

Student Activity Book

Moving Ahead with Multiplication

Questions 1–29 (SAB pp. 481–495)

1.

	60		4
30	$30 \times \boxed{60} = 1800$		$30 \times \boxed{4} = 120$
2	$2 \times \boxed{60} = 120$		8

1800	
120	
<u>120</u>	
+ 8	
2048	

2. A.

12	
× 52	
500	
100	
20	
+ 4	
624	

- B. $50 \times 10 = 500$
 C. $10 \times 2 = 20$

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Moving Ahead with Multiplication

Connecting Multiplication Methods

✓ Self-Check: Question 1

1. John solved 64×32 using all partials. Complete the same problem using the rectangle method. Fill in the blank boxes with the correct numbers.

All-Partials Method	
$\begin{array}{r} 64 \\ \times 32 \\ \hline 128 \\ 128 \\ \hline 2048 \end{array}$	

Rectangle Method																							
<table border="1" style="display: inline-table;"> <tr> <td style="width: 50px;"></td> <td style="text-align: center;">64</td> <td style="width: 50px;"></td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="width: 150px; height: 100px; vertical-align: middle;">$30 \times \boxed{} = 1800$</td> <td style="width: 20px;"></td> <td style="text-align: center; vertical-align: middle;">$30 \times \boxed{} = 120$</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="width: 150px; height: 30px; vertical-align: middle;">$2 \times \boxed{} = 120$</td> <td style="width: 20px;"></td> <td style="text-align: center; vertical-align: middle;">8</td> </tr> </table>		64		4	30	$30 \times \boxed{} = 1800$		$30 \times \boxed{} = 120$	2	$2 \times \boxed{} = 120$		8	<table style="vertical-align: middle;"> <tr> <td style="text-align: right;">1800</td> <td></td> </tr> <tr> <td style="text-align: right;">120</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>120</u></td> <td></td> </tr> <tr> <td style="text-align: right;">+ 8</td> <td></td> </tr> <tr> <td style="text-align: right;">2048</td> <td></td> </tr> </table>	1800		120		<u>120</u>		+ 8		2048	
	64		4																				
30	$30 \times \boxed{} = 1800$		$30 \times \boxed{} = 120$																				
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1800																							
120																							
<u>120</u>																							
+ 8																							
2048																							

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Use the Self-Check Question and the menu to choose practice with multiplication methods.

Can I Do This?	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.	
Make connections between methods.	★ Q# 2-3	● Q# 3-4	■ Q# 4
Use place value to multiply.	★★■ Multiplication Digits Game		

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- *2. Irma solved 12×52 using rectangles.

	50		2
10	$50 \times 10 = 500$		$10 \times 2 = 20$
2	$50 \times 2 = 100$		4

500	
100	
20	
<u>4</u>	
624	

- A. Use Irma's rectangle to fill in the blank boxes for the same problem using the all-partials method.

12	
× 52	
+ 20	
+ 4	
624	

- B. What numbers did Irma multiply in both methods to get 500?

- C. What numbers did Irma multiply in both methods to get 20?

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★3. Ana solved 38×24 using the expanded form method.

$$\begin{array}{r} 38 = 30 + 8 \\ \times 24 = 20 + 4 \\ \hline 600 \\ 160 \\ 120 \\ + 32 \\ \hline 912 \end{array}$$

A. Using the rectangle method, fill in the blank boxes for the same problem solved above.

B. What numbers did Ana multiply in both problems to get 120?

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■4. Professor Peabody's cat had muddy feet and walked across some problems. Fill in the missing spots to show each solution correctly.

A. 156×42

B. 64×18

$$\begin{array}{r} 64 = \\ \times 18 = \begin{array}{r} 10 + 8 \\ \hline 600 \\ 40 \\ \hline 32 \\ \hline 1152 \end{array} \end{array}$$

C. 89×46

$$\begin{array}{r} 89 \\ \times 46 \\ \hline 360 \\ 480 \\ + 54 \\ \hline \end{array}$$

D. 185×103

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3. A.

B. $4 \times 30 = 120$

4. A.

	100	50	6
40	$40 \times 100 = 4000$	$40 \times 50 = 2000$	$40 \times 6 = 240$
2	$2 \times 100 = 200$	$2 \times 50 = 100$	12

$$\begin{array}{r} 4000 \\ 2000 \\ 240 \\ 200 \\ + 100 \\ \hline 12 \\ \hline 6552 \end{array}$$

B. $64 \times 18 = 10 + 8$

$$\begin{array}{r} 64 \\ \times 18 \\ \hline 600 \\ 40 \\ \hline 480 \\ + 32 \\ \hline 1152 \end{array}$$

C. 89×46

$$\begin{array}{r} 89 \\ \times 46 \\ \hline 3200 \\ 360 \\ 480 \\ + 54 \\ \hline 4094 \end{array}$$

D.

