Workshop: Addition

Palindromes

A **palindrome** is a number, word, or phrase that reads the same forward and backward.

44
363
2112
12321

otto
wow
toot
Madam I'm Adam
Was it a cat I saw

1. Look at Professor Peabody's examples of palindromes. List three more examples.

2. Find all the palindromes on the *Palindrome Recording Chart* in the *Student Activity Book*.

Palindrome Recording Chart

Choose a color for each kind of palindrome. Find and color each kind in the chart.

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

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Student Guide

Workshop: Addition (SG p. 146)
Questions 1–2

1. Responses may vary.

2. 0–9, 11, 22, 33, 44, 55, 66, 77, 88, 99 should be shaded on the chart.

Student Activity Book

Palindrome Recording Chart
(SAB pp. 199–200)
Questions A–H

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

A. 110

B. 110

C. 33

D. 176

E. 99

F. 44

G. Problems will vary. A mental math strategy for A: 19 + 91 = 20 + 90 = 110.

H. Problems and methods will vary.
97 + 79 = 160 + 16 = 176.

Name _____ Date _____

Palindrome Recording Chart

Choose a color for each kind of palindrome. Find and color each kind in the chart.

☐ palindrome ☐ 1 step ☐ 2 step ☐ 3 step
☐ 4 step ☐ 5 step ☐ 6 step

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

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Palindromes and Addition Practice

Solve the following problems. Be prepared to show or tell your strategy.
• **Which problems can you solve in your head?**
• **Which problems can you solve by sketching a number line or a few quick notes?**
• **Which problems do you need to use pencil and paper to solve?**

A. 19 + 91   **B.** 64 + 46   **C.** 12 + 21

D. 97 + 79   **E.** 45 + 54   **F.** 31 + 13

G. Choose one problem and show how you used a mental math strategy.

H. Choose one problem and show how you used a paper-and-pencil method.

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Strategies to Add (SAB pp. 203–214)
Questions 1–21

1.

1000s	100s	10s	1s	Number Sentences
	2	6	20 +
+	1	3	10 +
	3	9	30 + 9 = 39

2.

1000s	100s	10s	1s	Number Sentences
	2	7	20 +
+	3	2	30 +
	5	9	50 +

3.

1000s	100s	10s	1s	Number Sentences
	6	8	60 +
+	2	2	20 +
	8	10	80 +
	9	0	90 +

4.

1000s	100s	10s	1s	Number Sentences
1	5	4	100 + 50 + 4
+	2	8	20 + 8
1	7	12	100 + 70 + 12
1	8	2	100 + 80 + 2
			= 182

5.

1000s	100s	10s	1s	Number Sentences
	3	1	8	$300 + 10 + 8$
+	4	5	5	$400 + 50 + 5$
	7	6	13	$700 + 60 + 13$
	7	7	3	$700 + 70 + 3$
				$= 773$

6.

1000s	100s	10s	1s	Number Sentences
	2	9	7	$200 + 90 + 7$
+		8	8	$80 + 8$
	2	17	15	$200 + 170 + 15$
	2	18	5	$200 + 180 + 5$
	3	8	5	$300 + 80 + 5$
				$= 385$

7.
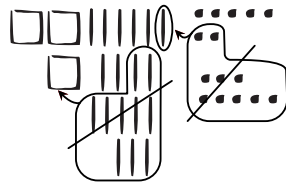
1000s	100s	10s	1s	Number Sentences
	6	8	6	$600 + 80 + 6$
+	5	8	7	$500 + 80 + 7$
	11	16	13	$1100 + 160 + 13$
	11	17	3	$1100 + 170 + 3$
	12	7	3	$1200 + 70 + 3$
1	2	7	3	$= 1273$
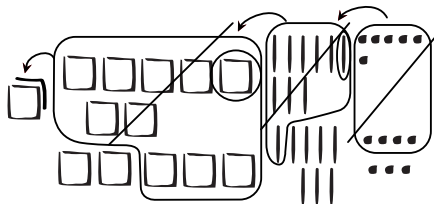
8. Answers will vary. Possible response: I agree with Tara. Tara thinks about the base-ten pieces she needs to represent the numbers she is adding together. She separates and groups the pieces by hundreds, tens, and ones. Then she combines the hundreds, tens, and ones to get an answer. That is like using expanded form because each of the numbers she needs to add together are broken apart into hundreds, tens, and ones, and then the hundreds, tens, and ones are combined to get an answer.

