Name_____ Date _____

Chapter 1 Numerical Expressions and Factors

Dear Family,

When you shop at the grocery store and you place your items on the checkout stand, you usually don't ask, "Does it matter if the price of milk is added before the price of bread?" This is because you know that the order you add the items doesn't matter—but you may not realize you are using one of the mathematical properties of addition!

You and your student can have fun relating the day-to-day mathematics you use to other number properties. For example, you can ask your student:

- "Does it matter if the cashier adds three cans of peas one at a time or multiplies the price of one can by three?" Your student may answer, "The total is the same either way."
- "If you take three apples from the display and put two back, is that the same as taking two apples from the display and putting three back? How does that make subtraction different?" Your student may answer, "Order does matter with subtraction. You can't put back more than you took originally!"
- "Does it matter if you multiply the price of an item you buy by the quantity or if you multiply the quantity by the price?" Your student may answer, "The total price is the same either way. Order doesn't matter when you multiply."
- "Does order matter with division? If you divide the price of a pack of pudding cups by the number of pudding cups will you get the same answer if you divide the number of pudding cups by the price?" Your student may answer, "No, the answers are different, so order does matter with division."

Your student will be studying concepts like these in math class. See if you and your student can find other examples of mathematical properties or formulas in your day-to-day life.

Happy Shopping!

Nombre _____ Fecha _____

Capítulo 1 Expresiones numéricas y factores

Estimada Familia:

Cuando compra en la tienda de abarrotes y coloca sus productos en el mostrador de compra, generalmente no pregunta: ¿"Importa si el precio de la leche se suma antes del precio del pan"? Esto se debe a que sabe que no importa el orden en que se suman los productos—¡pero quizás no se está dando cuenta de que está usando una de las propiedades matemáticas de la adición!

Usted y su estudiante pueden divertirse relacionando las matemáticas de la vida diaria que usan con otras propiedades numéricas. Por ejemplo, puede preguntarle a su estudiante:

- ¿"Importa si el cajero suma tres latas de arvejas de una en una o si multiplica el precio de una de ellas por tres"? Su estudiante puede responder: "El total es igual de cualquier forma".
- "Si tomas tres manzanas del mostrador y regresas dos, ¿es igual que tomar dos manzanas y regresar tres? ¿Cómo hace esto que la resta sea diferente?". Su estudiante puede responder: "El orden sí importa con la resta. ¡No se puede regresar más de lo que se tomó originalmente"!
- ¿"Importa si multiplicas el precio de un producto que compras por la cantidad o si multiplicas la cantidad por el precio"? Su estudiante puede responder: "El precio total es igual de cualquier forma. El orden no importa cuando se multiplica".
- ¿"Importa el orden con la división? Si divides el precio de una caja de envases de pudín entre el número de envases de pudín, ¿obtienes la misma respuesta que si divides el número de envases de pudín entre el precio"? Su estudiante puede responder: "No, las respuestas son diferentes, así que el orden sí importa con la división".

Su estudiante estará estudiando conceptos como estos en la clase de matemáticas. Vea si su estudiante puede encontrar otros ejemplos de propiedades o fórmulas matemáticas en su vida diaria.

¡Feliz Compra!

Activity 1.1 Start Thinking!

For use before Activity 1.1

Write two real-life problems using the same numbers but different whole number operations (addition, subtraction, multiplication, or division). Switch papers with a partner and solve.

Activity 1.1 Warm Up

For use before Activity 1.1

Find the sum or product.

1. $3 + 3 + 3$

2. $7 + 7 + 5$

3. $6 + 6 + 8$

4. $7 \cdot 10$

5. 13×4

6. 17×21

Lesson 1.1 Start Thinking!

For use before Lesson 1.1

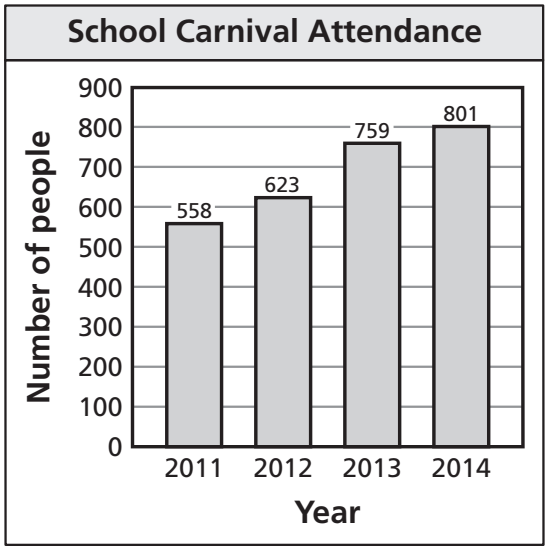
Your friend estimates the expression 12,464 + 39,783 to 10,000 + 40,000. Is this a good estimation of the expression? Explain your reasoning.

Lesson 1.1 Warm Up

For use before Lesson 1.1

The bar graph shows the attendance at a school's carnival. Write an expression you can use to answer the question. Then find the value of your expression.

1. What is the total attendance of the carnival?
2. How many more people attended the carnival in 2014 than 2012?
3. The carnival projects that the total attendance for 2015 will be double the attendance in 2012. What is the projected attendance for 2015?



Name_____ Date _____

1.1 Practice A

Find the value of the expression. Check your answer using estimation.

1. $986 + 1545$

2. $2847 + 2136$

3. $\begin{array}{r} 4767 \\ +\ 1309 \\ \hline \end{array}$

4. $8903 - 4621$

5. $\begin{array}{r} 3928 \\ -\ 1564 \\ \hline \end{array}$

6. $7612 - 5420$

7. 75×21

8. $\begin{array}{r} 316 \\ \times\ 24 \\ \hline \end{array}$

9. 394×215

10. $\frac{414}{23}$

11. $546 \div 78$

12. $3780 \div 126$

13. $5413 \div 16$

14. $\frac{7954}{181}$

15. $40{,}785 \div 145$

Determine the operation you would use to solve the problem. Do not answer the question.

