Name: ______________________ Date: ______________

Chapter 2 Estimation and Number Theory

Worksheet 1 Estimation

Find each sum or difference. Then use rounding to check that your answer is reasonable. Round each number to the nearest 100.

Example

475 + 382 = ?

475 + 382 = 857

857 is close to 900, so the answer is reasonable.

Number	Rounded to the nearest 100
475	500
382	400
Add	900

The estimated sum is 900.

Is your answer reasonable? Yes

Name: ______________________ **Date:** ______________

1. Find 534 + 208.

534 + 208 = ________

Number	Rounded to the nearest 100
534	
208	
Add	

The estimated sum is ________.

Is your answer reasonable? ________

2. Find 836 − 487.

836 − 487 = ________

Number	Rounded to the nearest 100
836	
487	
Subtract	

The estimated difference is ________.

Is your answer reasonable? ________

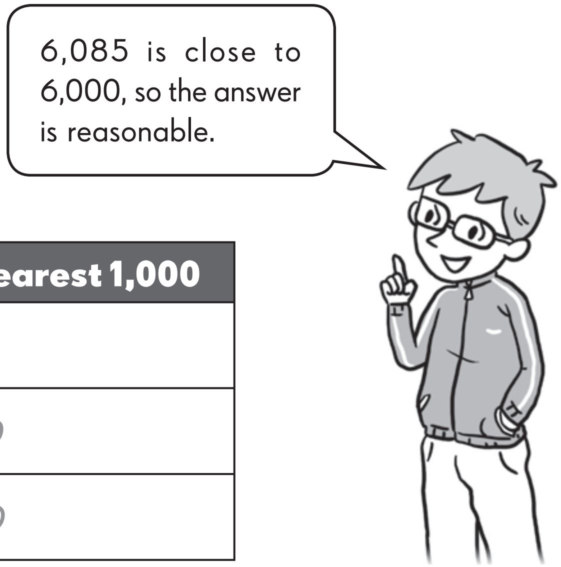
Name: ______________________ Date: ______________

Find each sum or difference. Then use rounding to check that your answer is reasonable. Round each number to the nearest 1,000.

Example

1,398 + 4,687 = ?

1,398 + 4,687 = 6,085



Number	Rounded to the nearest 1,000
1,398	1,000
4,687	5,000
Add	6,000

Is your answer reasonable? Yes

3. Find 4,772 + 2,409.

4,772 + 2,409 = __________

Number	Rounded to the nearest 1,000
4,772	
2,409	
Add	

Is your answer reasonable? __________

Name: ____________________ Date: ____________

4. Find 14,842 − 9,221.

14,842 − 9,221 = ________

Number	Rounded to the nearest 1,000
14,842	
9,221	
Subtract	

Is your answer reasonable? ________

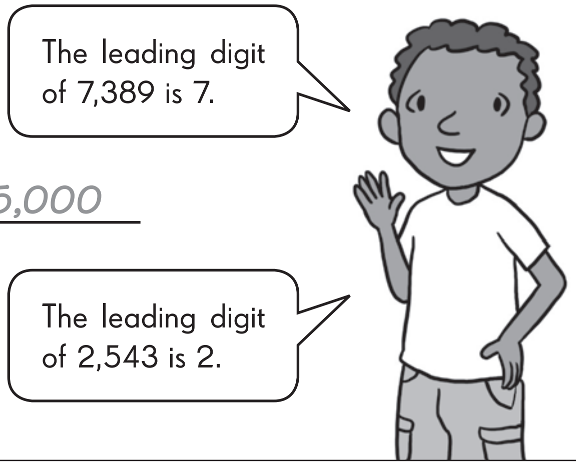
Estimate each sum or difference using front-end estimation.

Example

7,389 − 2,543 = ?

7,389 − 2,543

7,000 − 2,000 = 5,000



5. 3,351 + 1,469

6. 9,217 − 2,881

Name: ____________________ Date: ____________

Find each sum or difference. Then use front-end estimation to check that your answer is reasonable.

Example

478 + 403 = 881

4 78 + 4 03

Estimated sum: 400 + 400 = 800

Explain: 881 is close to 800, so the answer is reasonable.

