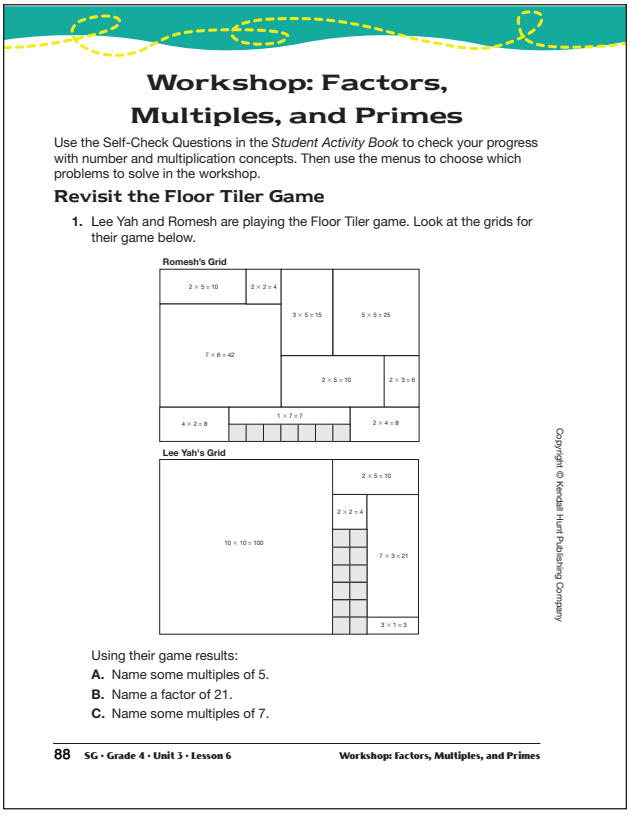


Workshop: Factors, Multiples, and Primes

Use the Self-Check Questions in the *Student Activity Book* to check your progress with number and multiplication concepts. Then use the menus to choose which problems to solve in the workshop.

Revisit the Floor Tiler Game

1. Lee Yah and Romesh are playing the Floor Tiler game. Look at the grids for their game below.

Romesh's Grid

Lee Yah's Grid

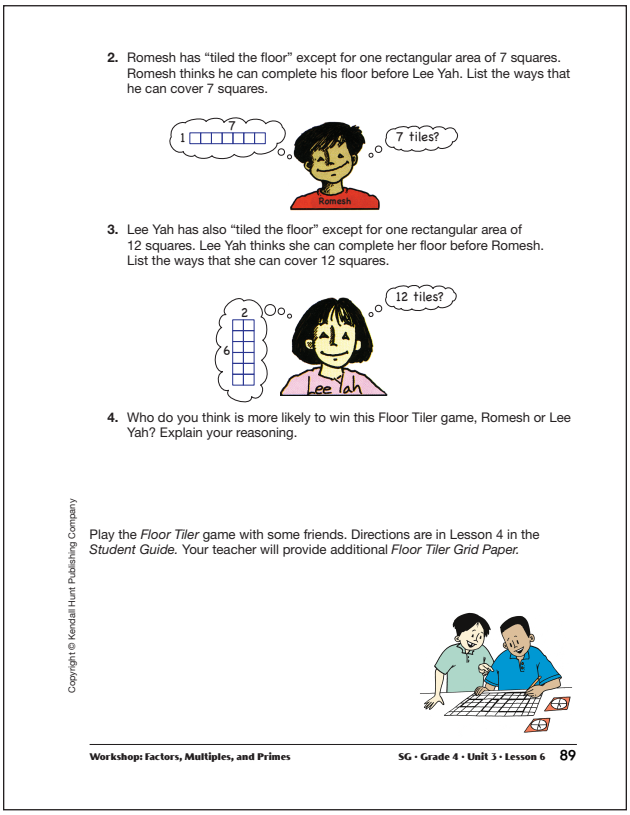
Using their game results:

A. Name some multiples of 5.

B. Name a factor of 21.

C. Name some multiples of 7.

***Student Guide* - Page 88**



2. Romesh has "tiled the floor" except for one rectangular area of 7 squares. Romesh thinks he can complete his floor before Lee Yah. List the ways that he can cover 7 squares.

3. Lee Yah has also "tiled the floor" except for one rectangular area of 12 squares. Lee Yah thinks she can complete her floor before Romesh. List the ways that she can cover 12 squares.

4. Who do you think is more likely to win this Floor Tiler game, Romesh or Lee Yah? Explain your reasoning.

Play the *Floor Tiler* game with some friends. Directions are in Lesson 4 in the *Student Guide.* Your teacher will provide additional *Floor Tiler Grid Paper.*

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Student Guide

Workshop: Factors, Multiples, and Primes

Questions 1–3 (SG pp. 88– 89)

1. **A.** 10, 15, 25; I can see these on Romesh's Grid.

   B. 7 and 3 are both factors of 21; $7 \times 3 = 21$

   C. 42, 21, and 7 are all multiples of 7 that are on the grids.

2. In one turn, the only way to cover 7 squares is to spin 1×7. In two turns, he could spin a 1×1 and then 2×3 or spin 2 x 2 and then 1×3 to win.

3. In one turn, 3 x 4 and 6 x 2 both make 12. There are many combinations of spins to make two rectangles to cover those 12 squares. 1×2 and 1×10; 1×3 and 3×3; 1×3 and 1×9; 1×4 and 2×4; 1×4 and 1×8; 1×5 and 1×7; 1×6 and 2×3.

4. Lee Yah is more likely to win, because she has more chances to spin a product of 12 or spin factors than make rectangles that sum 12.