	100	80	5
100	$100 \times 100 = 10,000$	$100 \times 80 = 800$	$5 \times 100 = 500$
3	$100 \times 3 = 300$	$80 \times 3 = 240$	15

$$\begin{array}{r} 10,000 \\ 800 \\ 500 \\ 300 \\ 250 \\ + 15 \\ \hline 11,355 \end{array}$$

5. 819; 39×21 using a mental math strategy:
 $40 \times 21 = 800 + 40$ because $40 \times 20 = 800$
 and one more 40. But now I need to subtract
 one 21. $800 + 40 - 21 = 819$.
 39×21 using all-partials:

$$\begin{array}{r} 39 \\ \times 21 \\ \hline 600 \\ 180 \\ 30 \\ + 9 \\ \hline 819 \end{array}$$

6. Yes, I agree with Michael. He made the multiplication problem easier by doing 90×46 . He had one 46 too many, so he subtracted.

$$\begin{array}{r} 7. \quad 50 \quad 2550 \\ \times 51 \quad - \quad \boxed{51} \\ \hline 2500 \quad \boxed{2499} \\ + 50 \\ \hline 2550 \end{array}$$

Tanya needed to take away one 51 because she added in one too many when she did 50×51 for 49×51 .

8. Double 50 to get $\boxed{100}$
 $44 \times 100 = 4400$
 $44 \times 50 = 4400 \div 2$
 $44 \times 50 = 2200$
9. 924; $44 \times 20 = 880$
 44×21 will be 44×1 or 44 more,
 $880 + 44 = 924$
 $44 \times 21 = 924$
10. 14,100; $100 \times 282 = 28,200$ so 50×282 is half of 28,200; $50 \times 282 = 14,100$

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Mental Math Strategies

✓ **Self-Check: Question 5**

5. Solve 39×21 using a mental math strategy and a paper-and-pencil method.

Mental Math Strategy

Paper-and-Pencil Method

Use the Self-Check Question and the menu to choose practice with using mental math strategies to multiply.

Can I Do This?	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.	
Use mental math strategies to multiply.	★ Q# 6-9	● Q# 8-10, 12	■ Q# 8,10-12

★6. Michael solved 89×46 another way.

I can't remember those multiplication facts.

Michael

I can do 90×46 on paper and then subtract the extra 46.
 $4140 - 40 - 6 = 4094$
 because I had to take away one 46.
 So, $89 \times 46 = 4094$

$$\begin{array}{r} 90 \\ \times 46 \\ \hline 3600 \\ + 540 \\ \hline 4140 \end{array}$$

Do you agree with Michael? Why or why not?

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★7. Tanya decided to solve 49×51 using a few quick notes. Help her finish her work by filling in the boxes. Explain how you decided what to take away.

$$\begin{array}{r} 49 \quad \xrightarrow{\text{instead}} \quad 50 \quad - \quad 2550 \\ \times 51 \quad \times 51 \quad - \quad \boxed{} \\ \hline 2500 \quad 2500 \\ + 50 \quad \boxed{} \\ \hline 2550 \end{array}$$

★●8. Kenya started to use a halving and doubling method to solve 44×50 . Finish her solution by filling in the boxes.

Double 50 to get $\boxed{}$

$$44 \times \boxed{} = 4400$$

$$44 \times 50 = 4400 \div 2$$

$$44 \times 50 = \boxed{}$$

★●9. Here is how Grace solved 44×18 . Show how Grace would solve 44×21 .

Grace

$44 \times 20 = 880$
 44×18 will be
 2×44 or 88 less,
 $880 - 88 = 792$
 $44 \times 18 = 792$

Grace

●10. Nicholas knows that 50 is half of 100. Here is how he solved 50×664 . Show how Nicholas would solve 50×282 .

Nicholas

$100 \times 664 = 66,400$
 so
 50×664 is half
 of 66,400
 $50 \times 664 = 33,200$

Nicholas

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■ 11. Here is how Jessie solved 204×40 in her head.

204 \times 40 as
 $204 \times 20 + 204 \times 20$,
 $4080 + 4080$, so
 $8000 + 160 = 8160$

Show how Jessie would solve 222×60 in her head.

■ 12. Solve the three problems below. Solve at least one problem using mental math and at least one using paper and pencil. Show mental math strategies in the thought bubbles. Show paper-and-pencil methods on the notepads with lines.