7. 798 − 465 = ________

7 98 − 4 65

Estimated difference: ________ − ________ = ________

Explain: ____________________

8. 2,326 + 3,639 = ________

2 ,326 + 3 ,639

Estimated sum: ________ + ________ = ________

Explain: ____________________

9. 5,389 − 2,658 = ________

5 ,389 − 2 ,658

Estimated difference: ________ − ________ = ________

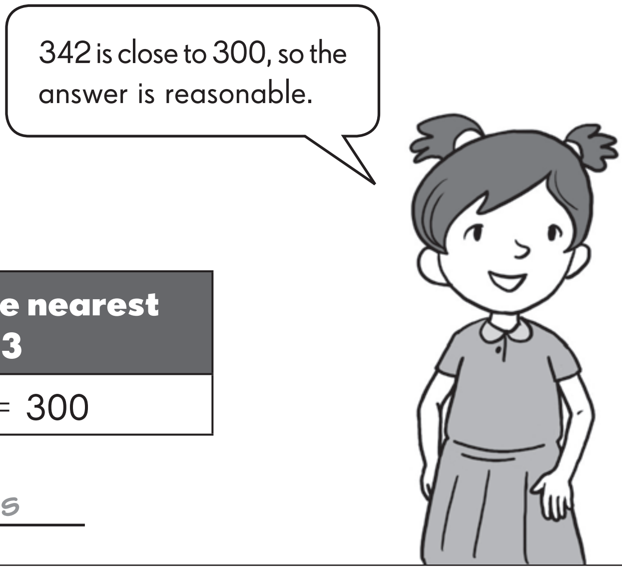
Explain: ____________________

Name: ____________________ Date: ____________

Find each product. Then use rounding to check that your answer is reasonable.

Example

$114 \times 3 =$ 342



Number	Rounded to the nearest 100 × 3
114	$100 \times 3 = 300$

Is the answer reasonable? Yes

10. $326 \times 3 =$ ________

Number	Rounded to the nearest 100 × 3

Is the answer reasonable? ________

11. $267 \times 2 =$ ________

Number	Rounded to the nearest 100 × 2

Is the answer reasonable? ________

Name: ______________________ Date: ____________

Find each product. Then use front-end estimation to check that your answer is reasonable.

Example

$79 \times 5 =$ 395

79 $\times 5$

70 $\times 5 =$ 350

The estimated product is 350.

Explain: 395 is close to 350, so the answer is reasonable.

12. $54 \times 4 =$ ________

54 $\times 4$

Estimated product: ________ $\times 4 =$ ________

Explain: ______________________________

13. $112 \times 3 =$ ________

112 $\times 3$

Estimated product: ________ $\times 3 =$ ________

Explain: ______________________________

Name: ____________________ Date: ____________

Find each quotient. Then use related multiplication facts to check that your answer is reasonable.

Example

$741 \div 3$

$741 \div 3 =$ 247

$3 \times 240 = 720$

$3 \times 250 = 750$

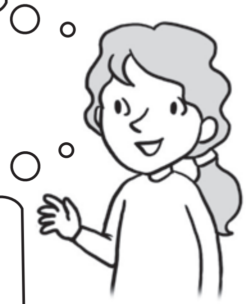
Estimated quotient:

$750 \div 3 =$ 250

The answer is reasonable.

$$\begin{array}{r} 247 \\ 3\overline{)741} \\ \underline{600} \\ 141 \\ \underline{120} \\ 21 \\ \underline{21} \\ 0 \end{array}$$

Multiplication is the opposite of division.



741 is closer to 750 than 720. So, $741 \div 3$ rounds to $750 \div 3$.

14. $496 \div 4 =$ ________

$4 \times$ ________ $=$ ________

$4 \times$ ________ $=$ ________

Estimated quotient: ________ $\div 4 =$ ________

The answer is ____________.

15. $516 \div 2 =$ ________

________ $\times$ ________ $=$ ________

________ $\times$ ________ $=$ ________

Estimated quotient: ________ $\div$ ________ $=$ ________

The answer is ____________.

Name: ____________________ Date: ____________

16. 780 ÷ 5 = ________

________ × ________ = ________

________ × ________ = ________

Estimated quotient: ________ ÷ ________ = ________

The answer is ____________.