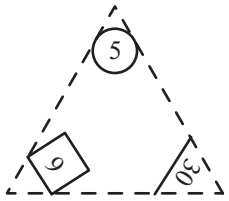
Student Activity Book

Number and Multiplication Concepts

Questions 1–27 (SAB pp. 61–78)

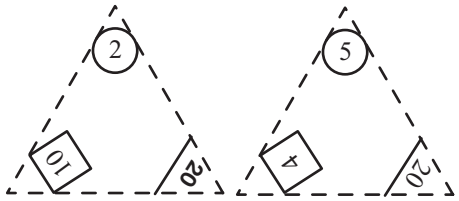
1. 21 and 99 are both multiples of 3; Possible response: I can make a rectangle that is 3 by something for both 21 and 99 or I can organize both 21 and 99 into groups of 3 evenly. Students might draw 7 × 3 rectangle for 21 and a 3 × 33 rectangle for 99. Students might also show how 19 units can be organized into a 3 x 6 rectangle with one left over.
2. I do not agree with Joe Smart. 2 and 3 are not factor s of 35. I cannot arrange 35 into groups of 2 or 3 evenly. When I skip-count by 2s I do not land on 35. When I skip-count by 3s I do not land on 35 either.
3. **A.** 5 × 6 = 30

   B.



   C. 10, 3, 5, and 6 are four factors of 20.

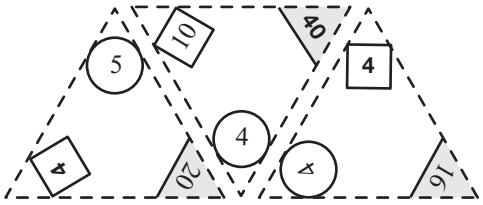
   D.



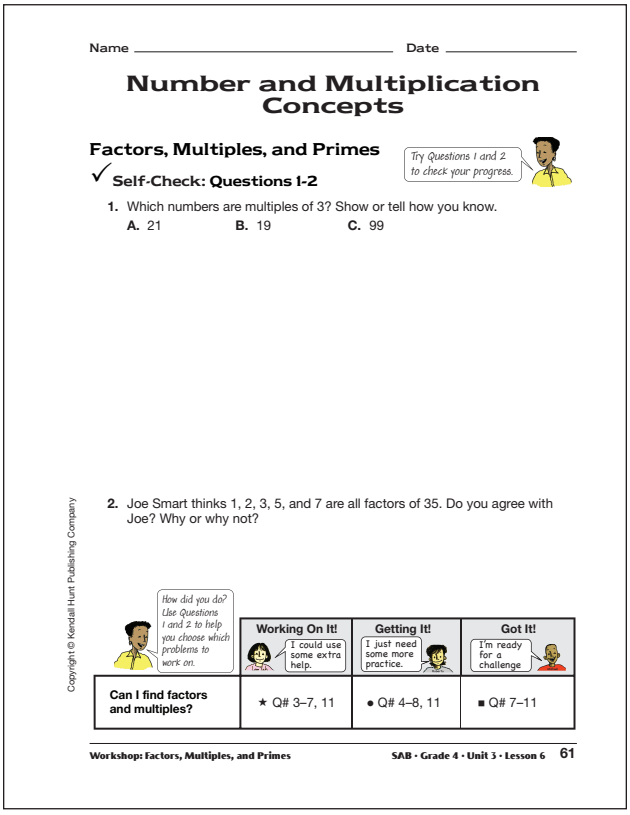
   E. 5 × 4 = 20; 10 × 2 = 20

   F. 5, 4, 2, and 10 are four factors of 20.

   G.



   20, 40, and 16 are multiples of 4.
   4 × 5 = 20, 4 × 10 = 40; 4 × 4 = 16



Name _____ Date _____

Number and Multiplication Concepts

Factors, Multiples, and Primes

✓ **Self-Check: Questions 1-2**

Try Questions 1 and 2 to check your progress.

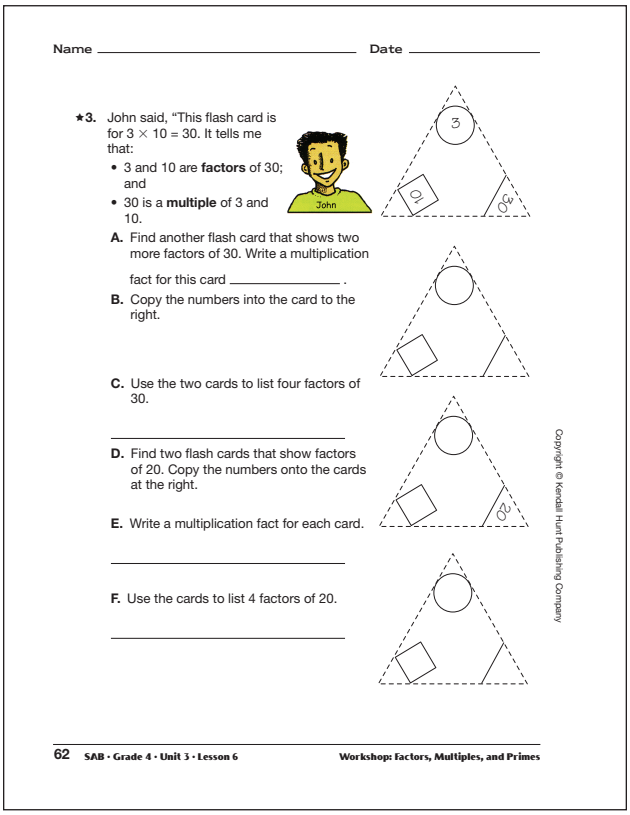
1. Which numbers are multiples of 3? Show or tell how you know.
   A. 21 **B.** 19 **C.** 99

2. Joe Smart thinks 1, 2, 3, 5, and 7 are all factors of 35. Do you agree with Joe? Why or why not?

How did you do? Use Questions 1 and 2 to help you choose which problems to work on.

	Working On It!	Getting It!	Got It!
	I could use some extra help.	*I just need some more practice.*	*I'm ready for a challenge*
Can I find factors and multiples?	★ Q# 3–7, 11	● Q# 4–8, 11	■ Q# 7–11

***Student Activity Book* - Page 61**



Name _____ Date _____

★3. John said, "This flash card is for 3 × 10 = 30. It tells me that:
- 3 and 10 are **factors** of 30; and
- 30 is a **multiple** of 3 and 10.

