Student Guide

Workshop: Strategies for Multiplication Facts (SG pp. 237–242)
Questions 1–10

1. Answers will vary. Possible response: My favorite strategy is skip counting for the 5s and 10s.

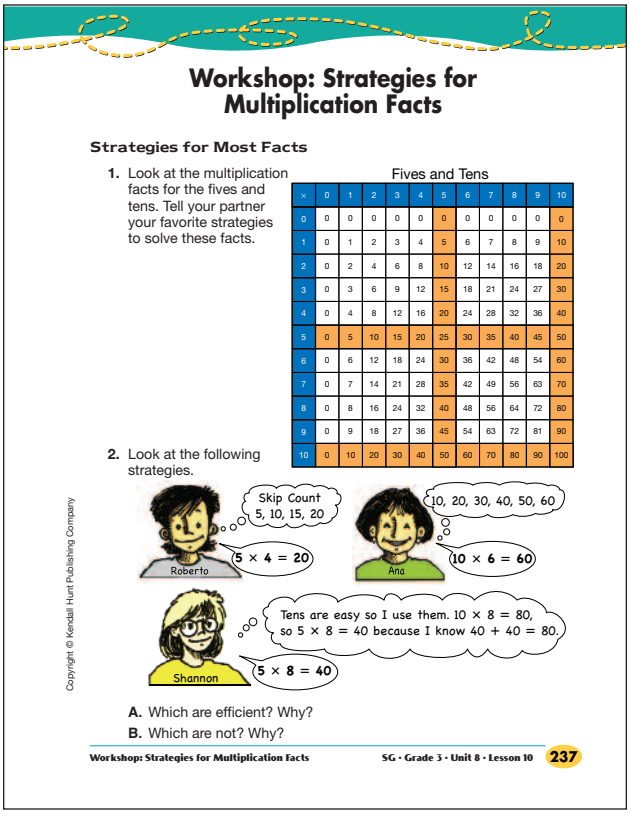
2. **A.*** Possible response: Skip counting with 5s and 10s is efficient when the numbers are small. Using 10s is also efficient because they are easy facts to remember.

   B.* Possible response: Skip counting is not efficient if you are using big numbers because it would take too long and you could lose track of what you are trying to answer.

3. Answers will vary. Possible response: I can easily use skip counting for my 2s. For my 3s it is easy to use my 2s and then one more group, for example for 3 X 4, I can solve 2 X 4 = 8 and then add 4 more, 8 + 4= 12.

4. **A.** Possible response: Using doubles is an efficient strategy for the 2s. It is also efficient to use facts you know to figure out the answers.

   B. Possible response: Skip counting is good for smaller numbers but takes too long with larger facts. Skip counting by 3s is not as easy as skip counting by 2s.



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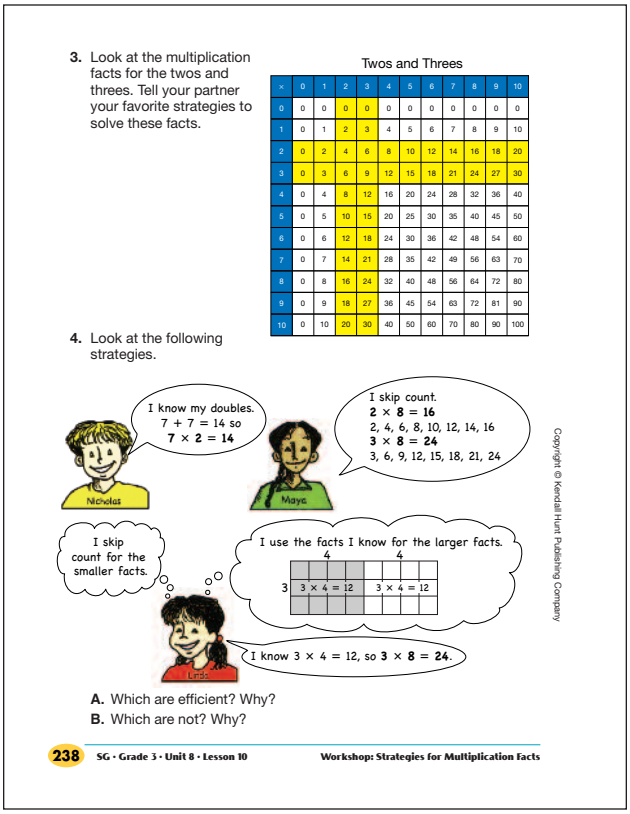

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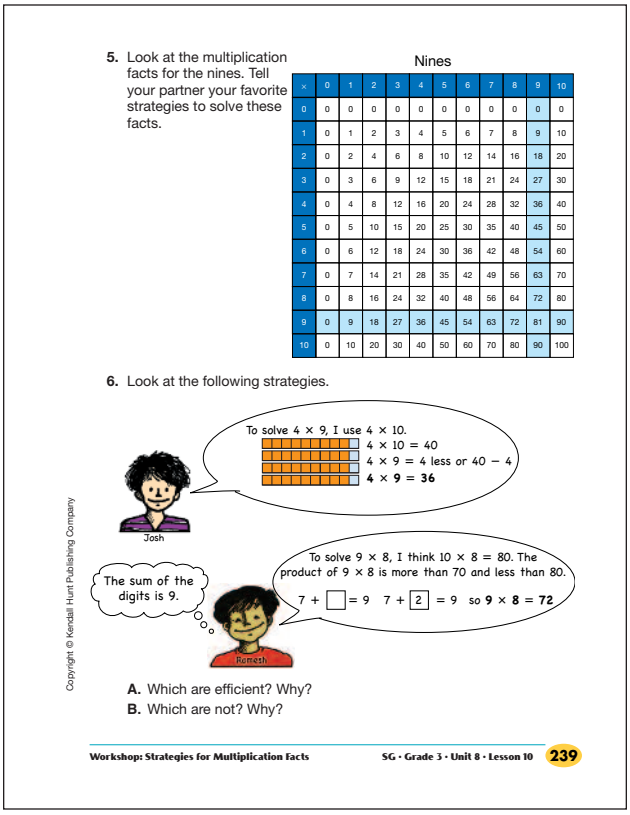
***Answers and/or discussion are included in the lesson.**



