8. $\boxed{\frac{5}{4}}$ | 3. $\boxed{8.3}$ | 9. $\boxed{31\,500}$ |
| 7. $\boxed{68}$ | 9. $\boxed{\frac{5}{73}}$ | 4. $\boxed{16.6}$ | 10. $\boxed{292.865178}$ |
| 8. $\boxed{2}$ | 10. $\boxed{\frac{23}{73}}$ | 5. $\boxed{33.3}$ | 11. $\boxed{29\,000}$ |
| 9. $\boxed{0.2}$ | 11. $\boxed{\frac{5}{1}}$ | 6. $\boxed{83.3}$ | 12. $\boxed{897\,000}$ |
| 10. $\boxed{1}$ | 12. $\boxed{\frac{5}{3}}$ | 7. $\boxed{7.7}$ | 13. $\boxed{0.586}$ |
| 11. $\boxed{4}$ | B. 1. $\boxed{1.375}$ | 8. $\boxed{7.085}$ | 14. $\boxed{0.49136}$ |
| 12. $\boxed{539.73}$ | 2. $\boxed{1.75}$ | D. 1. $\boxed{5.63}$ | |
| 13. $\boxed{0.17}$ | 3. $\boxed{1.6}$ | 2. $\boxed{17.45}$ | |
| 14. $\boxed{11\,180}$ | 4. $\boxed{0.83}$ | 3. $\boxed{18.00}$ | |
| 15. $\boxed{8300}$ | 5. $\boxed{1.83}$ | 4. $\boxed{253.49}$ | |
| 16. $\boxed{0.57}$ | | 5. $\boxed{57.70}$ | |

Exercise 1.2

- | | | |
|-----------------------------|-------------------|-----------------------|
| A. 1. $\boxed{\frac{2}{3}}$ | 3. $\boxed{1.6}$ | E. 1. $\boxed{\$730}$ |
| 2. $\boxed{\frac{1}{2}}$ | 4. $\boxed{0.83}$ | 2. $\boxed{0.15}$ |
| | 5. $\boxed{1.83}$ | 3. $\boxed{\$630.70}$ |

Exercise 1.3

- | |
|----------------------|
| A. 1. $\boxed{0.64}$ |
| 2. $\boxed{3}$ |
| 3. $\boxed{0.025}$ |
| 4. $\boxed{0.001}$ |
| 5. $\boxed{0.005}$ |
| 6. $\boxed{0.85}$ |
| 7. $\boxed{2.5}$ |
| 8. $\boxed{0.048}$ |
| 9. $\boxed{0.075}$ |