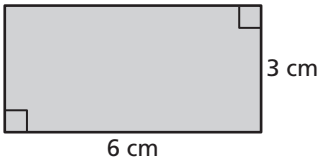
16. The box office sold a total of 1762 tickets. There were 241 balcony seat tickets sold. How many regular seat tickets were sold?

17. The warehouse has 14 aisles. Each aisle has 36 shelves. How many shelves does the warehouse have?

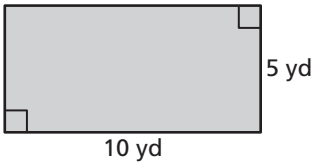
18. The orange grove produced 892 crates of oranges. Each train car holds 112 crates. What is the minimum number of train cars they will need?

Find the perimeter and area of the rectangle.

19.



20.



21. Without calculating, decide which is greater: 335×12 or 320×17. Explain.

22. There are 143 guests coming to a wedding. There are 15 tables in the reception hall. If the tables have approximately the same number of guests, what is the minimum number of guests at each table?

Name _____ Date _____

1.1 Practice B

Find the value of the expression. Check your answer using estimation.

1. $3143 + 999$

2. $\begin{array}{r} 5154 \\ +\ 2139 \end{array}$

3. $4137 + 3895$

4. $\begin{array}{r} 4123 \\ -\ 2314 \end{array}$

5. $9366 - 8549$

6. $5610 - 3462$

7. 92×17

8. 412×327

9. $\begin{array}{r} 644 \\ \times\ 189 \end{array}$

10. $2584 \div 152$

11. $\frac{1540}{44}$

12. $4004 \div 143$

13. $\frac{8167}{219}$

14. $4199 \div 99$

15. $29{,}104 \div 135$

16. You sign up for 13 weeks of swim lessons. The total cost is $325. What is the cost per week?

17. The cafeteria has 75 tables and 912 chairs. What is the total number of tables and chairs?

18. The convention center has 18 pianos. Each piano has 88 piano keys. What is the total number of piano keys?

19. You have 800 square feet of the room reserved for tables.

a. Each round table requires 49 square feet. How many round tables will fit in 800 square feet?

b. Each rectangular table requires 64 square feet. How many rectangular tables will fit in 800 square feet?

c. The round tables seat 8 people. The rectangular tables seat 12 people. Using your answers in (a) and (b), which type of table will seat more people in the allotted 800 square feet, *round* or *rectangular*?

Name_____ Date _____

1.1 Enrichment and Extension

Finding Decimal Equivalents

Long division can be used to find the decimal equivalent of a fraction. To find the decimal from a fraction, divide the denominator into the numerator. The decimal point in the quotient is placed directly above the decimal point in the dividend.

Example: Find the decimal equivalent of $\frac{3}{8}$.

Place eight as the divisor and three as the dividend. Place the decimal point directly behind three and add zeros as necessary. The quotient has a decimal point directly above the decimal point in the dividend.

$$
\begin{array}{r}
0.375 \\
8\overline{)3.000} \\
-\,24 \\
\hline
60 \\
-\,56 \\
\hline
40 \\
-\,40 \\
\hline
0
\end{array}
$$

So, the decimal equivalent of $\frac{3}{8}$ is 0.375.

Find the batting averages for each of your eight Little League baseball teammates. To find a batting average, divide the number of hits by the number of at bats.

Name	At Bats	Hits	Batting Average
Howard	8	5	
Bryant	12	3	
Bill	18	9	
Brien	8	1	
Joe	16	6	
Pat	24	6	
Michael	20	8	
Robin	10	3	

Name _____ Date _____

1.1 Puzzle Time

Did You Hear About The...

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

320 FOR
4436 TEST
181,632 BECAUSE
40 TO
4091 SPIDER
15,275 CAR
52 FAST
4460 TO
$44\frac{17}{164}$ IT
6 WANTED
18,622 WEB

Find the value of the expression.

A. $3328 + 763$

B. $6462 + 2841$

C. $2857 + 2788$

D. $8583 - 4123$

E. $6054 - 1618$

F. $3527 - 2072$

G. 73×26

H. 235×65

I. 528×344

J. $24\overline{)864}$

K. $432 \div 72$

L. $8960 \div 224$

M. $\frac{5409}{50}$

N. $\frac{7233}{164}$

O. Piano lessons cost $20 per week. How much will it cost, in dollars, for 16 weeks of piano lessons?

P. The scores of the first two football games were 28 and 35. What was the total number of points scored in the first two football games?

Q. The school store has 14 boxes of notebooks with the school mascot on them. If there are 980 notebooks, how many notebooks are in each box?

5645 ASKED
$108\frac{9}{50}$ TAKE
63 A
1455 DRIVE
60 SIGN
1898 A
70 SPIN
36 HE
7 BUMPER
9303 THAT
11 LIMIT

Activity 1.2 Start Thinking!

For use before Activity 1.2

Why is $4 \times 4 \times 4$ called a "product of repeated factors?"

Give another example of a product of repeated factors.

Describe a real-life situation that involves a product of repeated factors.

Activity 1.2 Warm Up

For use before Activity 1.2

Find the product.

1. $5 \times 5 \times 5 \times 5$

2. $3 \times 3 \times 3$

3. $7 \times 7 \times 7$

4. $10 \times 10 \times 10 \times 10 \times 10$

5. 11×11

6. $20 \times 20 \times 20 \times 20$

Lesson 1.2 Start Thinking!

For use before Lesson 1.2

How many great-great-great-grandparents do you have in your family tree? Explain the method you used to figure it out.

How does this relate to the concept of repeated factors?

Lesson 1.2 Warm Up

For use before Lesson 1.2

Write the product as a power.

1. $8 \times 8 \times 8 \times 8$

2. $2 \times 2 \times 2 \times 2 \times 2$

3. 17×17

4. $100 \times 100 \times 100$

5. $32 \times 32 \times 32$

6. $3 \times 3 \times 3 \times 3 \times 3 \times 3$

Name_____ Date _____

1.2 Practice A

Write the product as a power.