A. 98×20 B. 51×22 C. 22×29

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11. You can think about 222×60 as
 $222 \times 30 + 222 \times 30$
 $6660 + 6660 = 13,320$

12. Strategies will vary. Possible responses:

A. 98×20 using a mental math strategy:

$$100 \times 20 = 2000 \text{ minus two } 20\text{s.}$$

$$2000 - 20 \times 2 = 1960$$

98×20 using all-partials:

$$\begin{array}{r} 98 \\ \times 20 \\ \hline 1800 \\ + 160 \\ \hline 1960 \end{array}$$

B. 51×22 using a mental math strategy:

$$100 \times 22 = 2200 \text{ so } 50 \times 22 = 1100.$$

$$1100 + 22 = 1122.$$

51×22 using rectangle method:

	50	1	
20	$50 \times 20 = 1000$	20	+ 100 20 <u>2</u> 1122
2	$50 \times 2 = 100$	2	

C. 22×29 using a mental math strategy:

$$22 \times 30 = 22 \times 3 \text{ tens} = 66 \text{ tens}$$

$$66 \text{ tens} = 660$$

$$660 - 22 = 638$$

22×29 using expanded form:

$$\begin{array}{r} 22 = 20 + 2 \\ \times 29 \quad 20 + 9 \\ \hline 400 \\ 40 \\ 180 \\ 18 \\ \hline 638 \end{array}$$

13. A. Jessie did not use her estimate to check her answer. 690 is not between 1400 and 2400.

B. No, Jessie's answer is not reasonable.

C. Methods will vary.

$$26 \times 75 = 1950$$

Using all-partials:

$$\begin{array}{r} 26 \\ \times 75 \\ \hline 1400 \\ 420 \\ 100 \\ 30 \\ \hline 1950 \end{array}$$

D. I think my calculation is reasonable. 1950 is between 1400 and 2400.

14. A. Romesh did not use his estimate. His estimate was very different from his calculated answer.

B. I do not agree with Romesh's estimate.

$$70 \times 40 = 2800.$$

C. Round 73 to 70 and 38 to 40.

$$70 \times 40 = 2800.$$

D. Yes, 2774 is close to 2800.


Name _____ Date _____

Is the Answer Reasonable?
✓ Self-Check: Question 13

13. Jessie solved 26×75 and then found an estimate in her head to check that her answer was reasonable.

	70	5	
20	$20 \times 70 = 1400$	$20 \times 5 = 100$	140
6	$6 \times 70 = 420$	30	100
			+ 30
			<u>690</u> answer

$20 \times 70 = 1400$
 $30 \times 80 = 2400$
 The answer will be between 1400 and 2400.



A. Did Jessie use her estimate to check her answer? Why do you think that?

B. Do you agree with Jessie's answer? Why or why not?

C. Choose your own strategy and solve 26×75 .

D. Is your answer to Question 12C reasonable? How do you know?

Use the Self-Check Question and the menu to choose practice with estimating products.


Can I Do This?	Working On It! I could use some extra help.	Getting It! I just need some more practice.	Got It! I'm ready for a challenge.
Estimate products to check if my answers make sense.	★ Q# 14–16, 21–23, 24–26	● Q# 14–19, 21–28	■ Q# 14, 17–20, 21–23, 27–29

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★●■14. Romesh solved 73×38 . He found an estimate to check that his answer was reasonable.



Exact Answer	Estimate
$\begin{array}{r} 73 \\ \times 38 \\ \hline 560 \\ 24 \\ 90 \\ + 2100 \\ \hline 2774 \end{array}$	$\begin{array}{r} 70 \\ \times 40 \\ \hline 00 \\ 0 \\ + 28 \\ \hline 280 \end{array}$

A. Did Romesh use his estimate to check his exact answer? Why do you think that?

B. Do you agree with Romesh's estimate? Why or why not?

C. Explain how Romesh can find an efficient estimate in his head.

D. Using your estimate in Question 13C, is Romesh's answer reasonable? How do you know?

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Choose your own strategies and methods to solve the problems below. Remember to estimate to check that your answers are reasonable.

★● 15. 50×48 ★● 16. 40×502

●■ 17. 278×90 ●■ 18. 72×38

●■ 19. 46×38 ■ 20. 999×75

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★●■ 21. Choose a problem from Questions 15–20 and show how you can solve it using mental math.

★●■ 22. Choose a different problem and show your estimation strategy. Was your answer reasonable? Why or why not?

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Strategies will vary. One possible strategy is given for each.

15. 2400; $100 \times 48 = 4800$ so $50 \times 48 = 2400$.

16. 20,080; I multiplied 40 and 500 and then added two 40s. $40 \times 500 = 20,000$.
 $20,000 + 80 = 20,080$.