9. Problems will vary. One possible solution is given for Question 7:

$$\begin{aligned} 686 &= 600 + 80 + 6 \\ + 587 &= 500 + 80 + 7 \\ &\quad 1100 + 160 + 13 = 1273 \end{aligned}$$

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● **5.** 318
　　　+ 455

1000s	100s	10s	1s	Number Sentences

●■ **6.** 297
　　　+ 88

1000s	100s	10s	1s	Number Sentences

●■ **7.** 686 + 587

1000s	100s	10s	1s	Number Sentences

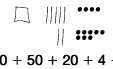**Workshop: Addition**　　　　　　SAB · Grade 3 · Unit 6 · Lesson 6　**205**

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★●■ **8.** Look at Tara's solution to $154 + 28$.

I thought about base-ten pieces.

$100 + 50 + 20 + 4 + 8 = 182$

This is a lot like using expanded form.

Tara

Tara thinks her strategy is similar to using expanded form.

$$\begin{aligned} 154 &= 100 + 50 + 4 \\ + 28 &\quad\quad 20 + 8 \\ &\quad 100 + 70 + 12 = 182 \end{aligned}$$

Do you agree with Tara? Why or why not?

★●■ **9.** Choose a problem from Questions 1–7 to solve using expanded form. Show your work below.
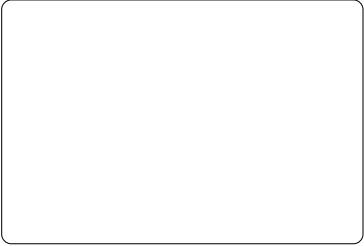
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Using Mental Math Strategies

✓ **Self-Check: Questions 10–11**

10. Use a mental math strategy to solve 64 + 59. Explain your strategy.

11. Use a number line to show how to solve 458 + 302.

Use the Workshop Menu to choose practice with using mental math strategies to add.

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.*
Use mental math strategies to add.	★ Q# 12–14, 15E–G	● Q# 13–15	■ Q# 14–15

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★**12.** Ms. Alfonso challenged the class to use a mental math strategy to solve each of the problems below. Grace and her classmates recorded their mental math strategies. Solve the problem next to each one using a similar strategy. Explain your thinking to your partner.

341 + 99 =
"I took the 1 from the 341 and put it with the 99 right away. Now the problem is 340 + 100, which is easy, 440"
— Grace

A. 132 + 98 =

157 + 25 =
"I thought about money."
150 + 25 = 175 + 7 = 182
— Peter

B. 504 + 75 =

328 + 50 =
"I made notes, but I pictured the number line to count on. I started at 328 and hopped +2 to 330. It is easier to hop on tens. After five +10 hops I land on 380. Hop back 2 to 378. 328 + 50 = 378"
— Ana

C. 352 + 98 =

220 + 160 =
"I separated out the hundreds. I added 200 + 100. That is 300. Then 20 + 60 = 80, so my answer is 300 + 80 = 380."
— Frank
200 + 20
100 + 60
300 + 80

D. 350 + 250 =

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10. Mental math strategies will vary. One possible solution for 64 + 59: Think of 63 + 60. 60 + 60 + 3 = 123.

11. Possible response:

+100   +100   +100   +100   +50   +8

302   402   502   602   702 752 760
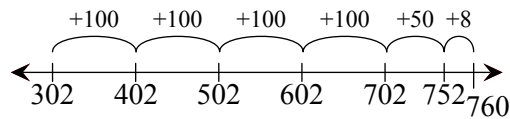
12. A. Grace's method for 132 + 98: Take the 2 from the 132 and put it with 98. Now the problem is 130 + 100 = 230.

   B. Peter's method for 504 + 75: Think about money. 500 + 75 = 575 + 4 = 579.

   C. Ana's method for 352 + 98: Think about a number line. Start at 352 and hop forward 100 to get to 452 and then hop back 2 to 450.

   D. Frank's method for 350 + 250: Separate out the hundreds and add 300 + 200. That is 500. Then 50 + 50 = 100. 500 + 100 = 600.

13. Mental math strategies will vary. One possible solution for 548 + 132: Take 2 from 132 and add it to 548 to make 550. 550 + 130 = 680.

14. Mental math strategies will vary. One possible solution for 732 + 198: Take 2 from 732 and add it to 198 to make 200. 730 + 200 = 930.

15. A. 500

B. 1102

C. 338

D. 970

E. 1044

F. 1765

G. Problems and strategies will vary. One possible strategy for 325 + 175: Think about money and add 75 + 25 to make 100. Then add 300 + 100 + 100 = 500.

Name _____ Date _____

★●**13.** Use a mental math strategy to solve 548 + 132. Explain your strategy to your partner. Make some notes to record your partner's strategy below. Include your partner's name.

