Student Workbook Answers

Chapter 1

1.1 Activity

1. a. *Sample answer*: What is the total amount of trash collected from 2010 to 2013?; addition; You are trying to find the combined amount for the given years, so this indicates a sum.

$2130 + 3975 + 4970 + 6390$; 17,465 pounds

b. *Sample answer*: How many more pounds of recyclables were collected in 2013 than in 2010?; subtraction; You are trying to find the difference of the amounts for the two given years.

$1095 - 183$; 912 more pounds

c. *Sample answer*: How many times more recyclables were collected in 2012 than in 2010? division; Even though it says "times" in the question, you know both values from the two given years. Multiplying would not make sense here. So, you are looking for a quotient.

$732 \div 183$; 4 times more

d. *Sample answer*: The amount of trash collected in 2014 is estimated to be twice the amount collected in 2011. What is that amount?; multiplication; You are trying to find an amount that is double the amount in 2011, so this indicates a product.

3975×2; 7950 pounds

2. a. *Sample answer*: Round each number in the sum to the nearest thousand, then add.

$$\begin{array}{r} 2130 \\ 3975 \\ 4970 \\ +\ 6390 \\ \hline \end{array} \qquad \begin{array}{r} 2000 \\ 4000 \\ 5000 \\ +\ 6000 \\ \hline 17{,}000 \end{array} \approx 17{,}465$$

b. *Sample answer*: Find the sum of the difference, 912, and the number being subtracted, 183. The sum is equal to the greater number in the expression.

$$\begin{array}{r} 912 \\ +\ 183 \\ \hline 1095 \end{array}$$

c. *Sample answer*: Round each number in the quotient $732 \div 183$ using compatible numbers, i.e., numbers that are easy to calculate.

$$183\overline{)732} \qquad \begin{array}{r} 4 \\ 200\overline{)800} \end{array}$$

d. *Sample answer*: Multiply the thousands, then hundreds, then tens, and then ones. Then add the results.

$$\begin{array}{r} 3000 \\ \times\ \ 2 \\ \hline 6000 \end{array} \qquad \begin{array}{r} 900 \\ \times\ \ 2 \\ \hline 1800 \end{array} \qquad \begin{array}{r} 70 \\ \times\ \ 2 \\ \hline 140 \end{array} \qquad \begin{array}{r} 5 \\ \times\ \ 2 \\ \hline 10 \end{array}$$

7800 150

7950

3. a. Lake Huron and Lake Erie

b. Lake Superior

c. Lake Huron

d. *Sample answer*: about 94,000 mi^2

4. *Sample answer*: Look for key words or phrases in the problem that indicate which operation to use to solve.

5.

4	9	2
3	5	7
8	1	6

The only row, column, or diagonal that has all three numbers is the diagonal with 8, 5, and 2. So, you know the sum for the magic square is $8 + 5 + 2 = 15$. The center column has two numbers. Because $9 + 5 = 14$, you can use mental math to determine that the bottom number in the center column is 1. Because $8 + 1 = 9$, you can use mental math to determine that the bottom number in the right column is 6, and so on.

1.1 Practice

1. 2531 **2.** 4983 **3.** 6076 **4.** 4282

5. 2364 **6.** 2192 **7.** 1575 **8.** 7584

9. 84,710 **10.** 18 **11.** 7 **12.** 30

13. $338\frac{5}{16}$ **14.** $43\frac{171}{181}$ **15.** $281\frac{8}{29}$

16. subtraction **17.** multiplication

18. division

19. Perimeter $= 18$ cm; Area $= 18$ cm^2

20. Perimeter $= 30$ yd; Area $= 50$ yd^2

21. 320×17; Because 320 and 335 are close to each other, 17 of the numbers would be greater than 12 of them.

22. 9 guests per table. Some tables will have 10 guests.

Student Workbook Answers

1.2 Activity

1. 5; 25; 125; 625; 780; $5 + 25 + 125 + 625 = 780$

2.

Repeated Factors	Using an Exponent	Value
a. 4×4	4^2	16
b. 6×6	6^2	36
c. $10 \times 10 \times 10$	10^3	1000
d. $100 \times 100 \times 100$	100^3	1,000,000
e. $3 \times 3 \times 3 \times 3$	3^4	81
f. $4 \times 4 \times 4 \times 4 \times 4$	4^5	1024
g. $2 \times 2 \times 2 \times 2 \times 2 \times 2$	2^6	64

h. *Sample answer:* 3 is the base number, or the number being multiplied. 5 is the exponent and determines how many times the base number is used as a factor.