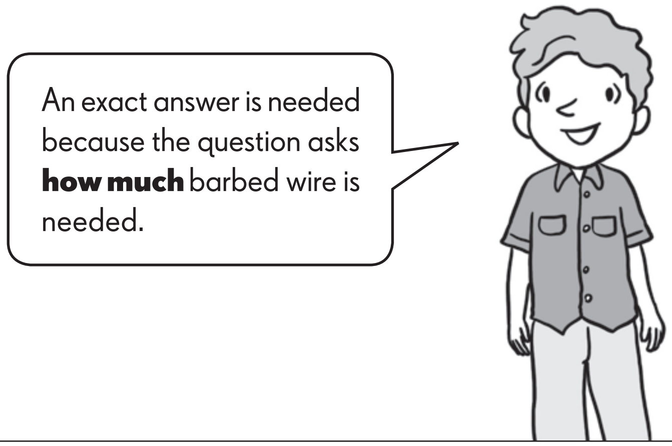
Solve. Decide whether to find an estimate or an exact answer.

Example

724 meters of barbed wire is needed to enclose a park.
How much barbed wire is needed to enclose 4 identical parks?

724 m × 4 = 2,896 m

2,896 meters of barbed wire is needed.



17. Ms. Katy has $111. She wants to spend $52 on books, $33 on fruit, and $21 on vegetables. Does she have enough money to buy all these things?

Name: ______________________________ **Date:** ________________

18. A bottle contains 784 milliliters of milk. A family drinks 309 milliliters of milk in the morning, and the rest of the milk in the afternoon. How much milk do they drink in the afternoon?

19. Caithlin spent $14.99 on a sweater, $5.29 on 2 pairs of socks, and $8.99 on a blouse. About how much money did Caithlin spend in all?

Name: ____________________ Date: ____________

Worksheet 2 Factors

Write the missing numbers.

Example

$14 \times 3 =$ 42

42 can be divided exactly by 14 and 3.

1. $21 \times 5 =$ ______

______ can be divided exactly by 21 and ______.

2. $35 \times 3 =$ ______

______ can be divided exactly by ______ and ______.

Write the missing numbers.

Example

$12 \times 3 =$ 36

36 is a product of 12 and 3.

12 and 3 are factors of 36.

Whole numbers can be broken into **factors**.

3. $8 \times 12 =$ ______

______ is a product of 8 and 12.

______ and ______ are factors of ______.

4. $26 \times 4 =$ ______

______ is a product of 26 and 4.

______ and ______ are factors of ______.

Name: ______________________ **Date:** ______________

Find the quotient. Then write the missing words.