1. 6×6

2. $8 \times 8 \times 8$

3. $3 \times 3 \times 3 \times 3$

4. $12 \bullet 12$

5. $4 \times 4 \times 4 \times 4$

6. $10 \bullet 10 \bullet 10 \bullet 10 \bullet 10$

7. Describe and correct the error in writing the value of the product.

$2 \times 2 \times 2 \times 2 = 4^2$

Find the value of the power.

8. 9^2

9. 3^4

10. 7^3

11. The amount of money in your savings account is 4×10^3. How much money is in your account?

Determine whether the number is a perfect square.

12. 9

13. 12

14. 50

15. 64

16. 100

17. 34

18. Write two perfect squares that each have a value greater than 100 and less than 200.

19. Copy and complete the table. Then describe how to write any power of 1 without multiplying.

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

20. The following items are in the shape of a square. How many squares are in each row?

a. A waffle has 16 squares.

b. A magic square has 49 squares.

c. A tile game has 100 squares.

21. Bob has three pennies. Betty has three times as many pennies as Bob. Bill has three times as many pennies as Betty. Barb has three times as many pennies as Bill. Write a power to represent the number of pennies that Barb has.

Name _____ Date _____

1.2 Practice B

Write the product as a power.

1. 12×12 **2.** $4 \bullet 4 \bullet 4$ **3.** $5 \times 5 \times 5 \times 5$

4. $25 \times 25 \times 25$ **5.** $30 \times 30 \times 30 \times 30 \times 30$ **6.** $17 \bullet 17 \bullet 17$

Find the value of the power.

7. 13^2 **8.** 2^5 **9.** 8^3

Use a calculator to find the value of the power.

10. 5^6 **11.** 13^4 **12.** 3^8

13. Describe and correct the error in writing the value of the product.

$7^5 = 7 \times 5 = 35$

14. The price of a car is 3×10^4. What is the price of the car?

Determine whether the number is a perfect square.

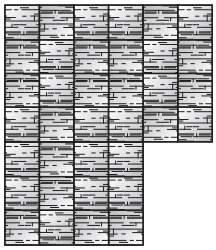
15. 169 **16.** 625 **17.** 336

Write the product as a power.

18. $d \bullet d \bullet d \bullet d$ **19.** $5 \bullet z \bullet z \bullet z$ **20.** $p \bullet p \bullet p \bullet p \bullet p \bullet p$

21. The number 75 falls between what two perfect squares?

22. A homeowner would like to modify the existing patio to create a square patio, either by adding new tiles or moving existing tiles. Each tile is one foot square. The current patio is shown.



a. What is the area of the existing patio in square feet?

b. How could the homeowner rearrange the tiles to create a square patio without adding new tiles?

c. How many tiles must the homeowner purchase to create a patio that is 49 square feet? Can this be done without moving any of the existing tiles?

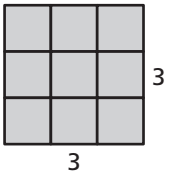
d. To create a patio that is 25 square feet, the homeowner must move some tiles and remove others. How many tiles must be moved and how many must be removed?

Name_____ Date _____

1.2 Enrichment and Extension

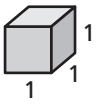
Finding Volume

The square of a whole number is a perfect square. Perfect squares describe the area of squares.



Area = $3^2 = 9$ square units

The cube of a whole number is a perfect cube. Perfect cubes describe the volume of cubes.



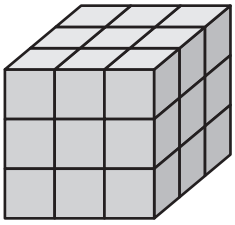
Volume = (side length)$^3 = 1^3 = 1$ cubic unit

1. Copy and complete the table to find the first five perfect cubes.

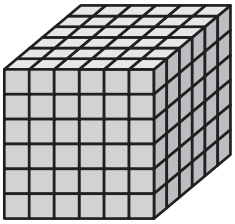
Whole Number	1	2	3	4	5
Repeated Factor	$1 \times 1 \times 1$				
Value	1				

Find the volume of the cube.

2.



3.



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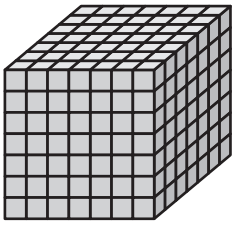

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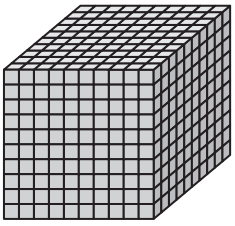


Name _____ Date _____

1.2 Puzzle Time

Did You Hear About...

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

15 HITS	
5^3 CREATED	
46 CATCHER	
27 HE	
No LOT	
7^3 SITE	
64 WANTED	
11^5 WEB	
36 GET	
3^5 PLAYER	
71 SURF	

Write the product as a power.

A. 8×8

B. 12×12

C. $3 \times 3 \times 3 \times 3 \times 3$

D. $9 \bullet 9 \bullet 9 \bullet 9$

E. $5 \bullet 5 \bullet 5$

F. $4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4$

G. $11 \bullet 11 \bullet 11 \bullet 11 \bullet 11$

H. $7 \times 7 \times 7$

Find the value of the power.

I. 2^4

J. 3^3

K. 4^3

L. 10^4

M. 6^2

N. 5^2

Determine whether the number is a perfect square.

O. 12

P. 144

Q. You are arranging chairs in the auditorium for the talent show. The number of rows is to be the same as the number of chairs per row. You will need a total of 225 chairs. How many chairs will be in each row?

25 A	
12^2 BASEBALL	
10,000 TO	
8^2 THE	
56 INNING	
9^4 WHO	
72 HOMERUN	
4^6 A	
Yes OF	
16 BECAUSE	
17 STRIKE	

Activity 1.3 Start Thinking!