5. Look at the multiplication facts for the nines. Tell your partner your favorite strategies to solve these facts.

Nines

×	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

6. Look at the following strategies.

A. Which are efficient? Why?
B. Which are not? Why?

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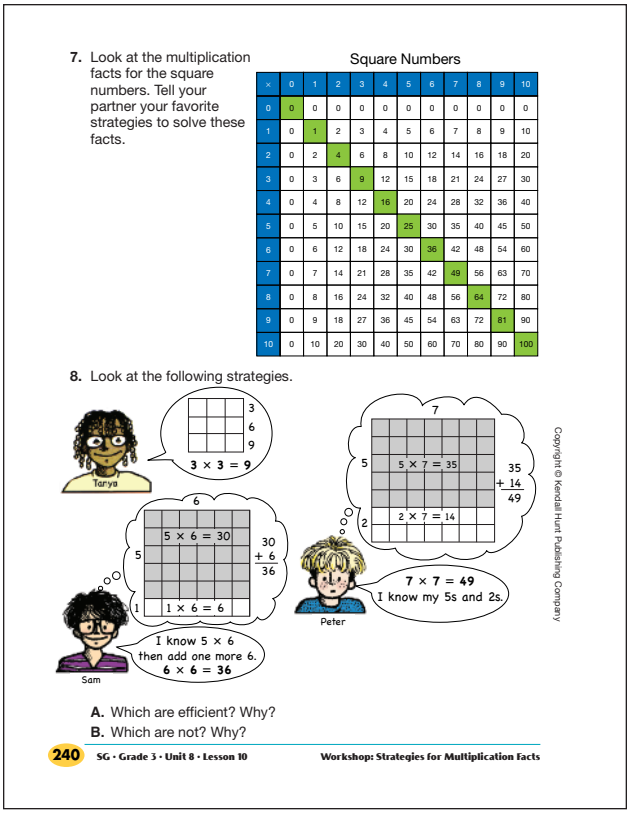

7. Look at the multiplication facts for the square numbers. Tell your partner your favorite strategies to solve these facts.

Square Numbers

×	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

8. Look at the following strategies.

A. Which are efficient? Why?
B. Which are not? Why?

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5. Answers will vary. Possible response: I like to use facts I know to help me. Since I know my 10s I multiply a number by 10 and then subtract one group since I only want 9 groups not 10.

6. **A.** Possible response: I think it is more efficient to use the 10 facts to solve multiplication problems with 9 because I can quickly answer the 10s and can use mental math strategies to subtract. Or, I like to think about the pattern for 9s. I know the sum of the digits in the product will add up to 9 so I can use that to check my work.

   B. Using the patterns for the 9s is great for smaller numbers, but when you get to larger numbers it would be more difficult.

7. Answers will vary. Possible response: I use facts I already know to help me with the squares. I can use the 5 facts to help me with the bigger numbers and I can use the 2s to help me with smaller numbers.

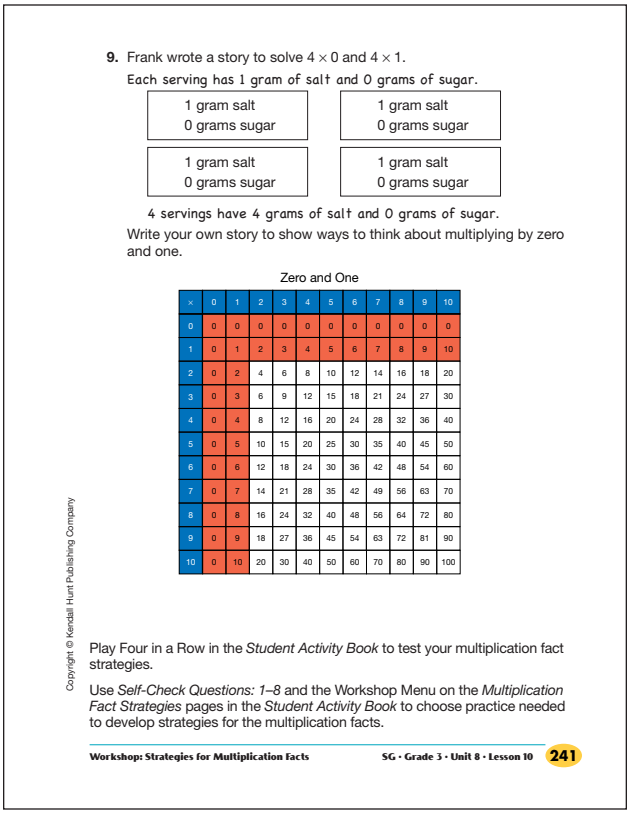
8. **A.** Tanya's strategy works with smaller facts. Sam and Peter use facts they know which is better than skip counting for larger facts.

   B. Possible responses: Tanya's strategy of thinking about an array does not work well for larger numbers.

9. Stories will vary. Possible response: I have three friends. I gave each friend 1 piece of candy but 0 pieces of gum. How many pieces of candy did I share? $3 \times 1 = 3$. How many pieces of gum did I share? $3 \times 0 = 0$.

10. A. Possible response: I would start with the 5s and 10s because they are the easiest. I know the 2s already because I know my doubles (e.g., 7 + 7). Then I would practice the 3s because I can use the 2s. After the 3s I would practice the 9s since I can use the 10s to help me. There are only a few square numbers to learn, and those I can figure out with the facts that I know. Finally I would practice the last six facts.