17. 25,020;

$$\begin{array}{r} 278 \\ \times 90 \\ \hline 720 \\ 6300 \\ \hline 18000 \\ 25,020 \end{array}$$

18. 2736;

$$\begin{array}{r} 72 \\ \times 38 \\ \hline 2100 \\ 60 \\ 560 \\ \hline 16 \\ 2736 \end{array}$$

19. 1748;

$$\begin{array}{r} 46 = 40 + 6 \\ \times 38 \\ \hline 30 + 8 \\ \hline 1200 \\ 180 \\ 320 \\ 48 \\ \hline 1748 \end{array}$$

20. 74,925; $1000 \times 75 = 75,000$

$$\begin{array}{r} 75,000 \\ - 75 \\ \hline 74,925 \end{array}$$

21. Responses will vary. See Questions 15 and 16 above.

22. Responses will vary.

23. A. Not reasonable; $5 \times 40 = 200$
and $5 \times 30 = 150$; 1525 is not
between 200 and 150.

$$\begin{array}{r} 35 \\ \times 5 \\ \hline 25 \\ 150 \\ \hline 175 \end{array}$$

B. Reasonable; $30 \times 20 = 600$

C. Not reasonable; $30 \times 40 = 1200$ (low estimate); $40 \times 40 = 1600$, $40 \times 50 = 2000$ (high estimate); 180 is too low.

	30	5
40	1200	200
5	150	25

D. Not reasonable;
 $40 \times 30 = 1200$;
the answer should
be larger than
1200.

$$\begin{array}{r} 42 \\ \times 34 \\ \hline 1200 \\ 60 \\ 160 \\ + 8 \\ \hline 1428 \end{array}$$

E. Not reasonable;
 $60 \times 20 = 1200$;
444 is too small.

$$\begin{array}{r} 56 = 50 + 6 \\ \times 24 = 20 + 4 \\ \hline 1000 \\ 120 \\ 200 \\ + 24 \\ \hline 1344 \end{array}$$

F. Reasonable; $40 \times 30 = 1200$; 1073 is only about 125 less.

Name _____ Date _____

✓ Check-In: Question 23

Joe and Moe Smart worked on their homework together. They did not estimate to make sure their answers made sense.

- **23.** Estimate answers for each of Joe's and Moe's problems below.
 - Just write down your estimates. You do not need to show your thinking.
 - Use your estimates. Which of the answers make sense?
 - Which answers do not make sense? Which problems should Joe and Moe recheck?
 - For each answer that does not make sense, solve the problem correctly using the same method as Joe and Moe. (Hint: Do not do any more problems than you have to. Use your estimates to choose the problems you need to correct.)

A.
$$\begin{array}{r} 35 \\ \times 5 \\ \hline 1525 \end{array}$$

B. 33×21

$33 \times 20 = 660$,
plus 33 makes 693.



C. 35×45

	30	5
40	120	20
5	15	25

$120 + 15 + 20 + 25 = 180$

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D.
$$\begin{array}{r} 42 \\ \times 34 \\ \hline 12 \\ 6 \\ 8 \\ 16 \\ \hline 42 \end{array}$$

E.
$$\begin{array}{r} 56 = 50 + 6 \\ \times 24 = 20 + 4 \\ \hline 1000 \\ 120 \\ 200 \\ + 24 \\ \hline 444 \end{array}$$

F.
$$\begin{array}{r} 37 \\ \times 29 \\ \hline 600 \\ 270 \\ 140 \\ + 63 \\ \hline 1073 \end{array}$$

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Estimation Strategies

Work with a partner to estimate answers for Questions 24–29.
For each problem:

- Estimate an answer on your own. Use mental math if you can. Write your own estimate in the first box.
- Share your estimate with your partner and explain your reasoning. Write your partner's estimate in the box under his or her name.
- Discuss with your partner which estimate is the best and why you think so. Write your group's best estimate in the "Our Best" column.
- In the "Our Reasoning" column, show or tell why your group decided it was the best estimate.

The first problem is an example.

Problem	ESTIMATES			Our Reasoning
	Mine	Partner Name:	Our Best	
Example 18×27	600	500	500	This estimate is best because the friendly numbers we chose got us closest to original numbers. $20 \times 25 = 500$ is close to 486, the exact answer.
★ ● 24. 38×52				
★ ● 25. 98×19				

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For Questions 24–29, estimates and reasoning will vary. Possible estimates are given.

24. $40 \times 50 = 2000$

25. $100 \times 20 = 2000$

26. $90 \times 40 = 3600$

27. $80 \times 20 = 1600$

28. $50 \times 50 = 2500$

29. $62 \times 1000 = 62,000$

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Problem	ESTIMATES			Our Reasoning
	Mine	Partner Name:	Our Best	
★ ● 26. 89×38				
● ■ 27. 75×25				
● ■ 28. 46×51				
■ 29. 62×985				

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