- | | | | | | | | |
|-------|---------------------|-----|-----------------|-----|------------------|-------|---------------------|
| 10. | $\frac{0.009}{1}$ | 2. | $\frac{5}{8}$ | 17. | $\frac{1}{800}$ | 32. | $\frac{5}{3}$ |
| 11. | $\frac{0.0625}{1}$ | 3. | $\frac{7}{4}$ | 18. | $\frac{1}{3}$ | C. 1. | $\frac{350\%}{1}$ |
| 12. | $\frac{0.99}{1}$ | 4. | $\frac{1}{20}$ | 19. | $\frac{3}{400}$ | 2. | $\frac{7.5\%}{1}$ |
| 13. | $\frac{2.25}{1}$ | 5. | $\frac{3}{8}$ | 20. | $\frac{2}{3}$ | 3. | $\frac{0.5\%}{1}$ |
| 14. | $\frac{0.0005}{1}$ | 6. | $\frac{3}{4}$ | 21. | $\frac{1}{16}$ | 4. | $\frac{37.5\%}{1}$ |
| 15. | $\frac{0.0825}{1}$ | 7. | $\frac{1}{25}$ | 22. | $\frac{1}{400}$ | 5. | $\frac{2.5\%}{1}$ |
| 16. | $\frac{0.005}{1}$ | 8. | $\frac{2}{25}$ | 23. | $\frac{1}{6}$ | 6. | $\frac{200\%}{1}$ |
| 17. | $\frac{1.125}{1}$ | 9. | $\frac{2}{5}$ | 24. | $\frac{3}{40}$ | 7. | $\frac{12.5\%}{1}$ |
| 18. | $\frac{0.09375}{1}$ | 10. | $\frac{7}{8}$ | 25. | $\frac{3}{400}$ | 8. | $\frac{0.1\%}{1}$ |
| 19. | $\frac{0.0075}{1}$ | 11. | $\frac{5}{2}$ | 26. | $\frac{7}{800}$ | 9. | $\frac{22.5\%}{1}$ |
| 20. | $\frac{1.625}{1}$ | 12. | $\frac{1}{50}$ | 27. | $\frac{1}{1000}$ | 10. | $\frac{0.8\%}{1}$ |
| 21. | $\frac{0.004}{1}$ | 13. | $\frac{1}{8}$ | 28. | $\frac{3}{500}$ | 11. | $\frac{145\%}{1}$ |
| 22. | $\frac{0.0025}{1}$ | 14. | $\frac{3}{5}$ | 29. | $\frac{1}{40}$ | 12. | $\frac{2.25\%}{1}$ |
| 23. | $\frac{0.00025}{1}$ | 15. | $\frac{9}{400}$ | 30. | $\frac{4}{3}$ | 13. | $\frac{0.25\%}{1}$ |
| 24. | $\frac{1.375}{1}$ | 16. | $\frac{1}{200}$ | 31. | $\frac{11}{6}$ | 14. | $\frac{99.5\%}{1}$ |
| 25. | $\frac{0.00625}{1}$ | | | | | 15. | $\frac{9\%}{1}$ |
| 26. | $\frac{0.00875}{1}$ | | | | | 16. | $\frac{300\%}{1}$ |
| 27. | $\frac{0.0225}{1}$ | | | | | 17. | $\frac{75\%}{1}$ |
| 28. | $\frac{0.16\%}{1}$ | | | | | 18. | $\frac{12\%}{1}$ |
| 29. | $\frac{1.16\%}{1}$ | | | | | 19. | $\frac{166.6\%}{1}$ |
| 30. | $\frac{1.85\%}{1}$ | | | | | 20. | $\frac{3.5\%}{1}$ |
| 31. | $\frac{0.85\%}{1}$ | | | | | 21. | $\frac{4.5\%}{1}$ |
| 32. | $\frac{0.6\%}{1}$ | | | | | 22. | $\frac{62.5\%}{1}$ |
| B. 1. | $\frac{1}{4}$ | | | | | 23. | $\frac{0.75\%}{1}$ |
| | | | | | | 24. | $\frac{83.5\%}{1}$ |

25.
26.
27.
28.
29.
30.
31.
32.

- (b)
- (c)
3.
4.
5. (a)
- (b)
- (c)
- (d)

8.
9. (a)
- (b)
10. (a)
- (b)
11.
12.
13.
14.
15.
16.
17.
18.

10. (a)
- (b)
- (c)

Review Exercise

1. (a)
- (b)
- (c)
- (d)
- (e)
- (f)
- (g)
- (h)
- (i)
- (j)

Exercise 1.4

- A. 1.
2.
3.
4.
5.
-
-
-
-
-
6.
-
-
-
-
-
- B. 1.
2. (a)

Exercise 1.5

- A. 1. (a)
- (b)
- (c)
2. (a)
- (b)
- (c)
3. (a)
- (b)
4. (a)
- (b)
5. (a)
- (b)
6.
7.