3. a–d. *Answer should include, but is not limited to:* Students should write their own "St. Ives" poems with illustrations. Students should then answer the question in their poems and show how exponents are used in their answers.

4. *Sample answer:* Real-life situations use repeated factors when something is multiplied by the same amount each time. For example: An earring design has 3 beads at the top. Each bead has 3 more beads below it. The number of beads in an earring is $3 \times 3 = 3^2 = 9$.

5.

10	100	1000	10,000	100,000	1,000,000
10^1	10^2	10^3	10^4	10^5	10^6

The exponent is the same as the number of zeros in the number.

1.2 Practice

1. 6^2 **2.** 8^3 **3.** 3^4

4. 12^2 **5.** 4^4 **6.** 10^5

7. $2 \times 2 \times 2 \times 2 = 2^4$ **8.** 81

9. 81 **10.** 343 **11.** \$4000

12. yes **13.** no **14.** no

15. yes **16.** yes **17.** no

18. any two of the following: 121; 144; 169; 196

19.

Power	1^1	1^2	1^3	1^4	1^5
Value	1	1	1	1	1

Any power of 1 is always 1.

20. a. 4 **b.** 7 **c.** 10 **21.** 3^4

1.3 Activity

1. a. 14; 11; no **b.** 7; 7; yes **c.** 8; 2; no
d. 8; 2; no **e.** 30; 16; no **f.** 16; 16; yes
g. 15; 3; no **h.** 5; 5; yes

2. a. $(4 + 5) \div 3$ **b.** $(8 \times 2) - 5$
c. $16 \times (4 \div 4)$ or $(16 \times 4) \div 4$
d. $(11 - 3) \div 8$ or $(11 - 8) \div 3$
e. $(2 + 5) \times 10$

3. a. 0 **b.** $\frac{17}{12}$ **c.** 7
d. 0.9 **e.** \$4.15 **f.** \$46.52

4. An order of operations is necessary so that everyone will get the same answer. *Sample answer:* Without an order of operations, the expression $7 + 4 \times 5$ could be 55 or 27.

5. Changes the order of operations

1.3 Practice

1. 4 **2.** 4 **3.** 3

4. 3 **5.** 32 **6.** 39

7. 10 **8.** 7 **9.** 1

10. $56 \div 4 \times 2 = 14 \times 2 = 28$

11. 12 problems **12.** 3

13. 44 **14.** 16 **15.** 21

16. 3 **17.** 52 **18.** 145 cents

19. *Sample answer:* $14 \div 7 + 5 - 2 \times 3$

20. \$37; $3 \times 9 + 2 \times 4 + 4 \times 3 - 10$

21. \$25.50; $17 \times 6 \div 4$

Student Workbook Answers

1.4 Activity

1. a–d.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

e. part (a): Numbers are even or the ones digit of each number is 0, 2, 4, 6, or 8.
part (b): the sum of the digits is divisible by 3.
part (c): The ones digit of each number is 0 or 5.
part (d): The ones digit of each number is 0.

2. a. *Sample answer:* 6, 12, 18, 24, 30, 36, 42, 48, 54, 60; The numbers are even and divisible by 3.

b. *Sample answer:* 9, 18, 27, 36, 45, 54, 63, 72, 81, 90; The sum of the digits is divisible by 9.

3. a. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47

b. i. composite; *Sample answer:* 57 has factors other than 1 and itself.

ii. prime; *Sample answer:* 67 has exactly two factors, 1 and itself.

iii. prime; *Sample answer:* 79 has exactly two factors, 1 and itself.

iv. composite; *Sample answer:* 81 has factors other than 1 and itself.

4. a. $108 = 2 \bullet 2 \bullet 3 \bullet 3 \bullet 3$

b. $80 = 2 \bullet 2 \bullet 2 \bullet 2 \bullet 5$

c. $162 = 2 \bullet 3 \bullet 3 \bullet 3 \bullet 3$

d. $300 = 2 \bullet 2 \bullet 3 \bullet 5 \bullet 5$

e. The steps could differ among groups, but final results should be the same.

5. Use divisibility rules.

6. The divisibility rules can help you determine the factors of each number in Activities 3 and 4.

1.4 Practice

1. prime; *Sample answer:* 89 has exactly two factors, 1 and itself.

2. composite; *Sample answer:* 56 has factors other than 1 and itself.

3. prime; *Sample answer:* 67 has exactly two factors, 1 and itself.

4. not possible; 152 is divisible by 2, but not divisible by 3. Therefore, 152 is not divisible by 6.

