Name _____ Date _____

Moving Ahead with Multiplication

Connecting Multiplication Methods

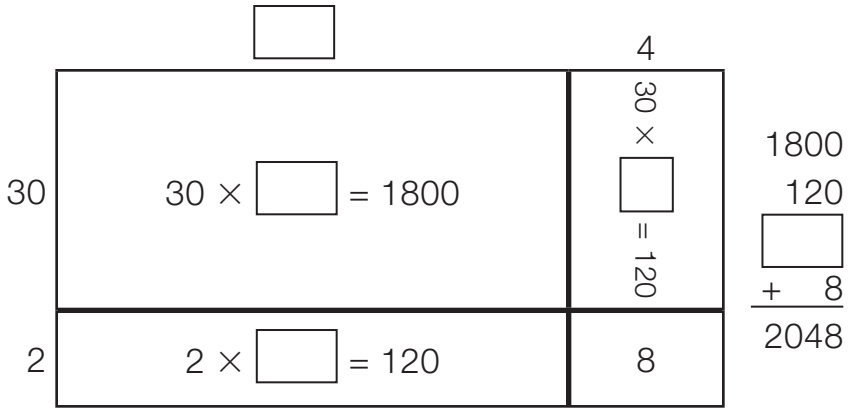
Self-Check: Question 1

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

$$\begin{array}{r} 64 \\ \times\ 32 \\ \hline 1800 \\ 120 \\ 120 \\ +\ \ 8 \\ \hline 2048 \end{array}$$

Rectangle Method



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

Workshop Menu			
Can I Do This?	**▲ Working On It!** I could use some extra help. — Linda	**● Getting It!** I just need some more practice. — Jackie	**■ Got It!** I'm ready for a challenge. — Romesh
Make connections between methods.	**Questions 2–3**	**Questions 3–4**	**Question 4**
Use place value to multiply.	**▲ ● ■ Multiplication Digits Game**		

Name _____ Date _____

2. Irma solved 12 × 52 using rectangles.

	50	2
10	50 × 10 = 500	10 × 2 = 20
2	50 × 2 = 100	4

500
100
20
\+ 4
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?

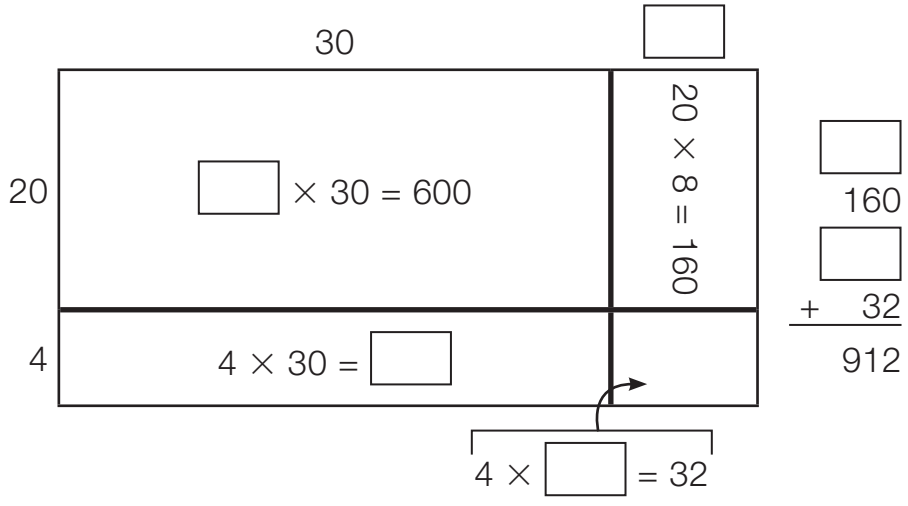
C. What numbers did Irma multiply in both methods to get 20?

Name _____ Date _____

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

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

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?

Name _____ Date _____

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

	100	50	6
40	40 × 100 = 4000	40 × 50 =	
2		2 ×	12

4000
+ _____
6552

B. 64 × 18

64 × 18 =

10 + 8
600
40
+ 32
1152

C.