Exercise 1.6

1.
2.
3.
4.
5.
6.
7.
8.
9.
2. (a)
- (b)
- (c)
- (d)
- (e)
- (f)
- (g)
- (h)
- (i)
- (j)
- (k)

3. (l) $\boxed{0.10375}$ (d) $\boxed{\$6.06}$ 18. $\boxed{\$11.44}$ 4. (a) $\boxed{112.5\%}$
 (a) $\boxed{\frac{1}{2}}$ 6. $\boxed{\$35.00}$ 19. (a) $\boxed{\$13.40}$ (b) $\boxed{2.25\%}$
 (b) $\boxed{\frac{3}{8}}$ $\boxed{150.00}$ (b) $\boxed{8.15}$ 5. $\boxed{\$7080}$
 (c) $\boxed{\frac{1}{6}}$ $\boxed{147.00}$ 20. $\boxed{\$5945.00}$ 6. $\boxed{\$203.00}$
 (d) $\boxed{\frac{5}{3}}$ $\boxed{252.00}$ 21. $\boxed{\$10.56}$ 7. $\boxed{\$7.35}$
 (e) $\boxed{\frac{1}{200}}$ $\boxed{\$584.00}$ 22. $\boxed{68.27}$ 8. $\boxed{\$299\ 250.00}$
 (f) $\boxed{\frac{3}{40}}$ 7. (a) $\boxed{\$11.89}$ 23. $\boxed{\$3052.00}$ 9. $\boxed{\$650}$
 (g) $\boxed{\frac{3}{400}}$ (b) $\boxed{\$10.71}$ 24. $\boxed{\$3817.50}$ 10. $\boxed{15.5\%}$
 (h) $\boxed{\frac{1}{160}}$ 8. $\boxed{\$13\ 875}$ 25. $\boxed{\$18.68}$ 11. $\boxed{\$2382.41}$
 4. (a) $\boxed{225\%}$ 9. $\boxed{\$13\ 680}$ 26. $\boxed{\text{more}}$ 12. $\boxed{\$788.50}$
 (b) $\boxed{2\%}$ 10. (a) $\boxed{\$1456.00}$ 27. (a) $\boxed{46.71143}$ 13. $\boxed{\$12.12}$
 (c) $\boxed{0.9\%}$ (b) $\boxed{\$9.60}$ (b) $\boxed{\$1634.90}$ 14. $\boxed{\$887.00}$
 (d) $\boxed{12.75\%}$ (c) $\boxed{16.5}$ (c) $\boxed{2.050231}$ 15. $\boxed{\$9.00}$
 (e) $\boxed{125\%}$ 11. (a) $\boxed{\$845.52}$ (d) $\boxed{\$71.76}$ 16. $\boxed{\$7190.40}$
 (f) $\boxed{137.5\%}$ (b) $\boxed{\$10.84}$ *Self-Test* 17. $\boxed{\$45\ 500.00}$
 (g) $\boxed{2.5\%}$ 12. (a) $\boxed{\$735}$ 1. (a) $\boxed{4415.87}$ 18. $\boxed{\$19.10}$
 (h) $\boxed{28\%}$ (b) $\boxed{\$17.09}$ (b) $\boxed{93.21}$
 5. (a) $\boxed{20.2085\text{ kg}}$ 13. (a) $\boxed{\$481.95}$ (c) $\boxed{2610.15}$
 (b) $\boxed{\$24.25}$ (b) $\boxed{33.15}$ (d) $\boxed{4623.33}$
 (c) $\boxed{5.05\text{ kg}}$ 14. (a) $\boxed{\$1924.25}$ (e) $\boxed{5489.46}$
 15. (a) $\boxed{\$398.65}$ 2. (a) $\boxed{1.75}$
 (b) $\boxed{\$11.39}$ (b) $\boxed{0.00375}$
 16. $\boxed{4.25\%}$ 3. (a) $\boxed{\frac{1}{40}}$
 17. $\boxed{\$21\ 750}$ (b) $\boxed{\frac{7}{6}}$