5. $14 = 1 \bullet 14$
$14 = 2 \bullet 7$

6. $26 = 1 \bullet 26$
$26 = 2 \bullet 13$

7. $51 = 1 \bullet 51$
$51 = 3 \bullet 17$

8. $18 = 1 \bullet 18$
$18 = 2 \bullet 9$
$18 = 3 \bullet 6$

9. $36 = 1 \bullet 36$
$36 = 2 \bullet 18$
$36 = 3 \bullet 12$
$36 = 4 \bullet 9$
$36 = 6 \bullet 6$

10. $47 = 1 \bullet 47$

11. $9 = 3^2$

12. $49 = 7^2$

13. $28 = 2^2 \bullet 7$

14. $50 = 2 \bullet 5^2$

15. $66 = 2 \bullet 3 \bullet 11$

16. $38 = 2 \bullet 19$

17. 700

18. 396

19. $144 = 2^4 \bullet 3^2$

20. $243 = 3^5$

21. $475 = 5^2 \bullet 19$

22. Composite because the total number of students is divisible by 3.

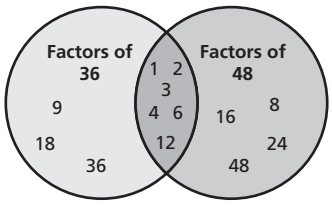
23. four arrangements; 120 by 1, 40 by 3, 24 by 5, or 8 by 15

24. a. *Sample answer*: $2 \bullet 3 \bullet 7 = 42$

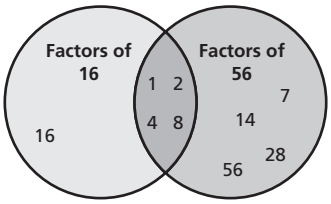
b. *Sample answer*: $2^3 \bullet 5 \bullet 7^2 = 1960$

1.5 Activity

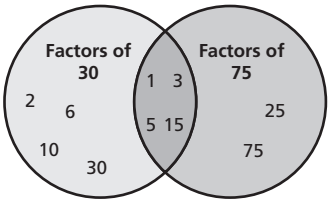
1. a. 1, 2, 3, 4, 6, 12



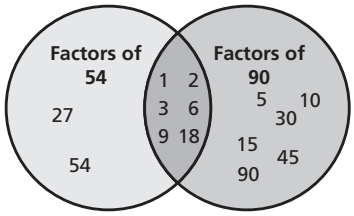
b. 1, 2, 4, 8



c. 1, 3, 5, 15



d. 1, 2, 3, 6, 9, 18



e. *Sample answer:* The greatest common factor is the greatest of the common factors.

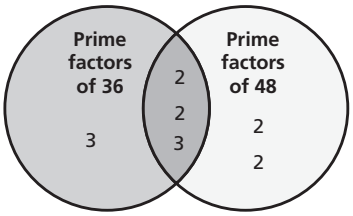
a. 12 **b.** 8 **c.** 15 **d.** 18

2. *Sample answer:* Find the product of the prime factors making sure to include the prime factors in the overlap for both numbers.

a. 18 and 27 **b.** 55 and 180

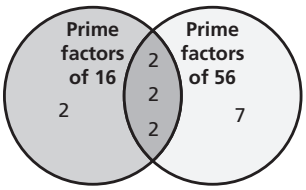
3. a. $36 = 2 \bullet 2 \bullet 3 \bullet 3$, or $2^2 \bullet 3^2$;

$48 = 2 \bullet 2 \bullet 2 \bullet 2 \bullet 3$, or $2^4 \bullet 3$



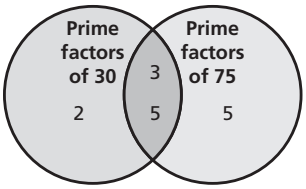
b. Part (b): $16 = 2 \bullet 2 \bullet 2 \bullet 2$, or 2^4;

$56 = 2 \bullet 2 \bullet 2 \bullet 7$, or $2^3 \bullet 7$



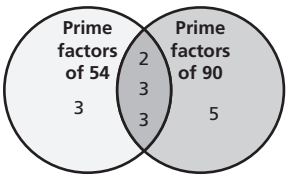
Part (c):

$30 = 2 \bullet 3 \bullet 5$; $75 = 3 \bullet 5 \bullet 5$, or $3 \bullet 5^2$



Part (d): $54 = 2 \bullet 3 \bullet 3 \bullet 3$; or $2 \bullet 3^3$;

$90 = 2 \bullet 3 \bullet 3 \bullet 5$, or $2 \bullet 3^2 \bullet 5$



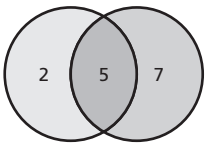
c. The product of the numbers in the overlap is equal to the greatest common factor of the numbers.