B. Answers will vary. Possible response for a strategy for the product 42; $6 \times 6 = 36$, $36 + 6 = 42$.



9. Frank wrote a story to solve 4 × 0 and 4 × 1.

Each serving has 1 gram of salt and 0 grams of sugar.

1 gram salt 0 grams sugar	1 gram salt 0 grams sugar
1 gram salt 0 grams sugar	1 gram salt 0 grams sugar

4 servings have 4 grams of salt and 0 grams of sugar.

Write your own story to show ways to think about multiplying by zero and one.

Zero and One

×	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

Play Four in a Row in the *Student Activity Book* to test your multiplication fact strategies.

Use *Self-Check Questions: 1–8* and the Workshop Menu on the *Multiplication Fact Strategies* pages in the *Student Activity Book* to choose practice needed to develop strategies for the multiplication facts.

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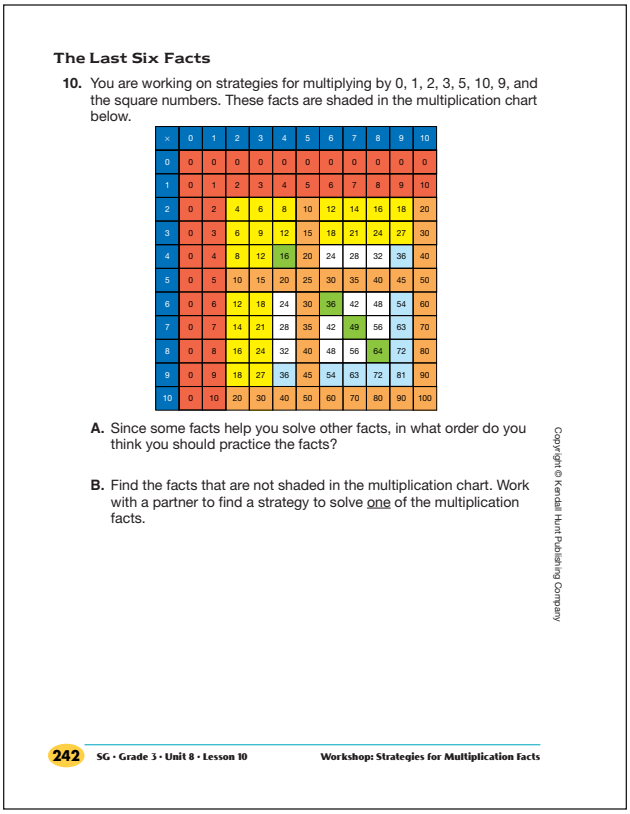

The Last Six Facts

10. You are working on strategies for multiplying by 0, 1, 2, 3, 5, 10, 9, and the square numbers. These facts are shaded in the multiplication chart below.

×	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

A. Since some facts help you solve other facts, in what order do you think you should practice the facts?

B. Find the facts that are not shaded in the multiplication chart. Work with a partner to find a strategy to solve one of the multiplication facts.

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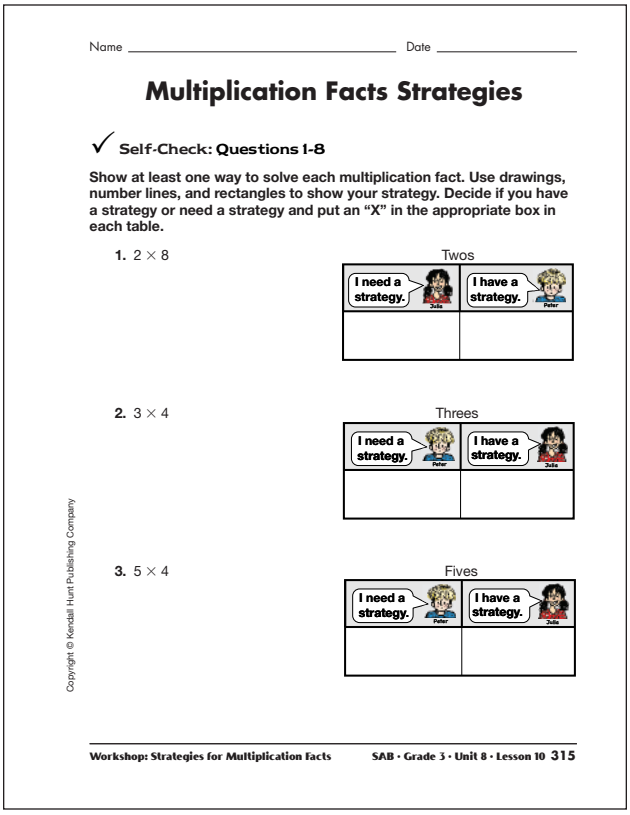

Name _____ Date _____

Multiplication Facts Strategies

✓ Self-Check: Questions 1-8

Show at least one way to solve each multiplication fact. Use drawings, number lines, and rectangles to show your strategy. Decide if you have a strategy or need a strategy and put an "X" in the appropriate box in each table.

1. 2 × 8

Twos

I need a strategy. (Julia)	I have a strategy. (Peter)

2. 3 × 4

Threes

I need a strategy. (Peter)	I have a strategy. (Julia)

3. 5 × 4

Fives

I need a strategy. (Peter)	I have a strategy. (Julia)