Chapter 2 Review of Basic Algebra *Exercise 2.1*

Exercise 2.1

- A. 1. $19a$
 2. $3m$
 3. $-a-10$
 4. $-3a-14$
 5. $-2x-4y$
 6. $3p+q$
 7. $14f-4v$
 8. $2c-3d$
 9. $0.8x$
 10. $1.06x$
 11. $1.4x$
 12. $0.98x$
 13. $2.79x$
 14. $4.05y$
 15. $-x^2-x-8$
 16. $-ax+x-2$
 17. $x-7y$
 18. $2a-2$
 19. $4b+2c+2$
 20. $-2a^2-6ab+5b^2$
 21. $-m^2+6m+1$
22. $14-9x+y$
 23. $10a-14b$
 24. $2f+2f^2+3fg$
- B. 1. $-12x$
 2. $-56a$
 3. $-10ax$
 4. $27ab$
 5. $-2x^2$
 6. $24m^2$
 7. $60xy$
 8. $-24abc$
 9. $-2x+4y$
 10. $10x-20$
 11. $2ax^2-3ax-a$
 12. $-24x+12bx+6b^2x$
 13. $35x-30$
 14. $-10a-15b$
 15. $-20ax+5a$
 16. $21y-31$
 17. $3x^2+5x-2$
 18. $5m^2-17mn+6n^2$
19. x^3+y^3
 20. a^3-3a^2+3a-1
 21. $7x^2+3x+39$
 22. $-5a^2-13a+12$
23. $4ab$
 24. $-5y$
 25. $4x$
 26. -6
 27. $10m-4$
 28. $-2x+3$
 29. $-2x^2+3x+6$
 30. a^2+4a+3
- C. 1. -5
 2. 14
 3. 5500
 4. 20000
 5. 0.586
 6. $\$40.50$
 7. $\$378$
 8. 0.125
 9. $\$3000$
 10. $0.1\dot{3}$
11. $\$901.99$
 12. $\$1052.71$
 13. $\$1400.06$
 14. $\$1600.08$

Exercise 2.2

- A. 1. 81
 2. 1
 3. 16
 4. 1
 5. $\frac{16}{81}$
 6. $\frac{625}{1296}$
 7. $-\frac{1}{64}$
 8. $-\frac{8}{27}$
 9. 0.25
 10. 113.379904
 11. -0.001
 12. -335.544320
 13. 1
 14. 1