★●■**14.** Use a mental math strategy to solve 732 + 198. Explain your strategy to your partner. Make some notes to record your partner's strategy below. Include your partner's name.

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15. Solve the following problems using a mental math strategy. Record your answer and explain your strategy to your partner. You do not need to write your strategy down, but you can jot down some notes.

●■ **A.** 325 + 175 =   ●■ **B.** 604 + 498 =

●■ **C.** 130 + 208 =   ●■ **D.** 849 + 121 =

★●■ **E.** 747 + 297 =   ★●■ **F.** 998 + 767 =

★●■ **G.** Show how you solved one of the problems above by describing your strategy in the thought bubble below.

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Using Different Methods

✓ **Self-Check: Question 16**

Use the *Addition Strategies Menu.*

16. Solve 48 + 37 using three different strategies or methods.

Use the Workshop menu to choose practice with addition methods.

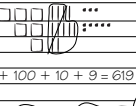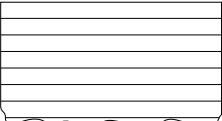| Can I Do This?	Working On It! I could use some extra help.	Getting It! I just need some more practice.	Got It! I'm ready for a challenge.
Use different methods to add multidigit numbers.	★Q# 17–20 Use each of these methods at least once: • base-ten pieces • expanded form • all-partials	●Q# 20–21 Use each of these methods at least once: • all-partials • expanded form • compact method	■Q# 20–21 Use each of these methods at least once: • all-partials • compact method

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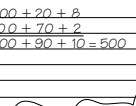
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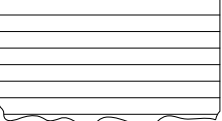
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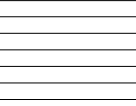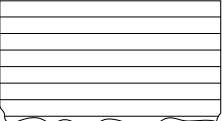
Name _____ Date _____

★**17.** Here is how Sam solved 343 + 276.

343
+ 276

300 + 200 + 100 + 10 + 9 = 619

Use the same method to solve 83 + 738.

★**18.** Here is how Nisha solved 328 + 172.

328 = 300 + 20 + 8
+ 172 = 100 + 70 + 2
         400 + 90 + 10 = 500

Use the same method to solve 473 + 279.

★**19.** Here is how Josh solved 329 + 476.

329
+ 476
700
90
15
805

Use the same method to solve 847 + 278.

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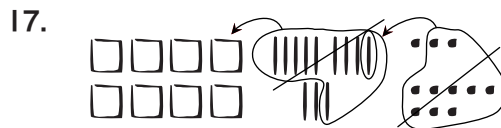
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16. Strategies and methods will vary.
Three possible solutions for 48 + 37:

Use mental math: Take 2 from 37 to make 50, and $50 + 35 = 85$.

Use all-partials:

$$
\begin{array}{r}
48 \\
+\ 37 \\
\hline
70 \\
15 \\
\hline
85 \\
\end{array}
$$

Use expanded form:

$$
\begin{array}{rl}
48 & = 40 + 8 \\
+\ 37 & = 30 + 7 \\
\hline
& 70 + 15 = 85 \\
\end{array}
$$

17.

$800 + 20 + 1 = 821$

18.
$$
\begin{array}{rl}
473 & = 400 +\ 70 +\ 3 \\
+\ 279 & = 200 +\ 70 +\ 9 \\
\hline
& 600 + 140 + 12 = 752 \\
\end{array}
$$

19.
$$
\begin{array}{r}
847 \\
+\ 278 \\
\hline
1000 \\
110 \\
15 \\
\hline
1125 \\
\end{array}
$$

20. Strategies and methods will vary. One possible solution strategy is given for each problem.

A. 205; All-partials:

```
    137
  +  68
    15
    90
   100
   205
```

B. 112; Compact method:

```
   1
   66
 + 46
  112
```

C. 81; Mental math for 35 + 46: Separate the tens and add 30 + 40 = 70. Add the ones, 5 + 6 = 11. 70 + 11 = 81.

D. 656; Expanded form:

$$446 = 400 + 40 + 6$$
$$+\ 210 = 200 + 10$$
$$600 + 50 + 6 = 656$$

E. Use base-ten pieces:

$$300 + 50 + 6 = 356$$

F. 3884; Compact method:

```
    1
   1448
 + 2436
   3884
```

G. 69; Use a number line for 23 + 46: Start at 23 and hop forward four +10 hops to 63. Then hop 6 more to 69.
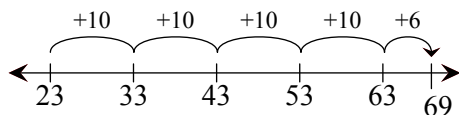
H. 5784; All-partials:

```
   2558
 + 3226
   5000
    700
     70
     14
   5784
```

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Name _____ Date _____

★●■**20.** Use the Workshop Menu to choose your own strategies and methods to solve the following problems. Use the *Addition Strategies Menu* as a guide.