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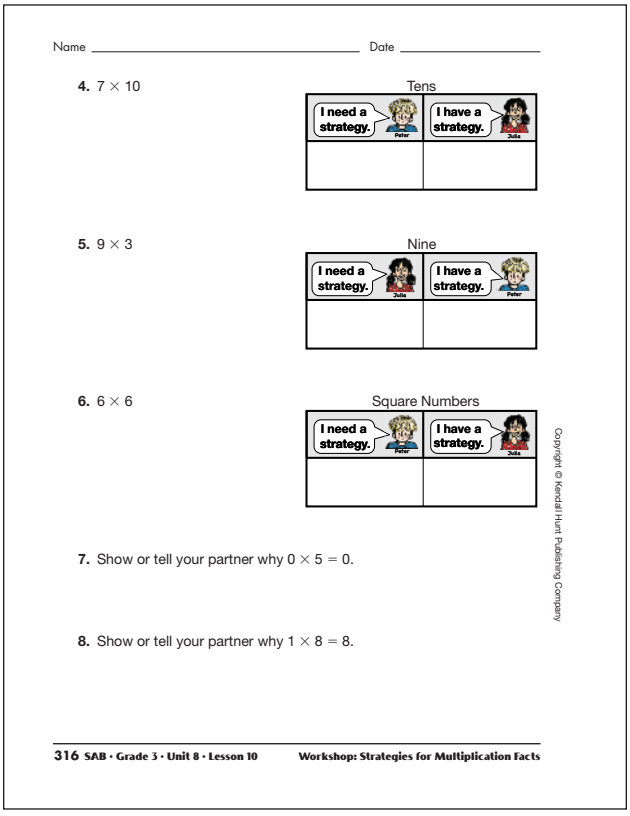

Name _____ Date _____

4. 7 × 10

Tens

I need a strategy. (Peter)	I have a strategy. (Julia)

5. 9 × 3

Nine

I need a strategy. (Julia)	I have a strategy. (Peter)

6. 6 × 6

Square Numbers

I need a strategy. (Peter)	I have a strategy. (Julia)

7. Show or tell your partner why 0 × 5 = 0.

8. Show or tell your partner why 1 × 8 = 8.

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Student Activity Book

Multiplication Facts Strategies (SAB pp. 315–328) Questions 1–22

1. 16; use doubles: 2 × 4 = 8 and 8 + 8 = 16.
2. 12; skip count by three: 3, 6, 9 12 .
3. 20; skip count by 5s: 5, 10, 15, 20.
4. 70; think 7 × 1 = 7, but it is 7 tens or 70.
5. 27; think 10 × 3 = 30 but that is one extra 3, so subtract 30 − 3 = 27.
6. 36; I know 5 × 6 = 30 then add one more 6.
7. If something comes in a group of 5 things but I have 0 groups, I have zero in all.
8. If I have one pack of gum with eight pieces in the pack, I have 8 pieces of gum; 1 × 8 means 1 group with 8 things in it.

9. A. Agree. $4 \times 1 = 4$; 4 hops of 1 stops on 4.

B. Agree; $4 \times 0 = 0$; 4 hops of 0 stops on 0.

C. Disagree; $0 \times 5 = 5$; no groups of 5 is 0.

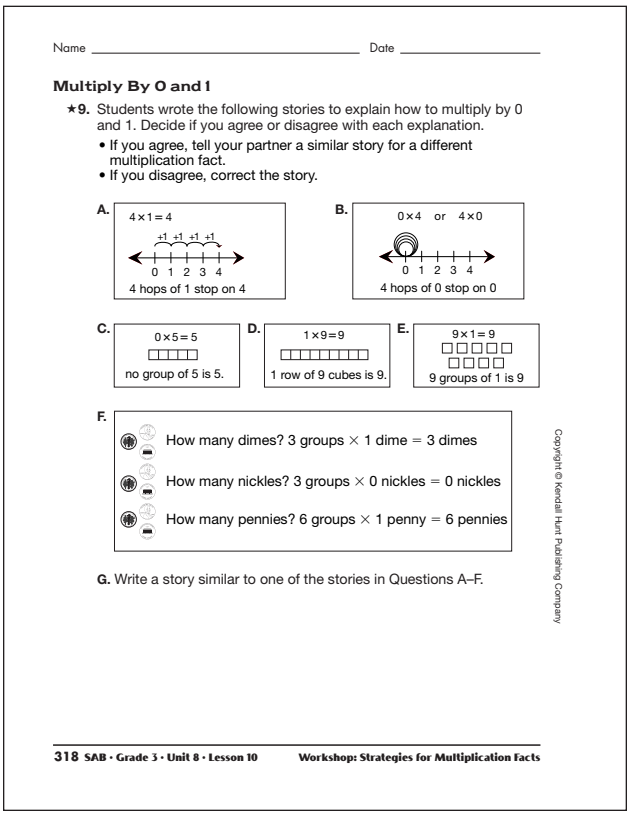
D. Agree. $1 \times 9 = 9$; 1 group of 9 is 9.

E. Agree. $9 \times 1 = 9$; 9 groups with one cube in each is 9 cubes.

F. Agree. 3 groups $\times$ 1 dime = 3 dimes
3 groups $\times$ 0 nickel = 0 nickels
6 groups $\times$ 1 penny = 6 pennies

G. Answers will vary. There are 0 black jelly beans in each of the jars. $0 \times 4 = 0$. There are 0 black jelly beans.

10. 30 minutes. 15 minutes.
45 minutes. 25 minutes.
20 minutes. 40 minutes.
35 minutes. 50 minutes.


Name _____ Date _____

Multiply By 0 and 1

★**9.** Students wrote the following stories to explain how to multiply by 0 and 1. Decide if you agree or disagree with each explanation.
- If you agree, tell your partner a similar story for a different multiplication fact.
- If you disagree, correct the story.