4. *Sample answer:* There are two methods you can use: (1) organize the factors of the two numbers using a Venn diagram and identify the greatest common factor, or (2) write the prime factorizations of the two numbers and find the product of their common prime factors.

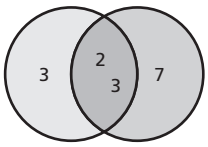
5. *Sample answer:* Make a list of the factors of each number. Identify the common factors and the greatest common factor.

1.5 Practice

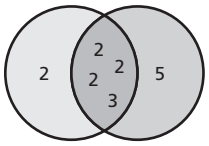
1.



2.



3.



4. 4 **5.** 11 **6.** 10 **7.** 17

8. 1 **9.** 6 **10.** 12 **11.** 15

12. 18 **13.** 39 **14.** 21 **15.** 1

16. a. 6 practice teams

b. 2 new and 2 returning female students

17. 9 **18.** 4 **19.** 8

20. *Sample answer*: 13, 26, 39

Student Workbook Answers

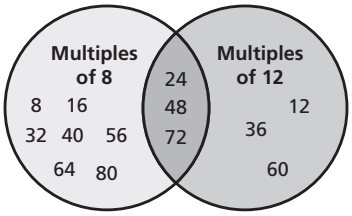
21. sometimes **22.** sometimes

23. a. 6

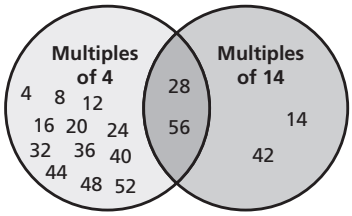
b. *Sample answer*: 54

1.6 Activity

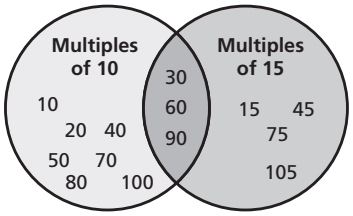
1. a. 24, 48, 72



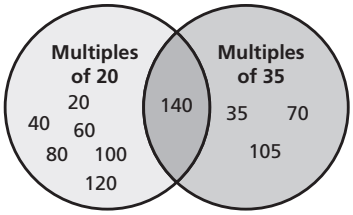
b. 28, 56



c. 30, 60, 90



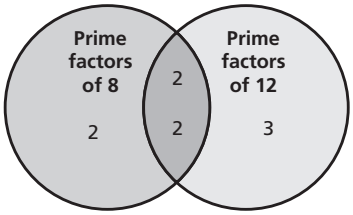
d. 140



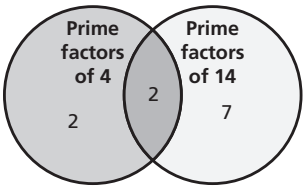
e. *Sample answer:* The least common multiple is the least of the common multiples.

a. 24 **b.** 28 **c.** 30 **d.** 140

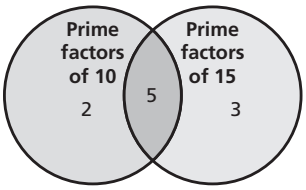
2. a. $8 = 2 \bullet 2 \bullet 2$, or 2^3; $12 = 2 \bullet 2 \bullet 3$ or $2^2 \bullet 3$



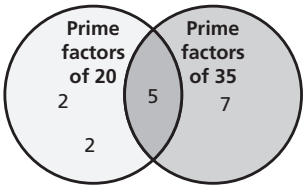
b. Part (b): $4 = 2 \bullet 2$, or 2^2; $14 = 2 \bullet 7$



Part (c): $10 = 2 \bullet 5$; $15 = 3 \bullet 5$



Part (d): $20 = 2 \bullet 2 \bullet 5$, or $2^2 \bullet 5$; $35 = 5 \bullet 7$



c. The product of all the prime factors in the diagram is equal to the least common multiple of the numbers.

3. *Sample answer:* There are two methods you can use: (1) organize the multiples of the two numbers using a Venn diagram and identify the least common multiple, or (2) write the prime factorizations of the two numbers and find the product of all their prime factors.

4. a. 120, 180 **b.** 60 **c.** 360

5. *Sample answer:* For the GCF, multiply the prime factors that appear in columns that have no empty spaces in the table. So, the GCF is $2 \bullet 2 = 4$. For the LCM, multiply the prime factors that appear in any column of the table. So, the LCM is $2 \bullet 2 \bullet 2 \bullet 3 = 24$.