15. $\frac{1}{9}$

16. 512

17. $-\frac{1}{125}$

18. $\frac{1}{167.9616}$

19. 125

20. $\frac{81}{16}$

21. $\frac{1}{1.01}$

22. 1

B. 1. 2^8

2. $(-4)^4$

3. 4^3

4. $(-3)^2$

5. 2^{15}

6. $(-4)^{18}$

7. a^{14}

8. m^5

9. 3^{11}

10. $(-1)^{15}$

11. 6

12. x^2

13. $\frac{3^{11}}{5^{11}}$

14. $\frac{1}{6^2}$

15. $\frac{(-3)^{11}}{2^{11}}$

16. $-\frac{3}{4}$

17. 1.025^{150}

18. 1.005^{90}

19. 1.04^{80}

20. $\frac{-3^{15}}{7^{15}}$

21. $(1+i)^{200}$

22. $(1-r)^6$

23. $(1+i)^{160}$

24. $(1-r)^{120}$

25. $a^5 b^5$

26. $16x^4 y^4$

27. $m^{24} n^8$

28. $\frac{a^{12} b^8}{x^4}$

29. 2^4

30. 5^5

31. $\frac{b^8}{a^8}$

32. $\frac{i^n}{(1+i)^n}$

Exercise 2.3

A. 1. 72

2. 14.35

3. 3

4. 1.01

5. 1.075886

6. 0.5

7. 1.013300

8. 1.011715

B. 1. 55

2. 7

3. 12.25

4. 60.154991

5. 1.071122

6. 1.015241

7. 0.629961

8. 0.995156

9. 163.053437

10. 16.546852

11. 2.158925

12. 0.589664

13. 1630.176673

14. 12 151.73813

15. 1139.915716

16. 1855.967995

17. 5000.00

18. 4391.497547

19. 0.029998

20. 0.019999

21. 0.04

22. 0.01

Exercise 2.4

A. 1. $9 = \log_2 512$

2. $7 = \log_3 2187$

3. $-3 = \log_5 \frac{1}{125}$

4. $-5 = \log_{10} 0.00001$

5. $2j = \ln 18$

6. $-3x = \ln 12$

B. 1. $2^5 = 32$

2. $3^{-4} = \frac{1}{81}$

3. $10^1 = 10$

4. $e^2 = e^2$

C. 1. 0.693147

2. $\boxed{5.298317}$

3. $\boxed{-2.253795}$

4. $\boxed{7.133435}$

5. $\boxed{6.825303}$

6. $\boxed{10.156367}$

Exercise 2.5

A. 1. $\boxed{x = 3}$

2. $\boxed{x = -5}$

3. $\boxed{x = 80}$

4. $\boxed{x = 650}$

5. $\boxed{x = 18}$

6. $\boxed{x = -56}$

7. $\boxed{x = -35}$

8. $\boxed{x = 24}$

9. $\boxed{x = -4}$

10. $\boxed{x = 7}$

11. $\boxed{x = -8}$

12. $\boxed{x = 9}$

13. $\boxed{x = 5}$

14. $\boxed{x = -12}$

15. $\boxed{x = 20}$

16. $\boxed{x = 300}$

17. $\boxed{x = 200}$

18. $\boxed{x = 60}$

B. 1. $\boxed{x = 4}$

2. $\boxed{x = 3}$

3. $\boxed{x = 0}$

4. $\boxed{x = -2}$

5. $\boxed{x = 5}$

6. $\boxed{x = -2}$

7. $\boxed{x = 21}$

8. $\boxed{x = 8}$

Exercise 2.6

A. 1. $\boxed{x = -10}$

2. $\boxed{x = -2}$

3. $\boxed{x = -3}$

4. $\boxed{x = 5}$

5. $\boxed{x = 3}$

6. $\boxed{x = 5}$

7. $\boxed{x = 14}$

8. $\boxed{x = 2}$

B. 1. $\boxed{x = 20}$

2. $\boxed{x = 16}$

3. $\boxed{x = -1}$

4. $\boxed{x = 3}$

5. $\boxed{x = \frac{1}{2}}$

6. $\boxed{x = -\frac{2}{3}}$

C. 1. $\boxed{x = -1}$

2. $\boxed{x = 2}$

3. $\boxed{x = \frac{5}{6}}$

4. $\boxed{x = -\frac{3}{4}}$

D. 1. $\boxed{x = \frac{y-b}{m}}$

2. $\boxed{S = \frac{M}{r}}$

3. $\boxed{\text{PMT} = \text{PVi}}$

4. $\boxed{t = \frac{I}{Pr}}$

5. $\boxed{r = \frac{A-P}{Pt}}$

6. $\boxed{i = \left[\frac{\text{FV}}{\text{PV}} \right]^{\frac{1}{n}} - 1}$

9. $\boxed{\$89.00.}$

10. $\boxed{\$23\,500.}$

11. $\boxed{1300.}$

12. $\boxed{18.}$

13. $\boxed{20 \text{ units.}}$

14. $\boxed{20 \text{ dimes, } 56 \text{ nickels, and } 16 \text{ quarters.}}$

15. $\boxed{30 \text{ } \$12 \text{ tickets, } 100 \text{ } \$8 \text{ tickets, and } 21 \text{ } \$15 \text{ tickets.}}$

16. $\boxed{6 \text{ medium pizzas, } 17 \text{ large pizzas, and } 13 \text{ small pizzas.}}$