89
× 46
_____
360
480
+ 54
_____

D. 185 × 103

	100	80	5
100		100 × 80 = 800	100 × 5 = 500
3		80 × 3 =	

+ _____

Name _____ Date _____

Mental Math Strategies

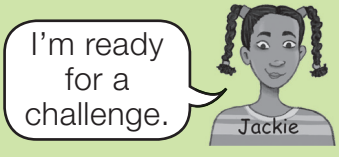
Self-Check: Question 5

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

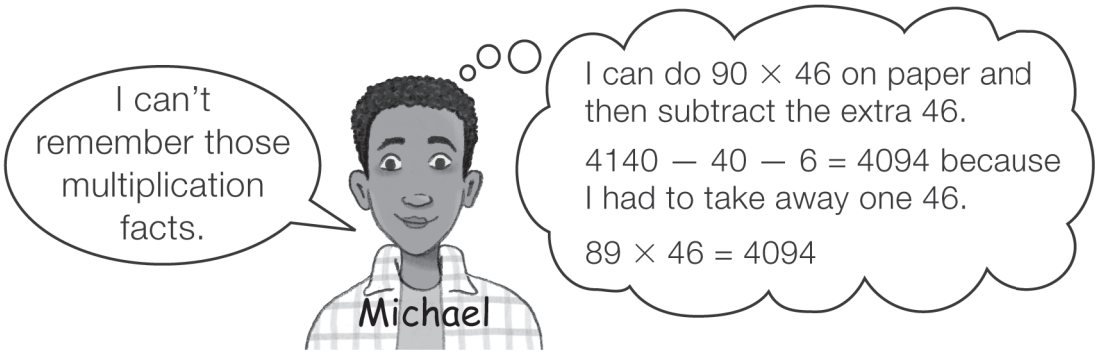
Mental Math Strategy

Paper-and-Pencil Method

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

Workshop Menu			
Can I Do This?	**▲ Working On It!** 	**● Getting It!** 	**■ Got It!** 
Use mental math strategies to multiply.	**Questions 6–9**	**Questions 8–10, 12**	**Questions 8, 10–12**

▲□□ **6.** Michael solved 89 × 46 another way.

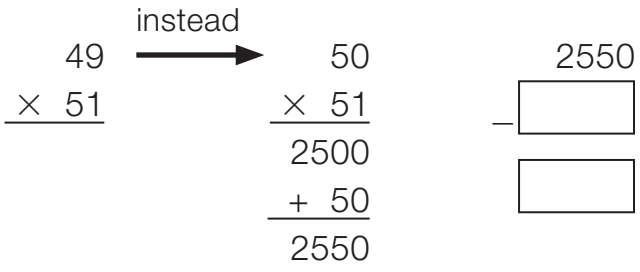



```
  90
× 46
3600
+ 540
4140
```

Do you agree with Michael? Why or why not?

Name _____ Date _____

▲ **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.



▲●■ **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 □

44 × □ = 4400

44 × 50 = 4400 ÷ 2

44 × 50 = □

▲● **9.** Here is how Grace solved 44 × 18.

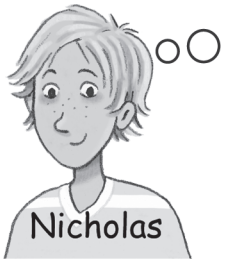
44 × 20 = 880
44 × 18 will be
2 × 44 or 88 less,
880 – 88 = 792
44 × 18 = 792

Show how Grace would solve 44 × 21.

●■ **10.** Nicholas knows that 50 is half of 100. Here is how he solved 50 × 664.

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

Show how Nicholas would solve 50 × 282.



Name _____ Date _____

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

You can think about
204 × 40 as
204 × 20 + 204 × 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

Name _____ Date _____

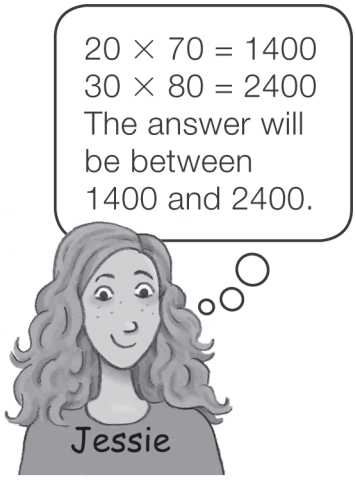
Is the Answer Reasonable?

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 × 70 = 1400	20 × 5 = 100
6	6 × 70 = 420	30

140
420
100
+ 30
690
answer



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.

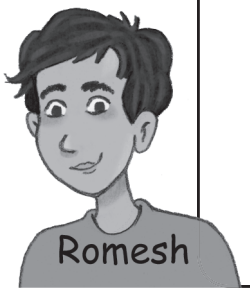
D. Is your answer to Question 12C reasonable? How do you know?

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

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

Name _____ Date _____

▲●■ **12.** Romesh solved 73 × 38. He found an estimate to check that his answer was reasonable.



Exact Answer	Estimate
73	70
× 38	× 40
560	00
24	0
90	+ 28
+ 2100	280
2774	

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?

Name _____ Date _____

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

Name _____ Date _____

▲●■ **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?

Name _____ Date _____

Check-In: Question 23

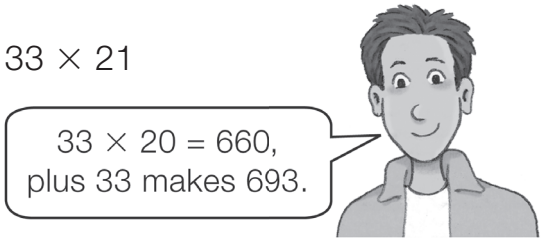
Joe and Moe Smart worked on their homework together. They did not estimate to make sure their answers made sense.

▲●■ **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



C. 35×45

	30	5
40	120	20
5	15	25

$120 + 15 + 20 + 25 = 180$

Name _____ Date _____

D.

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

E.

$$\begin{array}{rcl} 56 & = & 50 + 6 \\ \times\ 24 & = & 20 + 4 \\ \hline & & 100 \\ & & 120 \\ & & 200 \\ & & +\ 24 \\ \hline & & 444 \end{array}$$

F.

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

Name _____ Date _____

Estimation Strategies

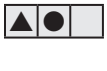
Work with a partner to estimate answers for Questions 24–29.
For each problem:

- 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.

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

Name _____ Date _____

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