A. Find another flash card that shows two more factors of 30. Write a multiplication fact for this card _____.

B. Copy the numbers into the card to the right.

C. Use the two cards to list four factors of 30.

_____

D. Find two flash cards that show factors of 20. Copy the numbers onto the cards at the right.

E. Write a multiplication fact for each card.

_____

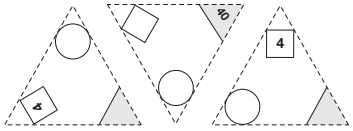
F. Use the cards to list 4 factors of 20.

_____

***Student Activity Book* - Page 62**

Name _____ Date _____

G. Find three cards that show 4 as factor. Fill in the cards below to match.



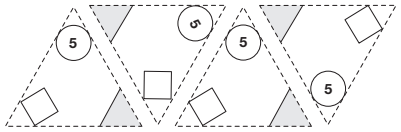
Use the cards to list three multiples of 4.

_____

Write a multiplication number sentence for each card.

_____ _____ _____

H. Find four cards that show 5 as a factor. Fill in the cards to match.



Write a multiplication number sentence for each card.

_____ _____

_____ _____

Use the cards to list four multiples of 5.

_____

***Student Activity Book* - Page 63**

Name _____ Date _____

★●**4.** Use the multiplication *Facts I Know* chart to look for factors and multiples.

A. Linda started to shade the multiples of 5. Help her finish and list them.

0, 5, 10,

_____

B. Shade and list multiples of 4.

_____

_____

C. What numbers on the chart are multiples of 4 and 5?

_____

×	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

D. Is 64 a multiple of 8? Show or tell how you know.

_____

E. Is 31 a multiple of 5? Show or tell how you know.

_____

F. Name two multiples of 5 that are also multiples of 10.

_____

G. Linda decided that 6 and 3 were factors of 18. She found 18 on the chart. Then she circled 6 and 3. Find 18 in a different place on the chart. Circle two other factors of 18. List these factors.

_____

H. Find 12 on the chart in two different places. Circle and list four factors of 12.

_____

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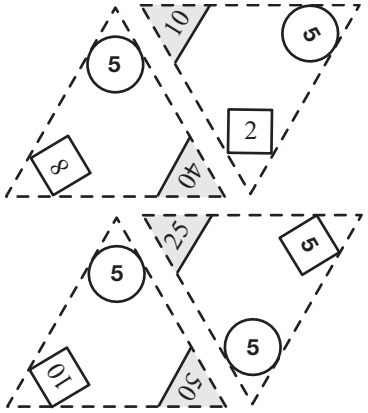
H. Responses will vary. Possible responses.



$5 \times 8 = 40$; $2 \times 5 = 10$;
$5 \times 10 = 50$; $5 \times 5 = 25$;
10, 25, 40, and 50 are multiples of 5.

4. A. 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

×	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

B. 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

C. 20 and 40 are multiples of both 4 and 5.

D. Yes, 64 is a multiple of 8. I found 64 in the row when I shaded all the multiples of 8. See chart.

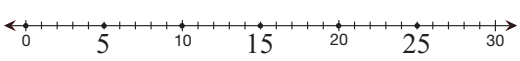
E. No. 31 is not a multiple of 5. I looked at the multiples I shaded on the chart. 30 and 35 are multiples, but 31 is not listed.

F. Answers will vary. Possible responses: 0, 10, 20, 30, 40, 50.

G. See chart. 9 and 2 are also factors of 18.

H. 2, 3, 4, and 6 are factors of 12.

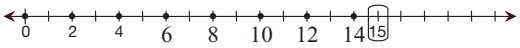
5. A.



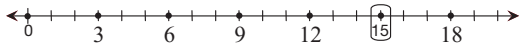
B. Yes, all these numbers have 5 as a factor. If I skip count by 5 from zero, I land on these numbers, or if I skip count from each number to zero I land on zero.

C. No, 22 is not a multiple of 5. When I skip count by 5 from zero, I do not land on 22.

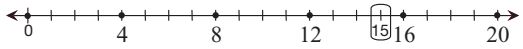
6. A.



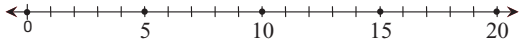
B. No, 2 is not a factor of 15. When I skip count by 2 from zero, I do not land on 15.



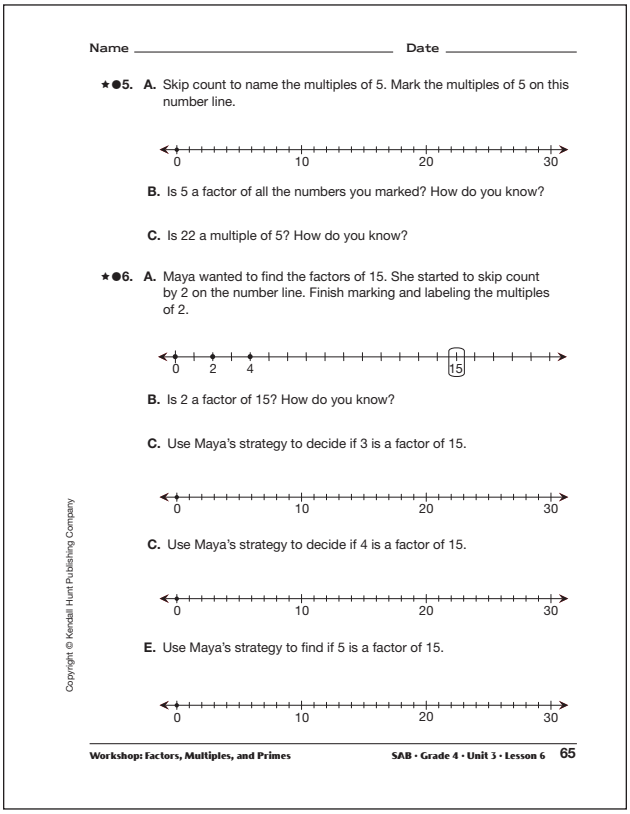
C. Yes, 3 is a factor of 15. When I skip count by 3 from zero, I land on 15.