Example

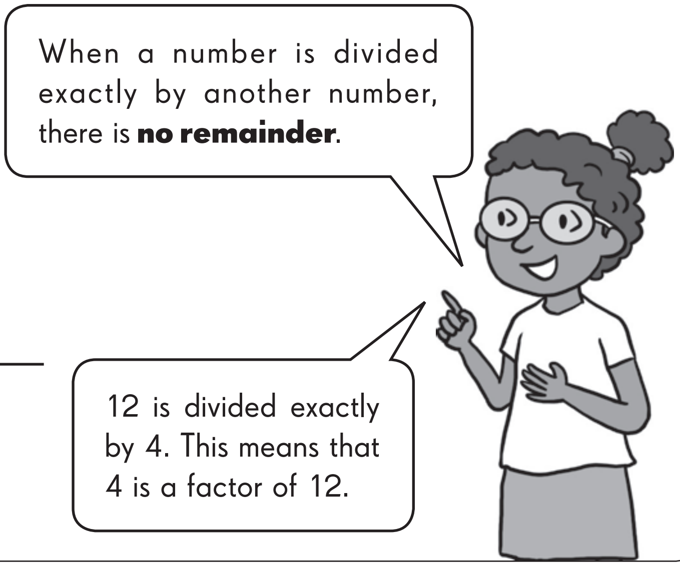
12 ÷ 4

12 ÷ 4 = 3

Can 12 be divided exactly

by 4? Yes

Is 4 a factor of 12? Yes



5. 14 ÷ 5 = __________

Can 14 be divided exactly by 5? __________

Is 5 a factor of 14? __________

6. 18 ÷ 6 = __________

Can 18 be divided exactly by 6? __________

Is 6 a factor of 18? __________

7. 28 ÷ 7 = __________

Can 28 be divided exactly by 7? __________

Is 7 a factor of 28? __________

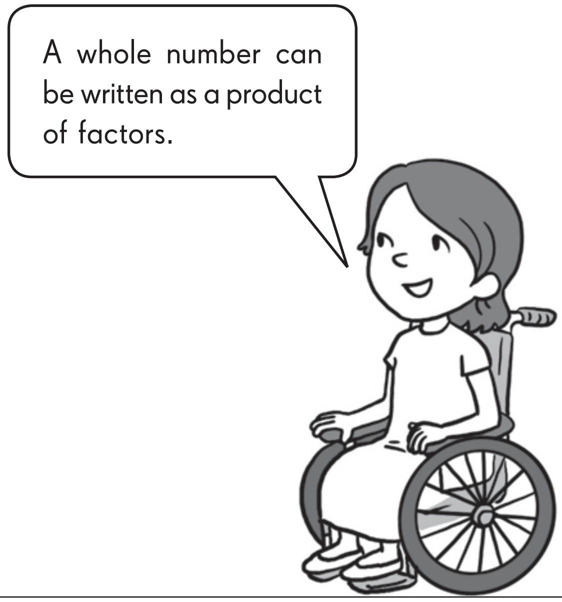
Name: ____________________ Date: ____________

Find the factors of each number.

Example

$8 = 1 \times 8$
$\;\;\; = 2 \times 4$

The factors of 8 are 1, 2, 4, and 8.



8. $24 = 1 \times 24$

$= 2 \times$ ______

$=$ ______ $\times$ ______

$=$ ______ $\times 6$

The factors of 24 are ______, ______, ______, ______, ______,

______, ______, and ______.

9. $54 =$ ______ $\times$ ______

$=$ ______ $\times$ ______

$=$ ______ $\times$ ______

$=$ ______ $\times$ ______

The factors of 54 are ______, ______, ______, ______, ______,

______, ______, and ______.

Name: ______________________ Date: ______________

10. $72 = \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

The factors of 72 are ____, ____, ____, ____, ____,

____, ____, ____, ____, ____, ____, and ____.

11. $108 = \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

$= \_\_\_\_ \times \_\_\_\_$

The factors of 108 are ____, ____, ____, ____, ____,

____, ____, ____, ____, ____, ____, and ____.

Name: ____________________ Date: ____________

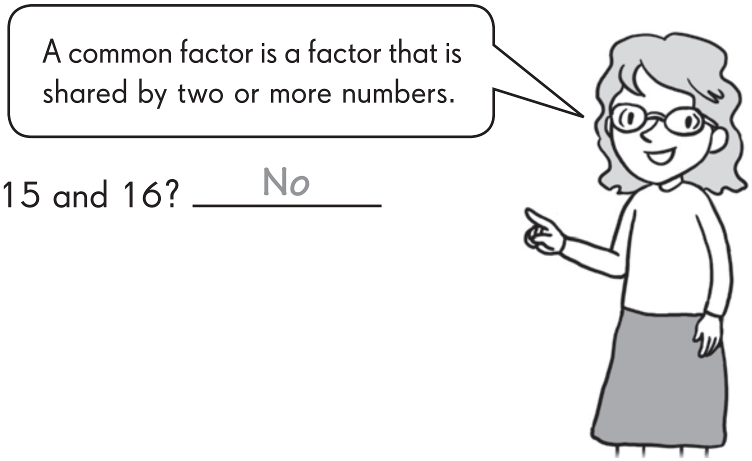
Divide. Then answer each question.

Example

15 ÷ 2 = 7 R 1

16 ÷ 2 = 8

Is 2 a common factor of 15 and 16? No



12. 48 ÷ 3 = __________

52 ÷ 3 = __________

Is 3 a common factor of 48 and 52? __________

13. 70 ÷ 5 = __________

95 ÷ 5 = __________

Is 5 a common factor of 70 and 95? __________

14. 45 ÷ 8 = __________

96 ÷ 8 = __________

Is 8 a common factor of 45 and 96? __________

Name: ______________________ Date: ______________

Find the factors of each pair of numbers. Then circle the common factors.