For use before Activity 1.3

When you get dressed each morning for school, does the order in which you put on clothing matter? Why or why not?

How is this situation related to the order of operations in mathematics?

Activity 1.3 Warm Up

For use before Activity 1.3

Evaluate the expression.

1. $10.5 - 8.7$

2. $13.3 + 24.9$

3. $10.1 - 4.3$

4. $\$25.79 + \$6.55$

5. $\$12.25 + \$4.79$

6. $\$18.66 - \$17.91$

Lesson 1.3 Start Thinking!

For use before Lesson 1.3

Students often use the phrase

Please **E**xcuse **M**y **D**ear **A**unt **S**ally

to remember the correct order of operations in evaluating a numerical expression.

1. Perform operations in **P**arentheses.

2. Evaluate numbers with **E**xponents.

3. **M**ultiply or **D**ivide from left to right.

4. **A**dd or **S**ubtract from left to right.

What are some problems that students may run into using this phrase to remember the correct order of operations?

Lesson 1.3 Warm Up

For use before Lesson 1.3

Find the value of the expression.

1. $12 + (7 - 3)$

2. $2 \times (12 \div 6)$

3. $(4 + 9) - 2$

4. $20 - (10 + 2)$

5. $32 \div (4 + 4)$

6. $(3 \times 7) + 4$

Name_____ Date _____

1.3 Practice A

Find the value of the expression.

1. $2 \times (5 - 3)$

2. $16 - (4 \times 3)$

3. $27 \div (3 + 6)$

Evaluate the expression.

4. $15 - 4 \times 3$

5. $5 + (2 + 1)^3$

6. $7 + 4 \times 2^3$

7. $30 \div 6 \times 2$

8. $4 + 6^2 \div 12$

9. $13 - (28 - 4^2)$

10. Describe and correct the error in evaluating the expression.

$$\times \quad 56 \div 4 \times 2 = 56 \div 8 = 7$$

11. For a math project, you need to complete 4 math worksheets in 5 days. Each worksheet contains 15 problems. Evaluate the expression $4 \times 15 \div 5$ to find how many problems you need to complete each day.

Evaluate the expression.

12. $(49 - 5^2) \div 2^3$

13. $7^2 - 5(10 - 3^2)$

14. $\left(\frac{5}{2} - \frac{3}{2}\right)^3 \times 16$

15. $33 - 6\left(1\frac{1}{3} + \frac{2}{3}\right)$

16. $18 - 5(4.7 - 1.7)$

17. $12(1.4 + 3.6) - 24 \div 3$

18. You have 8 dimes and 13 nickels. How many cents do you have?

19. Use all four operations without parentheses to write an expression that has a value of 1.

20. A family buys 3 dinners at \$9 each, 2 kid's meals at \$4 each, and 4 desserts at \$3 each. After using a \$10 off coupon, how much do they owe before sales tax? Explain how you solved the problem.

21. Four family members are going on an airplane trip together. They are parking a car at the airport terminal. The daily rate for parking a car is \$17 per car. The cars will be parked for 6 days. What is the total cost per family member? Explain how you solved the problem.

Name _____ Date _____

1.3 Practice B

Evaluate the expression.

1. $64 \div 4 \times 10$

2. $55 \div \left(4^2 - 5\right)$

3. $3 \bullet 7 + 4 \bullet 6^2$

4. $(22 - 4) \div (2 \times 3)$

5. $8^2 - 20 \div 2 \times 5$

6. $13 + \left(38 - 6^2\right) \bullet 3$

7. Evaluate each expression. Are the two expressions equal? Explain your answer.

a. $(100 \div 5) \times 4$

b. $100 \div 5 \times 4$

Evaluate the expression.

8. $(5 - 3)^4 - 2(7) + 8^2$

9. $27 - 3\left(5\frac{1}{2} - \frac{7}{2}\right)$

10. $9(6.2 + 5.8) + 28 \div 4$

11. $4^2(4.9 - 2.9) - 24 \div 3$

12. There are 34 people in a restaurant. Four groups of 3 people leave, and then 5 groups of 2 people arrive. Evaluate the expression $34 - 4 \bullet 3 + 5 \bullet 2$ to determine how many people are in the restaurant.

Evaluate the expression.

13. $\dfrac{11^2 - 5 + 4(7)}{(4)(3)}$

14. $\dfrac{54 \div 6 + 31}{4^2 + 4}$

15. A group of 8 students purchase 4 pizzas at \$5 each, 2 orders of breadsticks at \$2 each, and 8 drinks at \$1.50 each. How much does each student owe before tax? Explain how you solved the problem.

16. Five sandwich rings are each cut into 4 pieces. You then cut each of the pieces into 3 servings. How many servings do you have?

17. Copy each statement. Insert $+, -, \times,$ or $\div$ symbols to make each statement true.

a. $17 \_?\_ 2 \_?\_ 3 \_?\_ 8 = 3$

b. $33 \_?\_ 3 \_?\_ 2 \_?\_ 5 = 1$

Name_____ Date _____

1.3 Enrichment and Extension

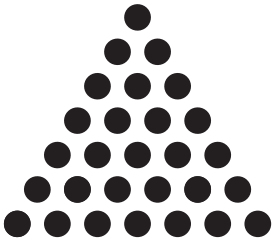
Triangular Numbers

A triangular number is the number of dots it takes to construct an equilateral triangle.

Triangular numbers can be found by arranging dots to form equilateral triangles or by adding a number and its square, then dividing by two.

Example: Find the seventh triangular number.

$$\frac{7^2 + 7}{2} = \frac{49 + 7}{2}$$
$$= \frac{56}{2}$$
$$= 28$$



So, the seventh triangular number is 28.

1. Copy and complete the table.

Triangular Number	Number of Dots	Picture
First	1	•
Second		
Third		
Fourth		

Use the information about triangular numbers to complete the questions.