A. 137 + 68

B.
```
   66
 + 46
```

C. 35 + 46

D. 446 + 210

E. 232 + 124

F.
```
   1448
 +2436
```

G.
```
   23
 + 46
```

H. 2558 + 3226

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●■**21.** • Using the *Addition Strategies Menu* as a guide, show how to solve each problem using two different strategies. Compare your strategies. Circle the one you like best.

• Use a mental math strategy at least three times.

• Use each paper-and-pencil strategy at least once.

One Strategy	Another Strategy
A. 375 + 427 =	
B. 498 + 204 =	
C. 127 + 786	
D. 366 + 252	

Did you try all of the strategies on the *Addition Strategies Menu*?

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21. Strategy solutions will vary.

A. 802

B. 702

C. 913

D. 618

Teacher Guide

Addition and Place Value Quiz
(TG pp. 1–3) Questions 1–8

1.

	1000s	100s	10s	1s	Number Sentences
		2	6	4	200 + 60 + 4
+		3	7	7	300 + 70 + 7
		5	¹13	1̸1̸	500 + 130 + 11
		⌐5	1̸4̸	1̄	500 + 140 + 1
		6	4	1	600 + 40 + 1 = 641

2.

$400 + 20 + 0 = 420$

+2   +100   +50
268 270   370   420

3. Possible strategy: If I add just the hundreds, I get 300. If I add just the tens, I get 110. $300 + 110 = 410$ so I know 420 is reasonable.

4. Strategies and methods will vary. One possible solution is given for each problem:

A. 102; Using mental math for $75 + 27$: Think about money. $75 + 25 + 2 = 102$

B. 1475; Using expanded form:

$$907 = 900 + 0 + 7$$
$$+\,568 = 500 + 60 + 8$$
$$1400 + 60 + 15 = 1475$$

C. 9492; Using compact method:

$$\overset{1\ \ 1}{6653}$$
$$+\ 2839$$
$$\overline{9492}$$

5. One possible estimation strategy: 6653 is a little more than 6500. 2839 is a little less than 3000. $6500 + 3000$ is 9500 so I know 9492 is reasonable.

6. The 1 over the 3 stands for 100 from adding $10 + 60 + 50$ which equals 120 in the tens column.

Name _____ Date _____

Addition and Place Value Quiz

1. Solve this problem using base-ten pieces and a base-ten recording sheet.

264
+ 377

1000s	100s	10s	1s	Number Sentences

2. Solve this problem using base-ten pieces and a number line.

268
+ 152

3. Explain an estimation strategy that shows your answer to Question 2 is reasonable.

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Name _____ Date _____

4. Solve these problems using any strategy or method you choose. Use the *Addition Strategies Menu* page in the *Student Guide* Reference section. Use a paper-and-pencil method at least once and a mental math strategy at least once. Show your work.

A. 75
+ 27

B. 907
+ 568

C. 6653
+ 2839

5. Explain an estimation strategy that shows your answer to Question 4C is reasonable.

6. Kris solved $363 + 458$ using the compact method. What does the 1 above the 3 mean?

$$\overset{1\,1}{363}$$
$$+\ 458$$
$$\overline{821}$$

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Name _____ Date _____

7. Ana solved this problem using the all-partials method. Explain Ana's step by the arrow.

```
    363
  + 468
    700
    120  ←
  +  11
    831
```

8. Solve this problem using a mental-math strategy and a paper-and-pencil method. Circle the strategy you think is the best choice for this problem. Explain.

```
    425
  + 206
```

Addition and Place Value Quiz Feedback Box	Expec-tation	Check In	Comments
Represent and solve addition problems using base-ten pieces and number lines. [Q# 1–2]	E2		
Add using mental math strategies. [Q# 4 and 8]	E3		
Add using paper-and-pencil methods. [Q# 2, 4, 6–8]	E4		
Estimate sums using mental math strategies. [Q# 2–3, 5]	E5		

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7. Ana added 6 tens plus 6 tens to get 12 tens or 120 in this step.

8. Using mental math: $425 + 200 + 6 = 631$.
Using all-partials:

Explanations will vary. Possible response: Mental math is a good solution strategy because it is quicker than using paper and pencil.

```
    425
  + 206
    600
     20
     11
    631
```