Review Exercise

1. (a) $\boxed{-2x - 7y}$

(b) $\boxed{1.97x}$

(c) $\boxed{6a - 7}$

(d) $\boxed{x + 3y}$

(e) $\boxed{9a^2 - 4b - 4c}$

(f) $\boxed{-x^2 + 3x + 1}$

2. (a) $\boxed{-15a}$

(b) $\boxed{28mx}$

(c) $\boxed{-7}$

Exercise 2.7

A. 1. $\boxed{\$28.28.}$

2. $\boxed{\$864.}$

3. $\boxed{\$35.00.}$

4. $\boxed{\$18.90.}$

5. $\boxed{192.}$

6. $\boxed{\$9.20.}$

7. $\boxed{\$670.}$

8. $\boxed{65 \text{ cm.}}$

- (d) $-3ab$
- (e) $36xy$
- (f) $24abc$
- (g) $-12x + 20y + 4$
- (h) $x - 2x^2 - x^3$
- (i) $-6x + 4$
- (j) $7a - 4$
- (k) $26a - 29$
- (l) $14ax - 2a^2 + 10a$
- (m) $2m^2 - 7m + 5$
- (n) $3a^3 - 8a^2 - 5a + 6$
- (o) $-14x^2 + 34x + 36$
- (p) $-26am^2 + 26am + 37a$
3. (a) -47
- (b) $6\frac{1}{3}$
- (c) 0.16
- (d) 200
- (e) $\$645.10$
- (f) 2500
4. (a) -243
- (b) $\frac{16}{81}$
- (c) 1
- (d) $-\frac{1}{3}$
- (e) $\frac{625}{16}$
- (f) 1
- (g) $-19\ 683$
- (h) 1024
- (i) $59\ 046$
- (j) m^{12}
- (k) $\frac{16}{81}$
- (l) $\frac{25}{16}$
- (m) 1.03^{150}
- (n) $(1+i)^{80}$
- (o) 1.05^{150}
- (p) $16x^4y^4$
- (q) $\frac{81}{a^8b^4}$
- (r) $\frac{1}{(1+i)^n}$
5. (a) 0.96
- (b) 1.012126
- (c) 1.07
- (d) 0.968442
- (e) 1.098612
- (f) -2.995732
- (g) 7.087540
- (h) 9.871647
6. (a) $x = -7$
- (b) $x = 880$
- (c) $x = -21$
- (d) $x = -18$
- (e) $x = 3$
- (f) $x = -11$
- (g) $x = 250$
- (h) $x = 40$
- (i) $x = -5$
- (j) $x = 7$
- (k) $x = 39$
- (l) $x = 56$
7. (a) $x = -7$
- (b) $x = 5$
- (c) $x = -3$
- (d) $x = -\frac{7}{12}$
- (e) $x = 7$
- (f) $x = -\frac{1}{3}$
- (g) $x = -\frac{1}{2}$
8. (a) $r = \frac{I}{Pt}$
- (b) $t = \frac{S-P}{Pr}$
- (c) $\frac{D}{L}$
- (d) $\left[\frac{FVp}{(1+p)^n - 1} \right]$
9. (a) $138.$
- (b) $\$63\ 350.$
- (c) $\$117.$
- (d) $\$44\ 500.$
- (e) $\begin{matrix} \text{heat } \$814 \\ \text{power } \$1056 \\ \text{water } \$341 \end{matrix}$
- (f) $\$37\ 500$
- (g) 35 minutes.
- (h) $\begin{matrix} \text{superlight poles} \\ \text{is } 27; \\ \text{ordinary poles is } 45. \end{matrix}$
- (i) $164.$

Self-Test

1. (a) $-2 - 8x$
 (b) $-2x - 9$
 (c) $-16a - 7$
 (d) $-6x^2 + 6x + 12$
2. (a) -7
 (b) $18\frac{2}{3}$
 (c) 0.192
 (d) 0.4
 (e) 1474
 (f) 1450
3. (a) -8
 (b) $\frac{4}{9}$
 (c) 1
 (d) 2187
 (e) $\frac{9}{16}$
 (f) $-x^{15}$
4. (a) 1.030465
 (b) 23.114767
 (c) 0.024693
 (d) 0.898612
 (e) 5.755972
 (f) 7.270789
5. (a) $n = 6$
 (b) $n = 5$
6. (a) $x = -36$
 (b) $x = 9$
 (c) $x = 20$
 (d) $x = -3$
 (e) $x = 3$
 (f) $x = 35$
 (g) $x = 25$
 (h) $x = 2$
7. (a) $P = \frac{I}{rt}$
 (b) $d = \frac{S - P}{St}$
8. (a) $\$240.$
 (b) $4600\text{square metres.}$
 (c) $55.$
 (d) $\$4500.$