2. Find the fifth triangular number.

3. Draw the picture of the fifth triangular number.

4. How many more dots must be added to the picture in Exercise 3 to produce the sixth triangular number?

5. Describe the pattern between the number of dots in the triangular numbers.

Name _____ Date _____

1.3 Puzzle Time

Which King Was Purple and Had Many Wives?

Write the letter of each answer in the box containing the exercise number.

Evaluate the expression.

1. $15 + 8 \div 2$

2. $3 \times 7 - 2 \times 3$

3. $(6 + 10) \div 2$

4. $4 \times (12 - 4)$

5. $3^2 + 4^2 + 2^2$

6. $(15 - 10)^2 + (15 - 5)^2$

7. $33 \div 11 \times 12 \div 2$

8. $9(3 + 2) - 3(8 - 7)$

9. $7 \times (6 - 3)^2$

10. $20 - 4^2 + 3^3$

11. $\left(\frac{1}{3} + 2\frac{2}{3}\right) \times 13$

12. $60 \div \left(6\frac{1}{7} - \frac{1}{7}\right) \times 4$

13. $(0.6 + 7.4)^2 - 14$

14. $4 \times (10.1 + 1.9) \div 2$

15. $\frac{2^4 \times 5 + 8}{4}$

16. $\frac{5(12 - 5) + 13}{6 + 2}$

17. You plan to practice playing guitar for 15 minutes on three weekdays and 20 minutes each on Saturday and Sunday. Evaluate the expression $15 \times 3 + 20 \times 2$ to find the number of minutes you will practice during the entire week.

Answers

E. 18
N. 22
N. 29
R. 50
P. 6
H. 15
G. 85
T. 31
R. 24
E. 19
G. 42
A. 8
E. 125
I. 39
K. 32
Y. 63
H. 40

4	11	15	8		12	1	5	13	9		10	2	6		17	14	3	16	7

Activity 1.4 Start Thinking!

For use before Activity 1.4

List the numbers from 1 to 20. Circle the numbers that are prime and put a box around the numbers that are composite.

What is the difference between the prime numbers and the composite numbers?

Which number is neither prime nor composite?

Activity 1.4 Warm Up

For use before Activity 1.4

Multiply.

1. 2×15 **2.** 7×15 **3.** 5×14

4. 7×10 **5.** 13×4 **6.** 17×21

Lesson 1.4

Start Thinking!

For use before Lesson 1.4

Is the number 1260 divisible by 2, 3, 5, 6, 9, and 10? Explain. Use a calculator to check your answers.

Write a number on your paper. Switch papers with a partner. Determine whether the number is divisible by 2, 3, 5, 6, 9, and 10.

Lesson 1.4

Warm Up

For use before Lesson 1.4

Use divisibility rules to determine whether the number is divisible by 2, 3, 5, 6, 9, and 10. Use a calculator to check your answers.

1. 780

2. 3675

3. 3132

4. 930

5. 2178

6. 3510

Name_____ Date _____

1.4 Practice A

Use divisibility rules to determine whether the number is divisible by 2, 3, 5, 6, 9, and 10. Use calculator to check your answers.

1. 1200 **2.** 1515 **3.** 1071

4. A baseball camp is held at a complex that has 6 baseball diamonds. The coaches would like each diamond to have the same number of campers. Use divisibility rules to determine whether this is possible if 152 kids show up for the camp.

List the factor pairs of the number.

5. 14 **6.** 26 **7.** 51

8. 18 **9.** 36 **10.** 47

Write the prime factorization of the number.

11. 9 **12.** 49 **13.** 28

14. 50 **15.** 66 **16.** 38

Find the number represented by the prime factorization.

17. $2^2 \bullet 5^2 \bullet 7$ **18.** $2^2 \bullet 3^2 \bullet 11$

Write the prime factorization of the number.

19. 144 **20.** 243 **21.** 475

22. A teacher divides the students into three groups for a project. Each group has the same number of students. Is the total number of students *prime* or *composite*? Explain.

23. The glee club has 120 cupcakes to sell. They have decided to arrange the cupcakes in the shape of a rectangle, such that the rows have an even number of cupcakes and the columns have an odd number of cupcakes. How many arrangements of cupcakes can they create? Explain.

24. Find composite numbers that have the following characteristics:

a. A number greater than 40 whose prime factorization contains 3 prime numbers that do not repeat.

b. A number greater than 1000 whose prime factorization contains 1 prime number that does not repeat, 1 prime number that repeats 3 times, and 1 prime number that repeats twice.

Name _____ Date _____

1.4 Practice B

Use divisibility rules to determine whether the number is divisible by 2, 3, 5, 6, 9, and 10. Use a calculator to check your answers.

1. 1035 **2.** 1830 **3.** 2061

List the factor pairs of the number.

4. 23 **5.** 44 **6.** 57

7. 32 **8.** 50 **9.** 61

10. Describe and correct the error in writing the factor pairs of 30.

$30 = 2 \bullet 15$
$30 = 3 \bullet 10$
$30 = 5 \bullet 6$

Write the prime factorization of the number.

11. 64 **12.** 40 **13.** 42

14. 72 **15.** 85 **16.** 91

Find the number represented by the prime factorization.

17. $3^2 \bullet 7 \bullet 11$ **18.** $5^2 \bullet 11^2 \bullet 17$

19. The prime factorization of a number is the product of the first 5 prime numbers. Find the number.

Write the prime factorization of the number.

20. 875 **21.** 256 **22.** 594

23. A friend is building a dog pen with an area of 150 square feet. Each side must be at least 5 feet long.

a. List all possible dimensions of the dog pen.

b. What is the maximum amount of fence required to build the dog pen? How much fence is required?

c. What dimensions would provide the longest running path for the dog?

Name_____ Date _____

1.4 Enrichment and Extension

Divisibility by Seven

To check a three-digit number for divisibility by seven, multiply the last digit by two and subtract the result from the remaining digits of the number. If the answer is divisible by seven, then the original number is also divisible by seven.

Example: Check 693 for divisibility by seven.

Multiply three by two and then subtract from 69. If the resulting number is divisible by seven, then 693 is divisible by seven.