D. No, 4 is not a factor of 15. When I skip count by 4 from zero, I do not land on 15.



E. Yes, 5 is a factor of 15.



Name _____ Date _____

★●5. **A.** Skip count to name the multiples of 5. Mark the multiples of 5 on this number line.

0 10 20 30

B. Is 5 a factor of all the numbers you marked? How do you know?

C. Is 22 a multiple of 5? How do you know?

★●6. **A.** Maya wanted to find the factors of 15. She started to skip count by 2 on the number line. Finish marking and labeling the multiples of 2.

0 2 4 15

B. Is 2 a factor of 15? How do you know?

C. Use Maya's strategy to decide if 3 is a factor of 15.

0 10 20 30

C. Use Maya's strategy to decide if 4 is a factor of 15.

0 10 20 30

E. Use Maya's strategy to find if 5 is a factor of 15.

0 10 20 30

Workshop: Factors, Multiples, and Primes SAB • Grade 4 • Unit 3 • Lesson 6 65

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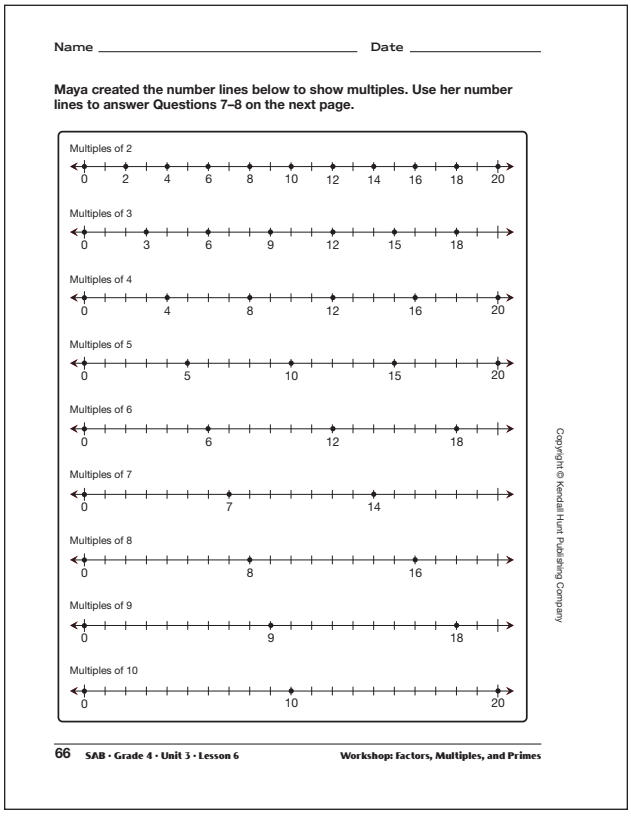

Name _____ Date _____

Maya created the number lines below to show multiples. Use her number lines to answer Questions 7–8 on the next page.

Multiples of 2
0 2 4 6 8 10 12 14 16 18 20

Multiples of 3
0 3 6 9 12 15 18

Multiples of 4
0 4 8 12 16 20

Multiples of 5
0 5 10 15 20

Multiples of 6
0 6 12 18

Multiples of 7
0 7 14

Multiples of 8
0 8 16

Multiples of 9
0 9 18

Multiples of 10
0 10 20

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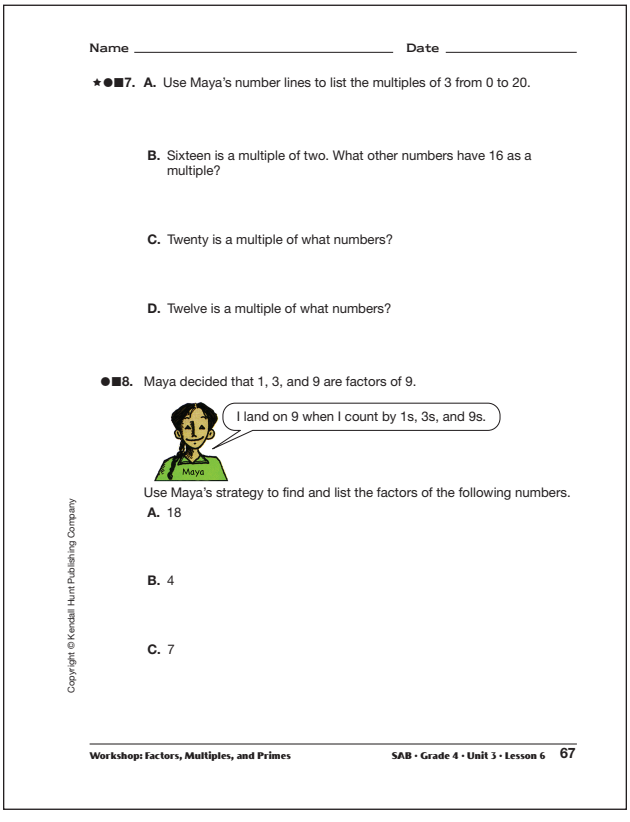

Name _____ Date _____

★●■7. **A.** Use Maya's number lines to list the multiples of 3 from 0 to 20.

B. Sixteen is a multiple of two. What other numbers have 16 as a multiple?

C. Twenty is a multiple of what numbers?

D. Twelve is a multiple of what numbers?

●■8. Maya decided that 1, 3, and 9 are factors of 9.

Use Maya's strategy to find and list the factors of the following numbers.

A. 18

B. 4

C. 7

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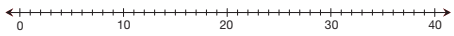
Name _____ Date _____

■9. **A.** Finish writing the squares of these numbers on the lines below them.

1	2	3	4	5	6
1		9			

Mark the square numbers on this number line.