Example

12 and 21

12: 1, 2, 3, 4, 6, 12

21: 1, 3, 7, 21

Which of the circled common factors is the greatest? 3

15. 21 and 28

21: ______________________

28: ______________________

Which of the circled common factors is greatest? __________

16. 32 and 42

32: ______________________

42: ______________________

Which of the circled common factors is the greatest?

17. 48 and 72

48: ______________________

42: ______________________

Which of the circled common factors is the greatest? __________

Name: ______________________________ Date: ____________________

Find the greatest common factor of each pair of numbers.

Example

16 and 24

Step 1 Divide 16 and 24 by a common factor.

$$\begin{array}{r|l} 2 & 16,\ 24 \\ \hline & \ \ 8,\ 12 \end{array}$$

$16 \div 2 = 8,\ 24 \div 2 = 12$

Step 2 Divide until 16 and 24 cannot be divided by a common factor other than 1.

$$\begin{array}{r|l} 2 & 16,\ 24 \\ \hline 2 & \ \ 8,\ 12 \\ \hline 2 & \ \ 4,\ 6 \\ \hline & \ \ 2,\ 3 \end{array}$$

2 and 3 have no common factor other than 1.

Step 3 Multiply the common factors.

$2 \times 2 \times 2 = 8$

The greatest common factor is 8.

Name: ____________________ Date: ____________

18. 12 and 24

2 | 12, 24

____ × ____ × ____ = ____

The greatest common factor is ____.

19. 36 and 42

36, 42

____ × ____ = ____

The greatest common factor is ____.

20. 54 and 72

21. 15 and 42

Answer the questions using these numbers.

10 15 24 36 54 75

Example

Which of the numbers have 2 as a factor?

10, 24, 36, and 54

Name: ____________________ Date: ____________

22. Which of the numbers have 3 as a factor?

____

23. Which of the numbers have 5 as a factor?

____

24. Which of the numbers have 3 and 5 as factors?

____

Find the factors of each number. Then decide whether the number is a prime number.

Example

$17 = 1 \times 17$

The factors of 17 are 1 and 17.
So, 17 is a prime number.

A **prime number** has only 2 different factors, 1 and itself.

25. 5

26. 9

27. 11

28. 26

Name: ______________________ Date: ______________

Find the factors of each number. Then decide whether the number is a composite number.

Example

$6 = 1 \times 6$
$\;\;= 2 \times 3$

The factors of 6 are 1, 2, 3, and 6.
So, 6 is a composite number.

A **composite number** has more than 2 different factors.

29. 20

30. 13

31. 63

32. 41

Which numbers in Exercises 29 to 32 are prime numbers?

33. The prime numbers are __________ and __________.

34. Why did you choose those two numbers? Explain your reasoning.

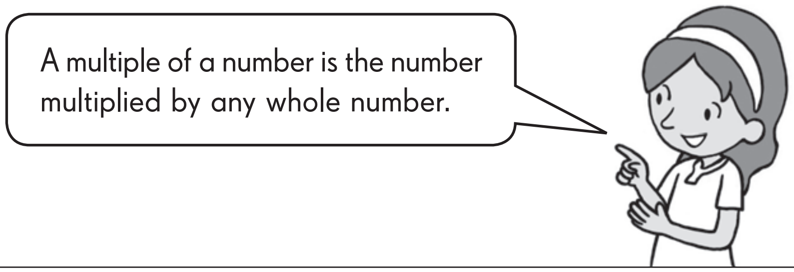
____

____.

Name: ______________________ Date: ______________

Worksheet 3 Multiples

Find the first eight multiples of each number.



Example

$1 \times 4 = 4$ $2 \times 4 = 8$ $3 \times 4 = 12$ $4 \times 4 = 16$
$5 \times 4 = 20$ $6 \times 4 = 24$ $7 \times 4 = 28$ $8 \times 4 = 32$

The first eight multiples of 4 are 4, 8, 12, 16, 20, 24, 28, and 32.

1. 6

$1 \times 6 = \square$ $2 \times 6 = \square$ $3 \times 6 = \square$ $4 \times 6 = \square$

$5 \times 6 = \square$ $6 \times 6 = \square$ $7 \times 6 = \square$ $8 \times 6 = \square$

The first eight multiples of 6 are ______________________.