A. 4 × 1 = 4; +1 +1 +1 +1; 0 1 2 3 4; 4 hops of 1 stop on 4

B. 0 × 4 or 4 × 0; 0 1 2 3 4; 4 hops of 0 stop on 0

C. 0 × 5 = 5; no group of 5 is 5.

D. 1 × 9 = 9; 1 row of 9 cubes is 9.

E. 9 × 1 = 9; 9 groups of 1 is 9

F.
How many dimes? 3 groups × 1 dime = 3 dimes
How many nickles? 3 groups × 0 nickles = 0 nickles
How many pennies? 6 groups × 1 penny = 6 pennies

G. Write a story similar to one of the stories in Questions A–F.

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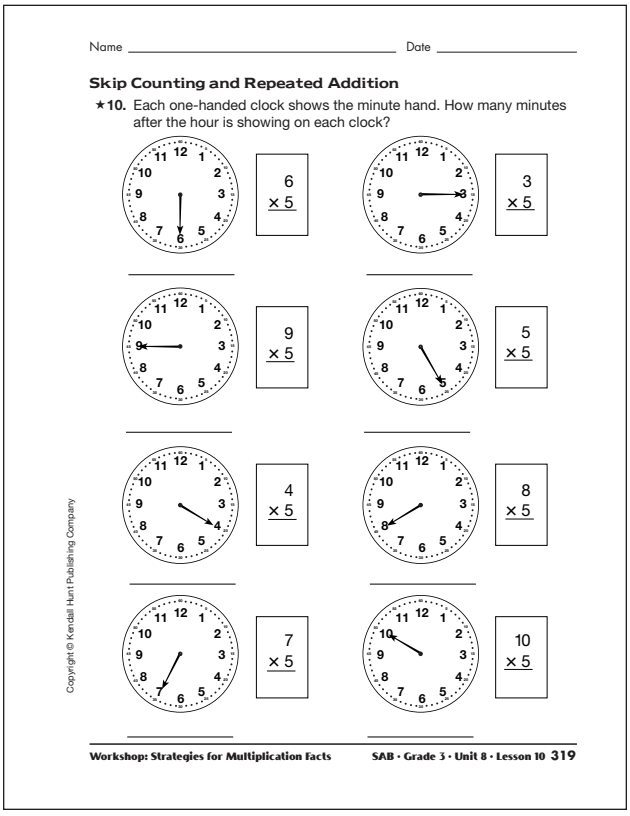
Name _____ Date _____

Skip Counting and Repeated Addition

★**10.** Each one-handed clock shows the minute hand. How many minutes after the hour is showing on each clock?

6 × 5 _____ 3 × 5 _____

9 × 5 _____ 5 × 5 _____

4 × 5 _____ 8 × 5 _____

7 × 5 _____ 10 × 5 _____

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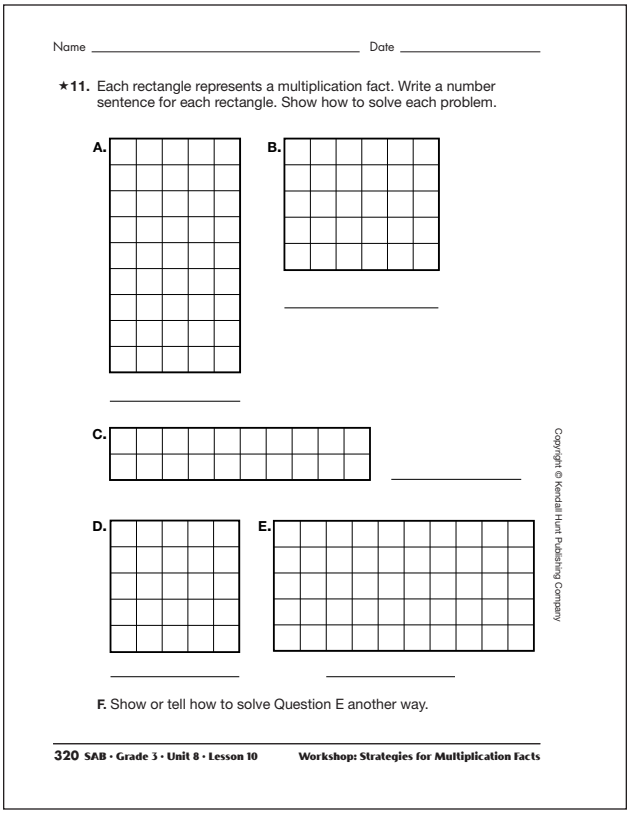

Name _____ Date _____

★11. Each rectangle represents a multiplication fact. Write a number sentence for each rectangle. Show how to solve each problem.

A. B. C. D. E.

F. Show or tell how to solve Question E another way.

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11. A. $9 \times 5 = 45$; Possible response: I broke the rectangle into two parts: $5 \times 5 = 25$, $4 \times 5 = 20$ and $25 + 20 = 45$.

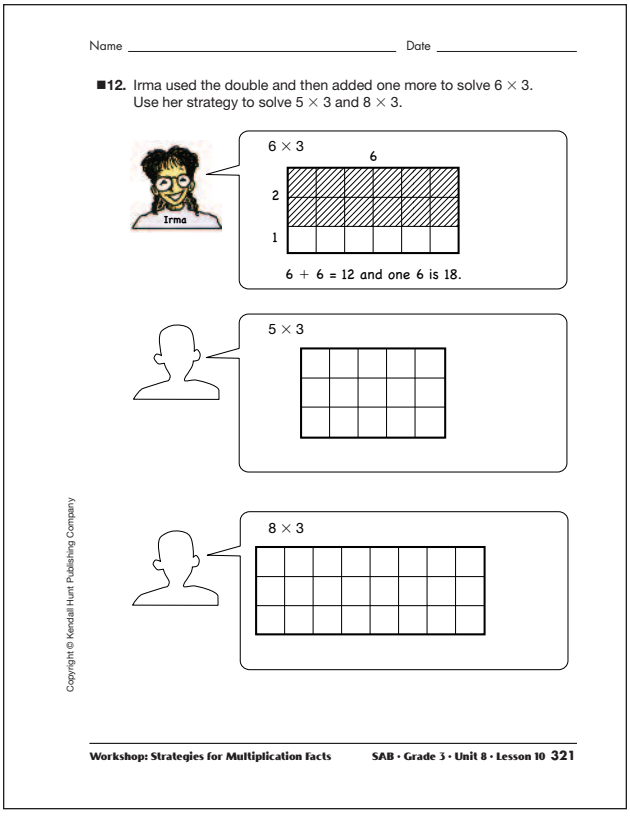
B. $5 \times 6 = 30$; Possible response: I used doubles. I broke 6 into $3 + 3$, $5 \times 3 = 15$, so $15 + 15 = 30$.