6. *Sample answer:* Make a list of some common multiples of each number. Identify the common multiples and the least common multiple.

1.6 Practice

1. 6 **2.** 20 **3.** 18 **4.** 15

5. 56 **6.** 12 **7.** 14 **8.** 42

9. 48 **10.** 60 **11.** 90 **12.** 78

13. 96 **14.** 200 **15.** 168

Student Workbook Answers

16. 5 is the GCF, not LCM; The LCM is 30.

17. a. 21 days **b.** 2 piano lessons; 6 tuba lessons

18. 105 **19.** 66 **20.** 24 **21.** 7:35 A.M.

1.6 Extension Practice

1. $\frac{25}{30}, \frac{9}{30}$ **2.** $\frac{20}{36}, \frac{33}{36}$

3. $>$ **4.** $<$ **5.** $=$ **6.** $<$

7. $1\frac{1}{12}$ **8.** $\frac{7}{8}$ **9.** $3\frac{27}{28}$ **10.** $6\frac{3}{10}$

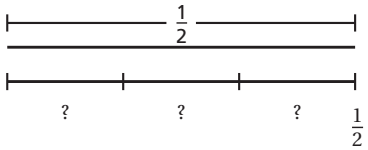
11. $\frac{1}{4}$ **12.** $\frac{23}{60}$ **13.** $4\frac{17}{28}$ **14.** $\frac{4}{9}$

15. $\frac{1}{12}$ cup **16.** $2\frac{5}{12}$ pounds

Chapter 2

2.1 Activity

1.



$\frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$

$\frac{2}{3} \times \frac{1}{2} = \frac{2}{6} = \frac{1}{3}$

You drank $\frac{1}{3}$ of the water.

2. $\frac{3}{4} \times \frac{4}{5} = \frac{12}{20} = \frac{3}{5}$ **3.** $\frac{2}{3}$ of $\frac{1}{2} = \frac{1}{3}$

4. $\frac{3}{4}$ of $\frac{4}{5} = \frac{3}{5}$ **5.** $\frac{2}{3}$ of $\frac{5}{6} = \frac{5}{9}$

6. $\frac{1}{6}$ of $\frac{1}{4} = \frac{1}{24}$ **7.** $\frac{2}{5}$ of $\frac{1}{2} = \frac{1}{5}$

8. $\frac{5}{8}$ of $\frac{4}{5} = \frac{1}{2}$

9. It means to take a part of a fraction.

10. Multiply the numerators and multiply the denominators.

2.1 Practice

1. $\frac{3}{20}$ **2.** $\frac{4}{21}$ **3.** $\frac{14}{33}$ **4.** $\frac{5}{7}$

5. $\frac{1}{4}$ **6.** $\frac{4}{25}$ **7.** $\frac{8}{39}$ **8.** $10\frac{1}{2}$

9. $1\frac{2}{3}$ **10.** $\frac{16}{81}$ **11.** $\frac{1}{6}$ **12.** $1\frac{31}{33}$

13. $\frac{3}{5}$ **14.** 4 **15.** $3\frac{1}{2}$ **16.** 80

17. $8\frac{1}{4}$ **18.** 24 **19.** $1\frac{2}{3}$ **20.** $43\frac{1}{2}$

21. 1

22. The mixed numbers must be changed to improper fractions before multiplying.

$$3\frac{7}{8} \times 6\frac{2}{5} = \frac{31}{8} \times \frac{32}{5} = \frac{31 \times \cancel{32}^{4}}{\cancel{8}_{1} \times 5} = \frac{124}{5} = 24\frac{4}{5}$$

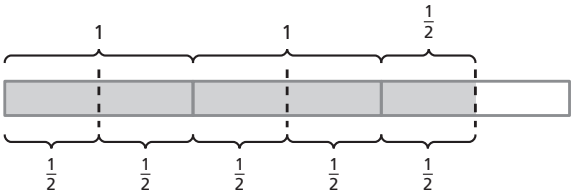
23. a. $\frac{1}{10}$ of the class **b.** 3 students

24. $6\frac{1}{2}$ ft **25.** $584\frac{3}{8}$ in.^{2}

2.2 Activity

1. a. $3 \div \frac{2}{3}$; 4; $\frac{1}{2}$; $4\frac{1}{2}$; $3 \div \frac{2}{3} = 4\frac{1}{2}$

b.



$\frac{5}{2} \div \frac{1}{2} = 5$