$3 \times 2 = 6$	Multiply 3 and 2.
$69 - 6 = 63$	Subtract 6 from 69.
$63 \div 7 = 9$	Divide 63 by 7.

Because 63 is divisible by 7, 693 is also divisible by 7.

Determine if the number is divisible by seven.

1. 604 **2.** 651 **3.** 460

4. 235 **5.** 343 **6.** 427

7. 178 **8.** 833 **9.** 280

10. Write a rule to determine if a three-digit number is divisible by seven and 10.

11. How is the divisibility rule for 7 more complicated than the rules for 2, 3, 5, and 10?

Name _____ Date _____

1.4 Puzzle Time

Did You Hear About...

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S					

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

1, 63; 3, 21; 7, 9 A	
90 TO	
$3^2 \bullet 5$ BAG	
$3 \bullet 5^2$ SPEND	
3^4 TO	
1, 18; 2, 9; 3, 6 THE	
300 WAKE	
$3 \bullet 11$ HAD	
252 WEEKS	
1, 55; 5, 11 BOUGHT	
1, 16; 2, 8; 4, 4 UP	

List the factor pairs of the number.

A. 18 **B.** 36

C. 41 **D.** 55

E. 63 **F.** 87

Write the prime factorization of the number.

G. 12 **H.** 45

I. 60 **J.** 33

K. 81 **L.** 75

Find the number represented by the prime factorization.

M. $2 \bullet 5 \bullet 17$ **N.** $2^2 \bullet 3^2 \bullet 7$

O. $2^2 \bullet 5 \bullet 11$ **P.** $2 \bullet 3^2 \bullet 5$

Q. $2^2 \bullet 3 \bullet 5^2$ **R.** $2 \bullet 3 \bullet 5^2$

S. The football cheerleaders consist of 16 members. The cheerleading coach places the cheerleaders in rows. Each row has the same number of members. Find the possible row arrangements.

1, 36; 2, 18; 3, 12; 4, 9; 6, 6 CAMPER	
400 SUNRISE	
1, 87; 3, 29 NEW	
$2^2 \bullet 3 \bullet 5$ AND	
170 TWO	
5^2 NIGHT	
1, 41 WHO	
150 IT	
220 TRYING	
$2^2 \bullet 3$ SLEEPING	

Activity 1.5 Start Thinking!

For use before Activity 1.5

Write out the steps to find the prime factorization of 56.

Pick your own number. Review with a partner the steps in finding the prime factors of that number.

Activity 1.5 Warm Up

For use before Activity 1.5

Write the prime factorization of the numbers.

1. 18 **2.** 55 **3.** 75

4. 84 **5.** 93 **6.** 102

Lesson 1.5 Start Thinking!

For use before Lesson 1.5

You have 126 pieces of chocolate candy and 60 pieces of hard candy to put into gift bags. You want identical groups of candy in each bag with no candy left over. Explain how you can use a Venn diagram to determine the maximum number of gift bags you can make.

Lesson 1.5 Warm Up

For use before Lesson 1.5

Use a Venn diagram to find the greatest common factor of the numbers.

1. 12, 24

2. 18, 30

3. 54, 72

4. 56, 84

5. 27, 36

6. 18, 60

Name_____ Date _____

1.5 Practice A

Use a Venn diagram to find the greatest common factor of the numbers.

1. 10, 35 **2.** 18, 42 **3.** 48, 120

Find the GCF of the numbers using lists of factors.

4. 8, 12 **5.** 22, 121 **6.** 50, 90

7. 34, 119 **8.** 32, 45 **9.** 18, 42

Find the GCF of the numbers using prime factorizations.

10. 36, 60 **11.** 45, 75 **12.** 54, 126

13. 78, 117 **14.** 42, 63 **15.** 53, 86

16. A high school swim team has 12 new female swimmers and 30 returning female swimmers. Each practice team must have the same number of new and returning female swimmers.

a. What is the greatest number of practice teams the coach can make using every swimmer?

b. How many new and returning female students will be on each practice team?

Find the GCF of the numbers.

17. 27, 45, 63 **18.** 20, 36, 72 **19.** 24, 40, 64

20. Write a set of three numbers that have a GCF of 13.

Tell whether the statement is *always*, *sometimes*, or *never* true.

21. The GCF of two numbers is a composite number.

22. The GCF of two numbers is equal to the lesser of the numbers.

23. You have three numbers.

a. Two of the numbers are 24 and 42. What is the GCF of these two numbers?

b. The third number is greater than 42 and does not change the GCF. What is one possibility for the third number?

Name _____ Date _____

1.5 Practice B

Find the GCF of the numbers using lists of factors.

1. 15, 40 **2.** 32, 56 **3.** 34, 39

4. 21, 84 **5.** 60, 100 **6.** 48, 108

Find the GCF of the numbers using prime factorizations.

7. 34, 85 **8.** 72, 108 **9.** 80, 200

10. 42, 56 **11.** 22, 154 **12.** 90, 150

13. Describe and correct the error in finding the GCF of 10 and 18.

✗
$10 = 2 \bullet 5$
$18 = 2 \bullet 3^2$
The GCF is 90.

Find the GCF of the numbers.

14. 45, 51, 69 **15.** 20, 45, 55 **16.** 24, 84, 108

17. You are creating a set of three numbers that have a GCF of 9. You have 27 and 54 for two of the numbers.

a. What is the GCF of 27 and 54?

b. Find two numbers that you could add to the set of 27 and 54 such that the GCF is now 9.

18. Consider the numbers 308, 616, and 660.

a. Find the prime factorization of each number.

b. Find the GCF of each pair of numbers.

c. Which pair of numbers has a different GCF than the other two pairs?

Name_____ Date _____

1.5 Enrichment and Extension

Successive Division

Successive division is a method useful for finding the GCF of two large numbers using long division repeatedly until a remainder of zero is reached.

Example: Find the GCF of 118 and 250.