C. $2 \times 10 = 20$; I used doubles $10 + 10 = 20$.

D. $5 \times 5 = 25$; I know the square facts.

E. $5 \times 10 = 50$; ten is twice five, $5 \times 5 = 25$ so 5 tens is 50.

F. Break 5 into $3 + 2$; $3 \times 10 = 30$, $2 \times 10 = 20$ and $30 + 20 = 50$.



Name _____ Date _____

■12. Irma used the double and then added one more to solve 6×3. Use her strategy to solve 5×3 and 8×3.

Irma

6×3

6 + 6 = 12 and one 6 is 18.

5×3

8×3

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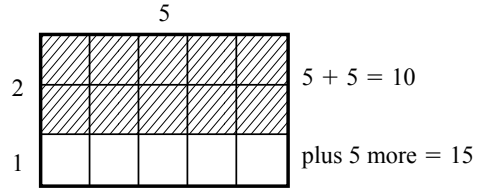
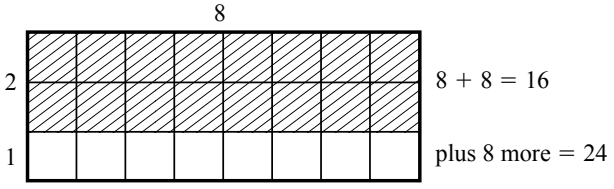
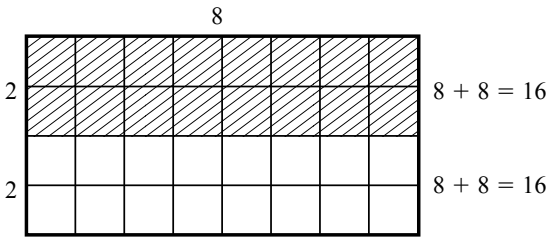
12. $5 + 5 = 10$ and one 5 is 15



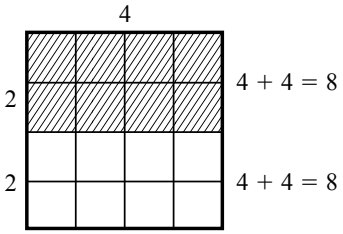
$8 + 8 = 16$ and one 8 is 24

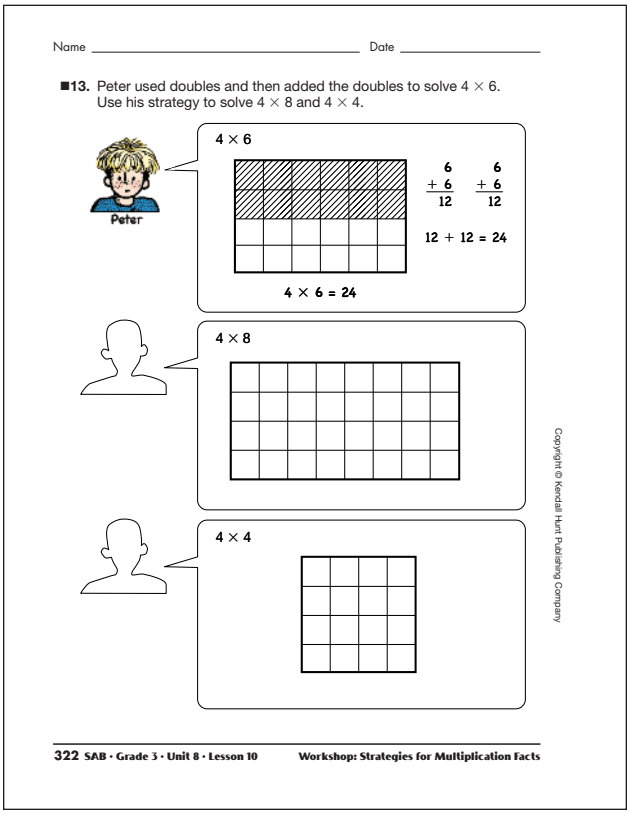


13. $8 + 8 = 16$ and $16 + 16 = 32$



$4 + 4 = 8$ and $8 + 8 = 16$




Name _____ Date _____

■13. Peter used doubles and then added the doubles to solve 4 × 6. Use his strategy to solve 4 × 8 and 4 × 4.

Peter

4 × 6

6 + 6 = 12 6 + 6 = 12

12 + 12 = 24

4 × 6 = 24

4 × 8

4 × 4

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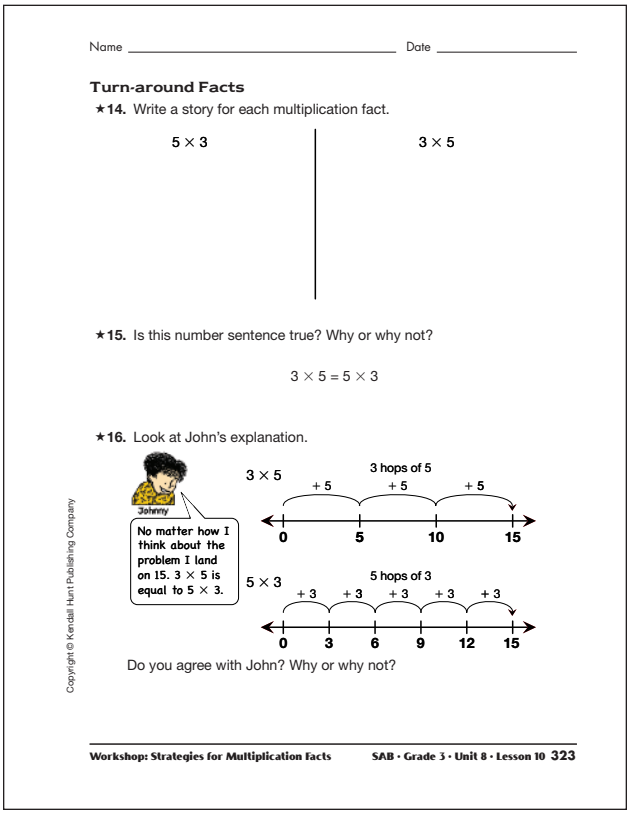
14. Possible response: $5 \times 3 = 15$; Five friends in my class each had three pencils. There were fifteen pencils in all. $3 \times 5 = 15$; Three hens each laid five eggs. The farmer collected fifteen eggs.