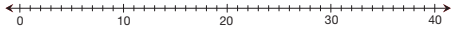


B. Find and label the distance from each square number to the next one.

C. Is there a pattern? If yes, describe the pattern.

D. Can you use the pattern to help you predict the distance to the next square number after 36? Explain and check your prediction.

■10. **A.** What are the prime numbers up to 40? Show them on this number line.



B. Is there a pattern? If yes, describe the pattern.

C. Can the pattern help you predict the next prime number? Explain and check your prediction.

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Name _____ Date _____

★●■11. Remember, a **prime number** is any number greater than one that has only two factors—itself and one.
- Tell if each number below is prime.
- Use the definition to show or tell how you know. You may use rectangles or number lines in your explanations as well as numbers and words.

A. 17

B. 39

C. 51

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7. A. 0, 3, 6, 9, 12, 15, 18

B. 4 and 8 have 16 as a multiple.

C. 2, 4, 5, and 10 have 20 as a multiple.

D. 2, 3, 4, and 6 have 12 as a multiple.

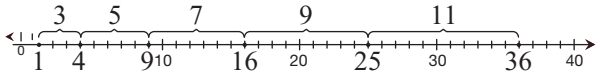
8. A. 1, 2, 3, 6 and 9 are factors of 18.

B. 1, 2, and 4 are factors of 4.

C. 1 and 7 are the only factors of 7.

9. A–B.

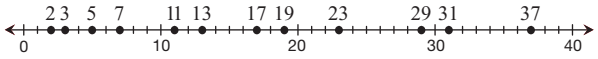
1	2	3	4	5	6
1	4	9	16	25	36



C. Yes. The distances continue to the next odd number.

D. Yes. To check, continue the pattern. 36 plus the next odd number (13) is 49 which is the next square number.

10. A.



B. There is no pattern.

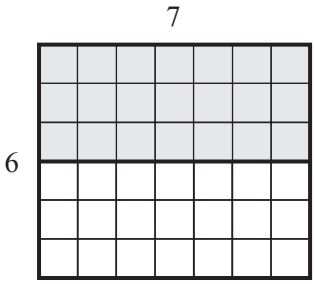
C. No, the next prime numbers cannot be predicted.

11. A. 17 is prime. Possible response: I tried to make rectangles with 17 tiles, and the only one I could make was the 1×17. The only factors are 1 and 17, so 17 is prime.

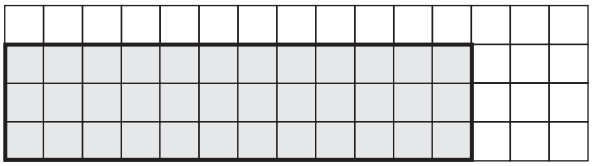
B. 39 is not prime. Possible response: I skip counted by 2 and did not land on 39, but I did when I skip counted by 3. So 3 as well as 1 and 39 are factors of 39.

C. 51 is not prime. Possible response: I divided 51 by several numbers and found that 51 is divisible by 3 and 17, so it has more factors than 1 and itself.

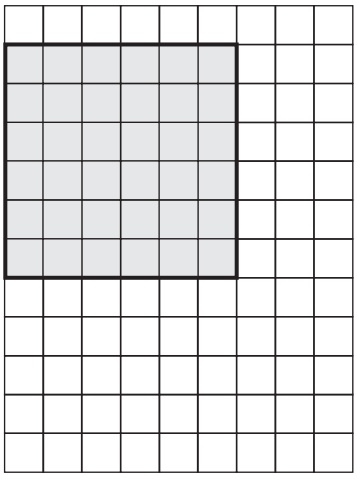
12. $7 \times 6 = 42$; Possible response: I skip counted by 3 because I noticed there 3 rows of 7 on top of 3 rows of 7. I skip counted by 3 seven times. Then $21 + 21 = 42$.



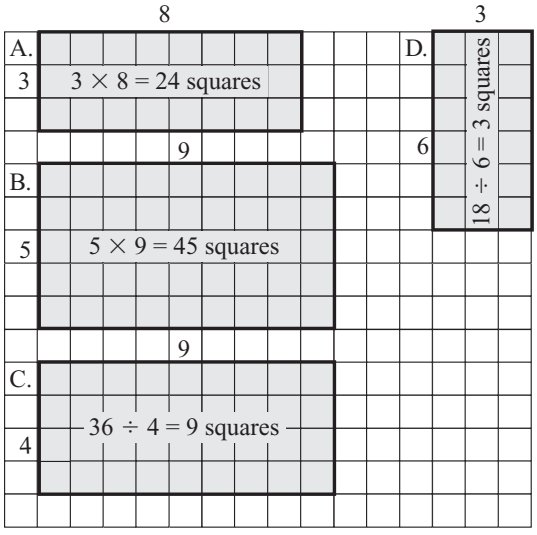
13. 12 squares in each row; $3 \times 12 = 36$

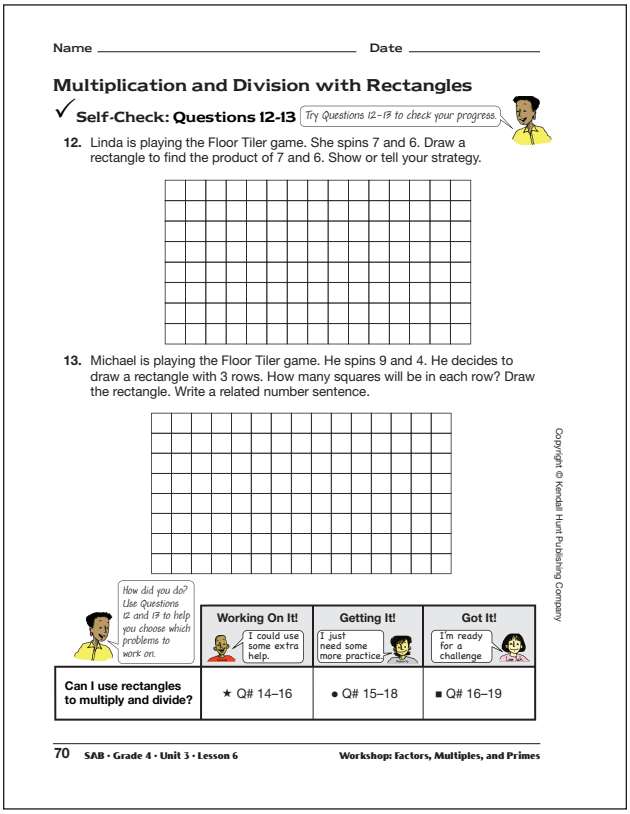


14. 6 squares in each row; $6 \times 6 = 36$



15.