Step 1: Using long division, divide the lesser number into the greater number.

$$\begin{array}{r} 2 \\ 118\overline{)250} \\ -\,236 \\ \hline 4 \end{array}$$

Step 2: Divide the remainder from Step 1 into the divisor from Step 1. If necessary, repeat this step until a remainder of zero is reached**.** The final divisor is the GCF of the two numbers

$$\begin{array}{r} 29 \\ 4\overline{)118} \\ -\,8 \\ \hline 38 \\ -\,36 \\ \hline 2 \end{array} \qquad \begin{array}{r} 2 \\ 2\overline{)4} \\ -\,4 \\ \hline 0 \end{array}$$

So, the GCF of 118 and 250 is 2.

Find the GCF of the numbers.

1. 108, 240

2. 184, 664

3 154, 875

4. 243, 405

5. 30, 159

6. 40, 712

7. 178, 1376

8. 88, 1592

Name _____ Date _____

Puzzle Time

Why Did The Horse Put On A Blanket?

Circle the letter of each correct answer in the boxes below. The circled letters will spell out the answer to the riddle.

Find the GCF of the numbers.

1. 12, 28

2. 15, 60

3. 9, 24

4. 16, 72

5. 35, 56

6. 33, 46

7. 26, 52

8. 45, 54

9. 42, 54

10. 34, 85

11. 48, 64

12. 77, 121

13. 20, 30, 90

14. 42, 63, 84

15. 36, 54, 108

Solve.

16. Your local minor league baseball team has 120 ball caps, 180 miniature baseball keychains, and 240 glow in the dark bracelets to give away to children on opening day. The items will be split into identical sets with no items left over. Each child will receive one set of items. What is the greatest number of children that will receive a set of items on opening day?

A	**H**	**E**	**B**	**E**	**G**	**H**	**W**	**I**	**L**	**A**	**T**	**S**	**B**	**A**	**L**	**L**	**B**	**I**
99	11	2	31	9	50	5	26	43	29	4	40	17	32	8	25	16	76	10
A	**T**	**X**	**E**	**T**	**K**	**R**	**L**	**T**	**E**	**A**	**R**	**C**	**R**	**O**	**W**	**L**	**A**	**T**
22	7	55	24	15	34	30	18	28	3	19	100	21	35	6	27	1	81	60

Activity 1.6

Start Thinking!

For use before Activity 1.6

List five pairs of numbers that have 2 and 3 as factors. Circle the pairs that have 6 as the GCF. How many possible numbers have 2 and 3 as factors? How many possible pairs of numbers have 6 as the GCF?

Activity 1.6

Warm Up

For use before Activity 1.6

Find the GCF using prime factorization.

1. 4, 18

2. 10, 25

3. 24, 40

4. 32, 52

5. 6, 15, 21

6. 16, 24, 36

Lesson 1.6 Start Thinking!

For use before Lesson 1.6

Every morning at breakfast, Joey eats one serving of cereal with one serving of milk. Each box of cereal contains 10 servings and each carton of milk contains 8 servings. If Joey opens a new box of cereal and a new carton of milk today, how many days will it take him to empty a box of cereal and a carton of milk on the same day? Explain.

Lesson 1.6 Warm Up

For use before Lesson 1.6

Use a Venn diagram to find the least common multiple of the numbers.

1. 4, 18

2. 9, 16

3. 15, 24

4. 12, 80

5. 24, 30

6. 22, 55

Name_____ Date _____

1.6 Practice A

Use a Venn diagram to find the least common multiple of the numbers.

1. 2, 3 **2.** 4, 10 **3.** 6, 9

Find the LCM of the numbers using lists of multiples.

4. 3, 5 **5.** 7, 8 **6.** 4, 6

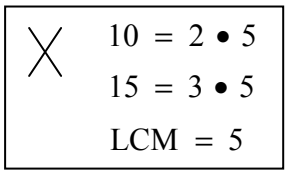
7. 2, 7 **8.** 14, 21 **9.** 16, 24

Find the LCM of the numbers using prime factorizations.

10. 10, 12 **11.** 18, 30 **12.** 26, 39

13. 32, 48 **14.** 25, 40 **15.** 21, 56

16. Describe and correct the error in finding the LCM.



17. You have piano lessons every 7 days and tuba lessons every 3 days. Today you have both lessons.

a. In how many days will you have both lessons on the same day again?

b. Not counting today or the day when you have the same lesson again, how many piano lessons will you have in between? How many tuba lessons will you have in between?

Find the LCM of the numbers.

18. 3, 5, 7 **19.** 2, 3, 11 **20.** 6, 8, 12

21. The snooze button on your alarm clock activates the alarm every 5 minutes. The snooze button on your cell phone activates the alarm every 7 minutes. Both alarms activate at 7:00 A.M. You hit each snooze button as each alarm activates. At what time are both alarms activated again?

Name _____ Date _____

1.6 Practice B

Find the LCM of the numbers using lists of multiples.

1. 9, 11 **2.** 6, 21 **3.** 15, 18

4. 24, 28 **5.** 12, 20 **6.** 8, 26

Find the LCM of the numbers using prime factorizations.

7. 14, 22 **8.** 16, 28 **9.** 18, 27

10. 12, 34 **11.** 10, 46 **12.** 21, 36

13. You run one lap around a mile track every 8 minutes. Your friend runs around the same track every 10 minutes. You both start at the starting line at the same time.

a. How far have each of you run when you first meet again at the starting line?

b. How far have each of you run the next time you meet at the starting line?

Find the LCM of the numbers.

14. 3, 7, 13 **15.** 5, 9, 12 **16.** 8, 14, 21

17. Plastic plates come in packs of 8, plastic utensils come in packs of 12, and plastic cups come in packs of 20. What are the least numbers of packs you should buy in order to have the same number of plates, utensils, and cups?

Tell whether the statement is *always*, *sometimes*, or *never* true.