15. Yes because each side of the equal sign equals fifteen; they are turn-around facts.

16. Possible response: I agree because each number sentence equals fifteen; they are turn-around facts.


Name _____ Date _____

Turn-around Facts

★14. Write a story for each multiplication fact.

5 × 3 | 3 × 5

★15. Is this number sentence true? Why or why not?

$3 \times 5 = 5 \times 3$

★16. Look at John's explanation.

Johnny

No matter how I think about the problem I land on 15. 3 × 5 is equal to 5 × 3.

3 × 5: 3 hops of 5 (+5, +5, +5) 0, 5, 10, 15

5 × 3: 5 hops of 3 (+3, +3, +3, +3, +3) 0, 3, 6, 9, 12, 15

Do you agree with John? Why or why not?

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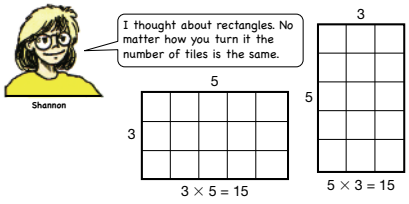
★17. Look at Shannon's explanation.



Do you agree with Shannon? Why or why not?

■★18. Which number sentences are true?

		True	False
A.	10 × 5 = 5 × 10		
B.	4 × 3 = 3 × 4		
C.	9 × 2 = 2 × 9		
D.	3 + 5 = 5 + 3		
E.	8 − 2 = 2 − 8		
F.	25 × 4 = 4 × 25		
G.	82 × 8 = 8 × 82		
H.	35 × 10 = 10 × 35		

I. Show or tell how you decided if Question B is true.

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17. Possible response: I agree with Shannon because both rectangles have 15 squares in them. If you cut out one of them it would fit exactly on top of the other one.

18. **A–H.** All are true except **E;** E is false.

I. They are turn-around facts so they both have the same product and are equal.

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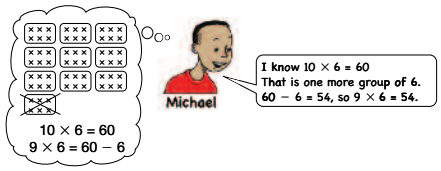
Reasoning Strategies

★19. Michael used the multiplication facts for the tens to solve 9 × 6.



A. Show how to use Michael's strategy to solve 9 × 7.

B. Show how to use 9 × 5 to solve 9 × 7.

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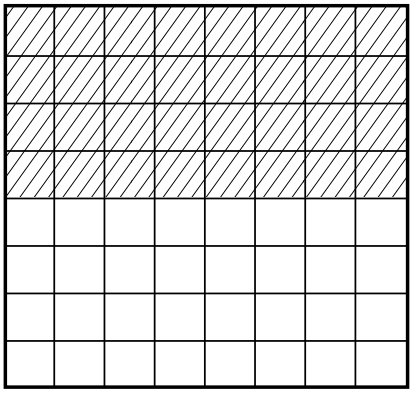
19. **A.** 10 × 7 = 70, 70 − 7 = 63

B. Seven is two more than five, 9 × 5 is 45 and two more nines is 18, 45 + 18 = 63.

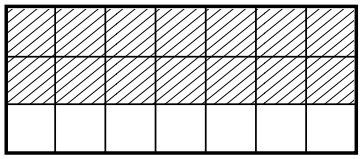
20. A. $8 \times 8 = 64$; Break 8 into $4 + 4$, $4 \times 8 = 32$, $32 + 32 = 64$.



$4 \times 8 = 32$

$4 \times 8 = 32$

B. $3 \times 7 = 21$; break 3 into $2 + 1$, $2 \times 7 = 14$, $1 \times 7 = 7$ and $7 + 14 = 21$.

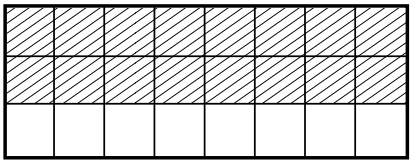


$2 \times 7 = 14$

$1 \times 7 = 7$

21. Possible responses:

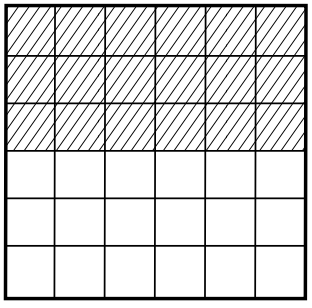
A. $3 \times 8 = 24$; $2 \times 8 = 16$ and one more 8 is 24.



$2 \times 8 = 16$

$1 \times 8 = 8$

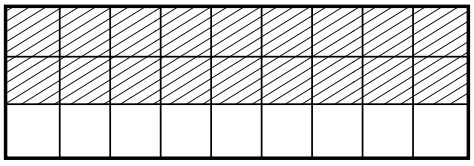
B. $6 \times 6 = 36$; six is three plus three, use doubles $6 \times 3 = 18$, $18 + 18 = 36$.