Name _____ Date _____

Multiplication and Division with Rectangles

✓ **Self-Check: Questions 12-13** *Try Questions 12–19 to check your progress.*

12. Linda is playing the Floor Tiler game. She spins 7 and 6. Draw a rectangle to find the product of 7 and 6. Show or tell your strategy.

13. Michael is playing the Floor Tiler game. He spins 9 and 4. He decides to draw a rectangle with 3 rows. How many squares will be in each row? Draw the rectangle. Write a related number sentence.

How did you do? Use Questions 12 and 13 to help you choose which problems to work on.

	Working On It!	Getting It!	Got It!
	I could use some extra help.	I just need some more practice.	I'm ready for a challenge
Can I use rectangles to multiply and divide?	★ Q# 14–16	● Q# 15–18	■ Q# 16–19

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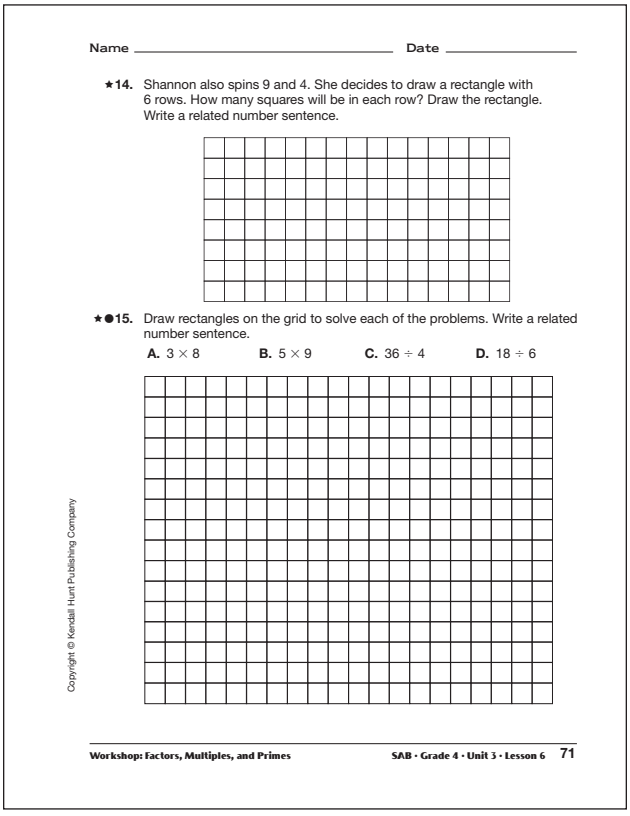

Name _____ Date _____

★**14.** Shannon also spins 9 and 4. She decides to draw a rectangle with 6 rows. How many squares will be in each row? Draw the rectangle. Write a related number sentence.

★●**15.** Draw rectangles on the grid to solve each of the problems. Write a related number sentence.

A. 3×8 **B.** 5×9 **C.** $36 \div 4$ **D.** $18 \div 6$

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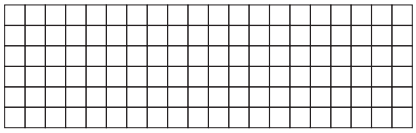
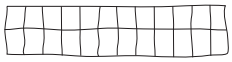
★●■16. Ming spins 8 and 4. He decides to draw a rectangle with 2 rows. How many squares will be in each row? Draw the rectangle. Write a related number sentence.



●17. Mr. Dewey is laying a rectangular patio using 24 square tiles. What are all the rectangles he can make with 24 square tiles? He organizes his work in a table. Help Mr. Dewey complete the table.

Number of Rows	Tiles in each row	Sketch
2	12	

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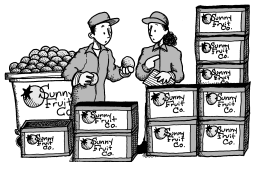
●■18. Design a box for the TIMS Candy Company that will hold 36 pieces of candy and has more than two layers. Each layer must have the same number of pieces. Tell how many layers are in your box. Also, tell how many pieces of candy are in each layer. Show or tell how you solved this problem.

■19. Help the Sunny Fruit Company design a rectangular-shaped box for shipping four dozen oranges. (How many oranges are in four dozen?) How many layers will your box have, how many rows of oranges will be in each layer, and how many oranges will be in each row? Show or tell how you solved this problem. (There is more than one correct solution.)



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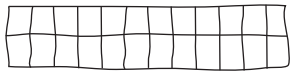
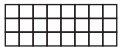
16. 16 squares in each row, $2 \times 16 = 32$ squares

17.

Number of Rows	Tiles in each row	Sketch
1	24	
2	12	
3	8	
4	6	

18. Boxes will vary. Some possible boxes include: 3 layers with 12 candies each, 4 layers with 9 candies each, 6 layers with 6 candies each, etc.