18. The GCF of two different numbers is greater than the LCM of the numbers.

19. The LCM of a prime number and a composite number is a multiple of the prime number.

20. A theater gives away one free ticket to every 10th customer and two free tickets to every 25th customer. The manager wants to give away four free tickets when the customer is both a 10th and a 25th customer.

a. Who is the first customer that will receive four free tickets?

b. If 120 customers have bought tickets today, how many free tickets has the manager given away?

Name_____ Date _____

1.6 Enrichment and Extension

Using the GCF to find the LCM

The GCF of a pair of numbers can be used to find the LCM of the numbers. To find the LCM, divide the product of the pair of numbers by the GCF.

Example: Find the LCM of 8 and 12.

Step 1: Find the product of 8 and 12.

$$12 \times 8 = 96$$

Step 2: Find the GCF of 8 and 12.

Factors of 12: 1, 2, 3, ④, 6, 12

Factors of 8: 1, 2, ④, 8

The GCF of 8 and 12 is 4.

Step 3: Divide the product by the GCF.

$$\frac{96}{4} = 24$$

So, the LCM of 8 and 12 is 24.

Find the LCM of the numbers.

1. 6, 56

2. 6, 34

3. 4, 36

4. 18, 22

5. 22, 38

6. 12, 28

7. 15, 45

8. 27, 33

9. 28, 32

10. 14, 26

11. 15, 21

12. 12, 39

Name _____ Date _____

1.6 Puzzle Time

What Does A Computer Do When It Gets Hungry?

Write the letter of each answer in the box containing the exercise number.

Find the LCM of the numbers.

1. 5, 9

2. 2, 11

3. 12, 16

4. 3, 8

5. 7, 9

6. 10, 14

7. 13, 39

8. 30, 45

9. 14, 21

10. 6, 10

11. 15, 20

12. 18, 24

13. 2, 3, 11

14. 2, 4, 6

15. 8, 10, 16

16. One local radio station plays a commercial every 6 minutes. Another local radio station plays a commercial every 9 minutes. Both radio stations just played commercials. How many minutes will pass before both local radio stations play commercials again at the same time?

Answers

T. 60

E. 22

E. 42

B. 63

E. 72

T. 80

S. 70

Y. 12

T. 45

G. 30

O. 39

T. 18

I. 24

A. 90

T. 66

A. 48

4	13		10	2	15	6		8		5	14	1	12		16	7		9	3	11

Extension 1.6 Start Thinking!

For use before Extension 1.6

Explain to a partner how to find the GCF of 16 and 20 and the LCM of 24 and 42.

Extension 1.6 Warm Up

For use before Extension 1.6

Add or subtract. Write the answer in simplest form.

1. $\frac{5}{8} + \frac{1}{8}$

2. $\frac{1}{7} + \frac{2}{7}$

3. $4\frac{3}{10} + 7\frac{6}{10}$

4. $\frac{7}{11} - \frac{6}{11}$

5. $\frac{8}{9} - \frac{8}{9}$

6. $10\frac{4}{7} - 3\frac{3}{7}$

Name _____ Date _____

Extension 1.6 Practice

Use the LCD to rewrite the fractions with the same denominator.

1. $\frac{3}{4}, \frac{1}{10}$

2. $\frac{2}{3}, \frac{5}{8}$

3. $\frac{5}{14}, \frac{1}{6}$

4. $\frac{1}{3}, \frac{5}{6}, \frac{4}{9}$

Copy and complete the statement using <, >, or =.

5. $\frac{3}{4} \_\_?\_\_ \frac{2}{3}$

6. $\frac{5}{12} \_\_?\_\_ \frac{4}{15}$

7. $3\frac{5}{18} \_\_?\_\_ 3\frac{7}{24}$

8. $\frac{18}{8} \_\_?\_\_ 2\frac{1}{4}$

Add or subtract. Write the answer in simplest form.

9. $\frac{1}{2} + \frac{3}{5}$

10. $\frac{4}{9} - \frac{1}{4}$

11. $\frac{5}{8} - \frac{3}{14}$

12. $\frac{7}{15} + \frac{3}{10}$

13. $4\frac{1}{8} + 3\frac{3}{4}$

14. $5\frac{7}{12} - 2\frac{2}{9}$

15. $1\frac{1}{3} + \frac{6}{7}$

16. $4\frac{11}{12} - 2\frac{3}{20}$

17. In which of Exercises 9–16 is the LCD the same as the product of the denominators? What characteristic do the denominators in this set of problems have that the other problems do not?

Name_____ Date _____

Chapter 1

Technology Connection

For use after Section 1.3

Order of Operations

When using a calculator to do problems involving more than one operation, you need to be careful that the order of operations are observed.

EXAMPLE Evaluate $12 + 9 \div 3^2 - 6$ using your calculator.

SOLUTION

Press 12 $[+]$ 9 $[\div]$ 3 $[x^2]$ $[-]$ 6 $[=]$.

ANSWER 7

If your calculator does not follow the order of operations, inserting grouping symbols can prioritize certain operations.

EXAMPLE Insert parentheses to make the equation true:

$$6^2 + 24 \div 8 + 4 = 38$$

SOLUTION

The two places where parentheses can change the current order of operations are around the two sums $6^2 + 24$ and $8 + 4$.

Press $[($ 6 $[x^2]$ $+$ 24 $])$ $[\div]$ 8 $[+]$ 4 $[=]$. The answer is 11.5, not 38.

So, try the second sum.

Press 6 $[x^2]$ $[+]$ 24 $[\div]$ $[($ 8 $[+]$ 4 $])$ $[=]$. The answer is 38.

Use a calculator to evaluate the expression.

1. $10^3 - (42 - 20)^2$

2. $7^5 - (8 \times 3)^3 + 3^2 \times 6$

3. $(25^4 - 500^2) \div (3^2 \times 5^4)$

4. $(21^3 \div (6^2 - 9)) \div 7^2$

Insert one set of parentheses to make each equation true.

5. $3.4 \times 2.7 + 8.9 - 4.1 = 25.5$

6. $15 - 5^2 \div 20 = 5$