$6 \times 3 = 18$

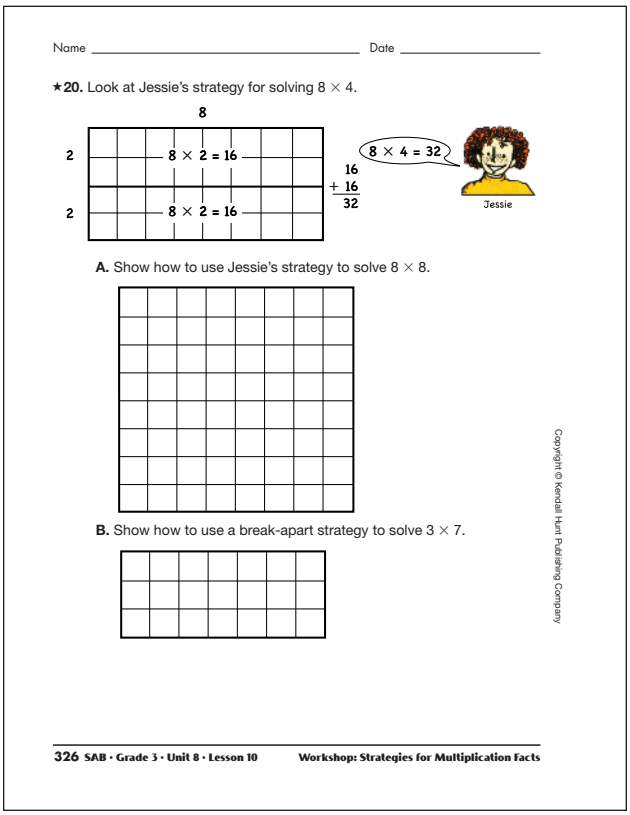
$6 \times 3 = 18$

C. $3 \times 9 = 27$; break 3 into $2 + 1$, $2 \times 9 = 18$ and one more 9 equals 27.



$2 \times 9 = 18$

$1 \times 9 = 9$



Name _____ Date _____

★**20.** Look at Jessie's strategy for solving 8×4.

8

2 | $8 \times 2 = 16$ | 16

2 | $8 \times 2 = 16$ | + 16 = 32

$8 \times 4 = 32$

Jessie

A. Show how to use Jessie's strategy to solve 8×8.

B. Show how to use a break-apart strategy to solve 3×7.

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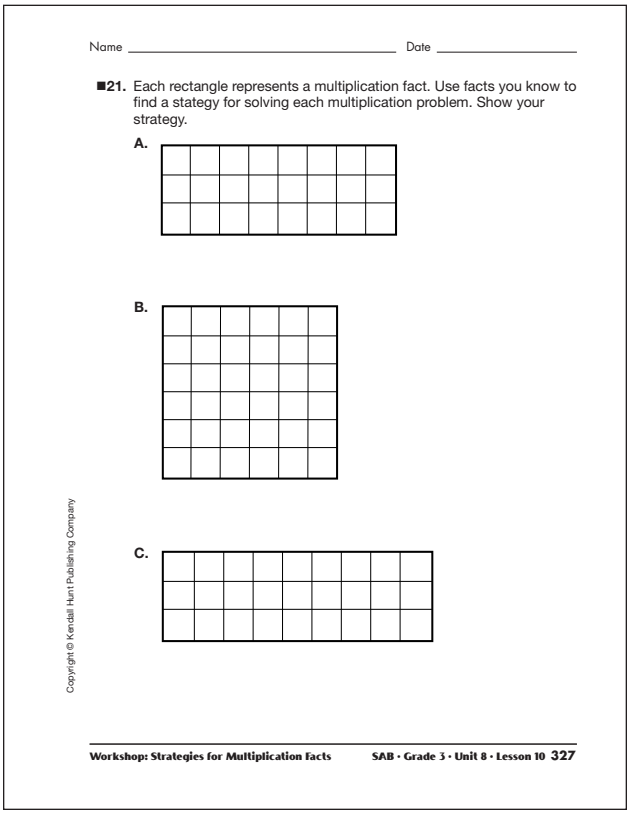

Name _____ Date _____

■**21.** Each rectangle represents a multiplication fact. Use facts you know to find a stategy for solving each multiplication problem. Show your strategy.

A.

B.

C.

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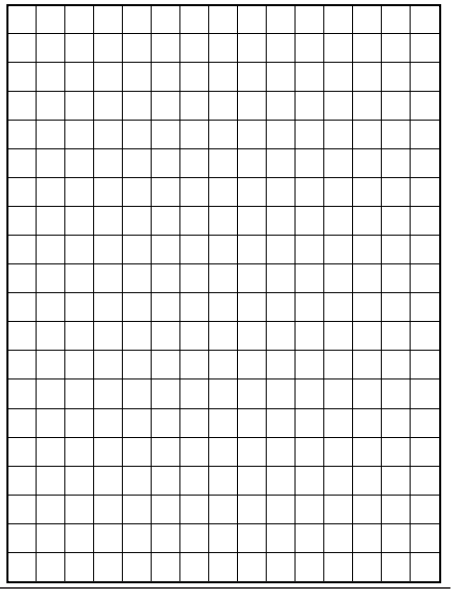
■ **22. A.** List three multiplication facts you are trying to figure out.

_____ _____ _____

B. Use the grid below to find a strategy to solve this list of facts.



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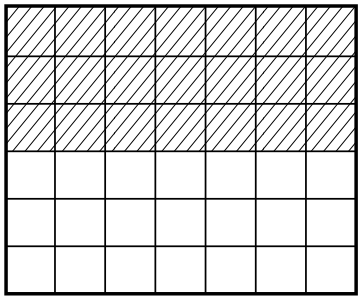
22. Answers will vary. Possible response for 6×7: I broke 6 into $3 + 3$. I know $3 \times 7 = 21$ and $21 + 21 = 42$, so $6 \times 7 = 42$.



$21 + 21 = 42$