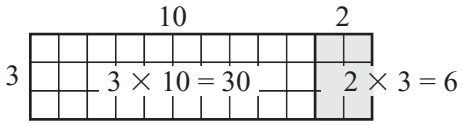
19. 48 oranges need to be boxed; designs of boxes vary. Possible solutions are:

4 layers of oranges, each layer has 12 oranges arranged in 3 rows of 4 oranges (or 6 rows of 2 oranges);

3 layers of oranges, each layer has 16 oranges arranged in 4 rows of 4 oranges (or 8 rows of 2 oranges);

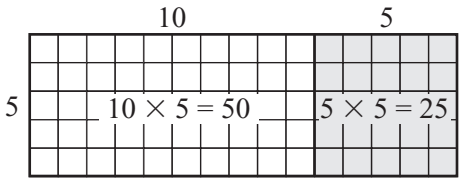
2 layers of oranges, each layer has 24 oranges arranged in 4 rows of 6 oranges (or 8 rows of 3 oranges)

20.



30 + 6 = 36

21.

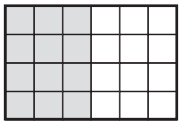


50 + 25 = 75

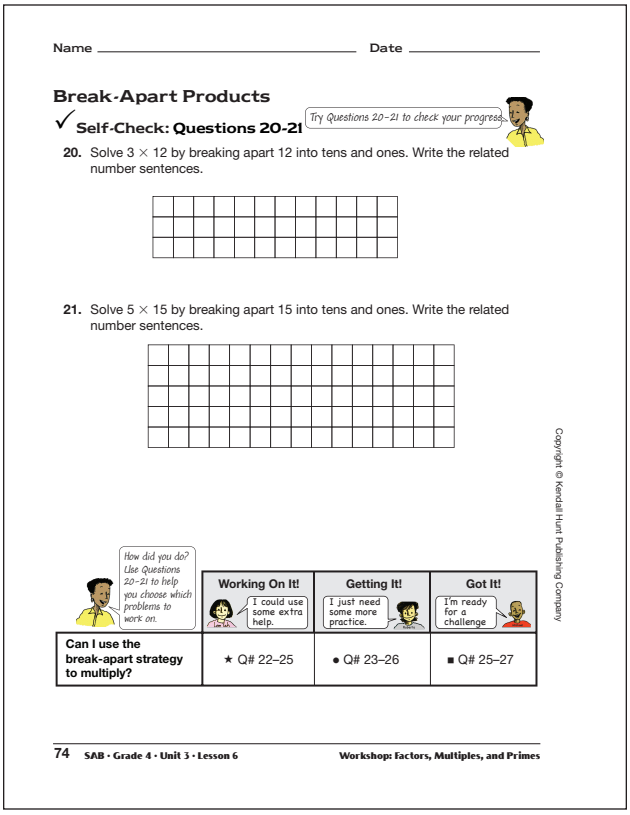
22. A. 4 × 2 = 8
4 × 4 = 16
16 + 8 = 24

B. 2 × 6 = 12
2 × 6 = 12
12 + 12 = 24

C. Responses will vary. Possible response:



4 × 3 = 12
4 × 3 = 12
12 + 12 = 24



Name _____ Date _____

Break-Apart Products

✓ **Self-Check: Questions 20–21**

Try Questions 20–21 to check your progress.

20. Solve 3 × 12 by breaking apart 12 into tens and ones. Write the related number sentences.

21. Solve 5 × 15 by breaking apart 15 into tens and ones. Write the related number sentences.

How did you do? Use Questions 20–21 to help you choose which problems to work on.

	Working On It!	Getting It!	Got It!
	I could use some extra help.	I just need some more practice.	I'm ready for a challenge
Can I use the break-apart strategy to multiply?	★ Q# 22–25	● Q# 23–26	■ Q# 25–27

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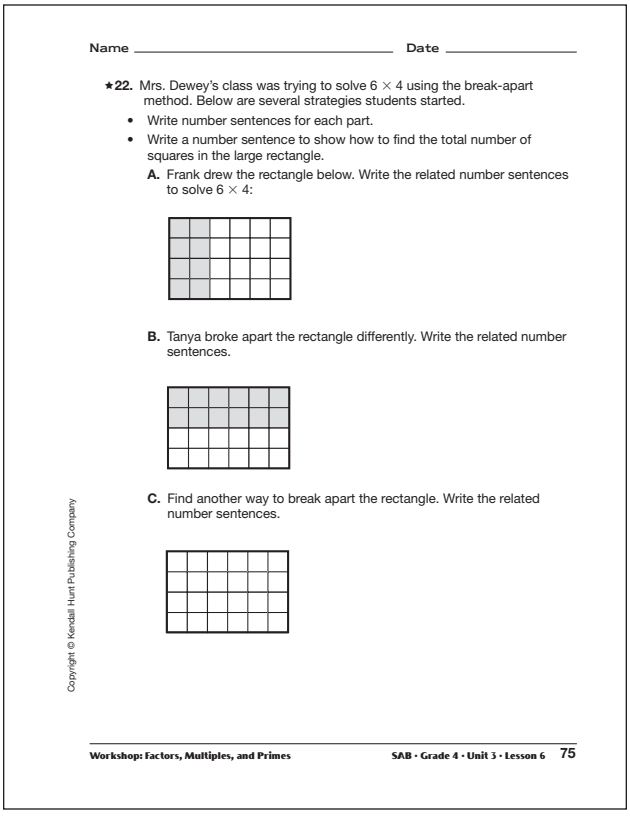

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★**22.** Mrs. Dewey's class was trying to solve 6 × 4 using the break-apart method. Below are several strategies students started.

- Write number sentences for each part.
- Write a number sentence to show how to find the total number of squares in the large rectangle.

A. Frank drew the rectangle below. Write the related number sentences to solve 6 × 4:

B. Tanya broke apart the rectangle differently. Write the related number sentences.

C. Find another way to break apart the rectangle. Write the related number sentences.

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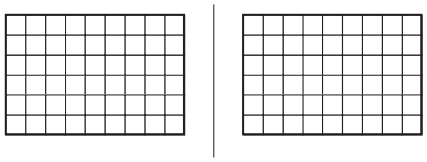
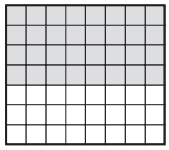
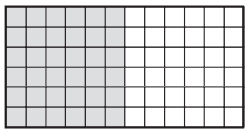
★●23. Show two ways to solve 6 × 9 using the break-apart strategy. Write the related number sentences.