2. 8

$1 \times 8 = \square$ $2 \times 8 = \square$ $3 \times 8 = \square$ $4 \times 8 = \square$

$5 \times 8 = \square$ $6 \times 8 = \square$ $7 \times 8 = \square$ $8 \times 8 = \square$

The first eight multiples of 8 are ______________________.

Name: ______________________ **Date:** ______________

Circle the numbers that are not multiples of the given number.

Example

4: 4, 14, 16, 20, 34, 44

> 4 is a factor of all the multiples of 4.
> The numbers 4, 16, 20, and 44 can be divided exactly by 4. So, they are multiples of 4.

3. 3: 12, 15, 18, 21, 23

4. 5: 5, 15, 25, 51, 55

5. 7: 7, 17, 21, 27, 35, 42, 56, 63

6. 9: 18, 36, 39, 45, 47, 49, 54, 63, 72, 79

Check (✔) the correct box. Then write the missing numbers and words.

Example

Is 14 a multiple of 2?

$$\begin{array}{r} 7 \\ 2\overline{)\,1\;4} \\ 1\;4 \\ \hline 0 \end{array}$$

> Use division to determine whether a number is a multiple of another number.

☑ Yes, 14 is the seventh multiple of 2.

☐ No, 14 is not a multiple of 2. It cannot be divided exactly by 2.

Name: ______________________ **Date:** ______________

7. Is 24 a multiple of 3?

$$\begin{array}{r} \square \\ 3\overline{)\ 2\ \ 4} \\ \square\square \\ \hline \square \end{array}$$

☐ Yes, 24 is the ______________ multiple of 3.

☐ No, 24 is not a multiple of 3. It cannot be divided exactly by 3.

8. Is 45 a multiple of 6?

$$\begin{array}{r} \square \\ 6\overline{)\ 4\ \ 5} \\ \square\square \\ \hline \square \end{array}$$

☐ Yes, 45 is the ______________ multiple of 6.

☐ No, 45 is not a multiple of 6. It cannot be divided exactly by 6.

9. Is 96 a multiple of 8?

☐ Yes, 96 is the ______________ multiple of 8.

☐ No, 96 is not a multiple of 8. It cannot be divided exactly by 8.

Name: ______________________ Date: ______________

Circle the common multiples of each pair of numbers. Then write the missing numbers.

Example

3: 3, 6, 9, 12, 15, 18, 21, 24, 27

4: 4, 8, 12, 16, 20, 24, 28, 32, 36

A **common multiple** is a multiple that is shared between two or more numbers.

The common multiples are ___12___ and ___24___.

The **least common multiple** is the common multiple that is less than all the others.

The least common multiple is ___12___.

10. 5: 5, 10, 15, 20, 25, 30, 35, 40, 45

7: 7, 14, 21, 28, 35, 42, 49, 56, 63

The common multiple is __________.

The least common multiple is __________.

11. 6: 6, 12, 18, 24, 30, 36, 42, 48, 54

8: 8, 16, 24, 32, 40, 48, 56, 64, 72

The common multiples are __________ and __________.

The least common multiple is __________.

Name: ____________________ Date: ____________

Find the first two common multiples of each pair of numbers. Circle them and then write the least common multiple.

Example

3 and 7

3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42

7: 7, 14, 21, 28, 35, 42, 49

The least common multiple is 21.

12. 2 and 5

2: ____________________

5: ____________________

The least common multiple is ______.

13. 6 and 9

6: ____________________

9: ____________________

The least common multiple is ______.

Name: ______________________ Date: ______________

Find the least common multiple of each pair of numbers using division.

Example

8 and 16

Step 1 Divide 8 and 16 until they cannot be divided by a common factor other than 1.

There are five factors.

$$\begin{array}{r|l} 2 & 8,\ 16 \\ \hline 2 & 4,\ 8 \\ \hline 2 & 2,\ 4 \\ \hline & 1,\ 2 \end{array}$$

1 and 2 have no common factor other than 1.

Step 2 Multiply the factors.

$2 \times 2 \times 2 \times 1 \times 2 = 16$

16 is the least common multiple of 8 and 16.

14. 9 and 18

15. 14 and 28

16. 15 and 45

17. 12 and 52