★●24. Linda drew the following rectangle to solve 7 × 8. Finish her solution and write the related number sentence.



★●■25. Luis drew the following rectangle to solve 6 × 12. Finish his solution and write the related number sentence.



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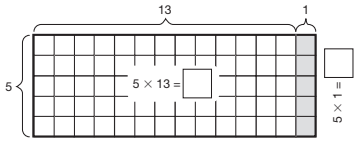
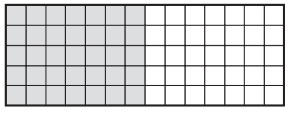
●■26. **A.** Ming drew the rectangle below to solve 5 × 14 using the break-apart method. Finish Ming's number sentences.



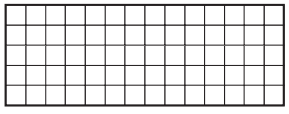
5 × 14 = _____ + _____ = _____

What do you think about Ming's solution?

B. Ming broke apart the rectangle a different way. Write the related number sentences.



C. Solve 5 × 14 by breaking apart 14 into tens and ones. Write the related number sentences.



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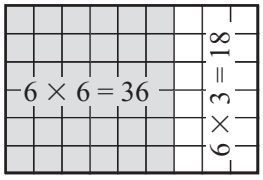
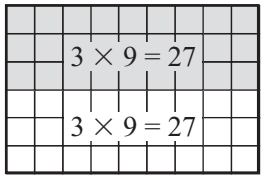
23. Solutions will vary. Possible responses:



36 + 18 = 54



27 + 27 = 54

24. 4 × 8 = 32
3 × 8 = 24
32 + 24 = 56

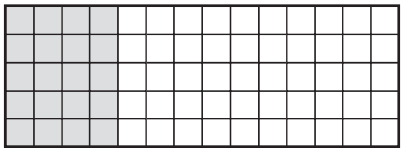
25. 6 × 6 = 36
6 × 6 = 36
36 + 36 = 72

26. A. 5 × 13 = 65
1 × 5 = 5
5 × 14 = 65 + 5 = 70

Possible response: Ming's solution works, but I did not know 5 × 13. The problem would have been easier if he broke the rectangle into multiplication problems that I know like 5 × 10 and 5 × 3. Those problems are easy.

B. 5 × 7 = 35
5 × 7 = 35
35 + 35 = 70

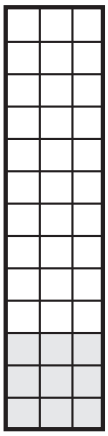
C.



5 × 4 = 20
5 × 10 = 50
20 + 50 = 70

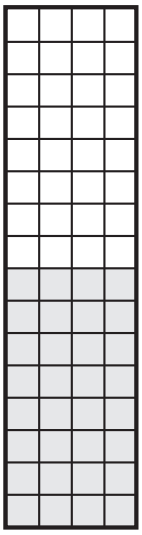
27. Possible response:

A.



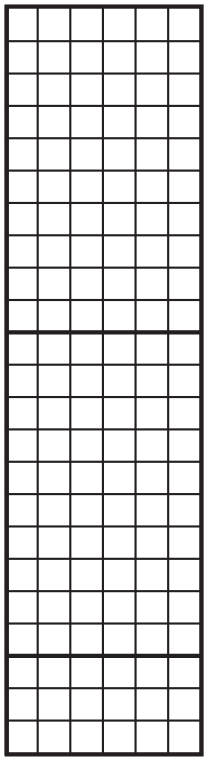
$3 \times 3 = 9$
$10 \times 3 = 30$
$3 \times 13 = 30 + 9 = 39$

B.

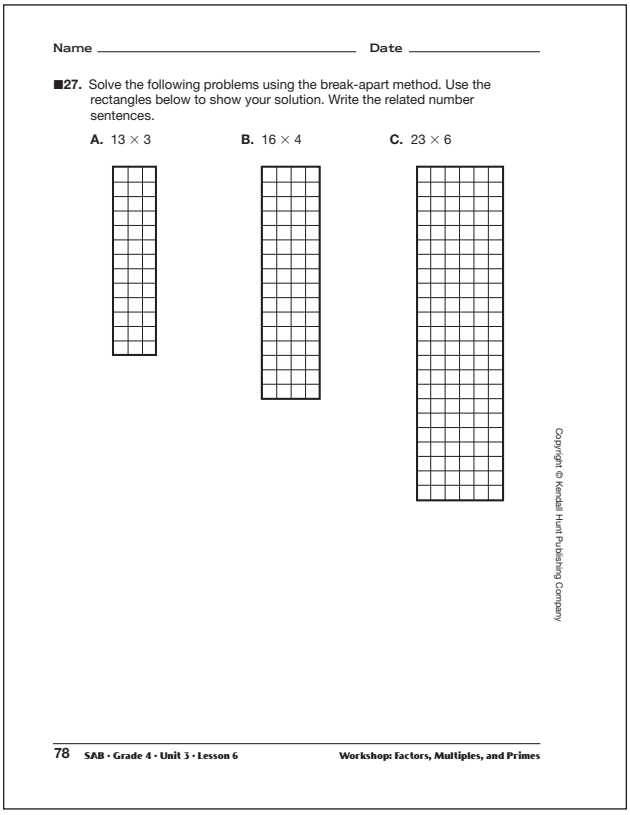


$8 \times 4 = 32$
$8 \times 4 = 32$
$32 + 32 = 64$

C.



$10 \times 6 = 60$
$10 \times 6 = 60$
$3 \times 6 = 18$
$60 + 60 + 18 = 138$



Name _____ Date _____

■**27.** Solve the following problems using the break-apart method. Use the rectangles below to show your solution. Write the related number sentences.

A. 13×3 **B.** 16×4 **C.** 23×6

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