

Chapter

2

Mental Math
and Estimation

Practice 1 Mental Addition

Add mentally. First, add the tens. Then, add the ones.

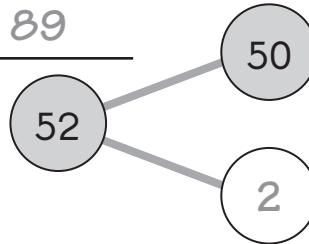
Example

$37 + 52 = ?$

$37 + 50 = \underline{87}$

$\underline{87} + \underline{2} = \underline{89}$

So, $37 + 52 = \underline{89}$.



First, add 50.
Then, add 2.

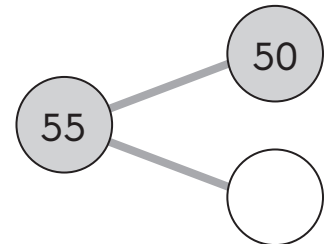


1. $24 + 55 = ?$

$24 + 50 = \underline{\hspace{2cm}}$

$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

So, $24 + 55 = \underline{\hspace{2cm}}$.

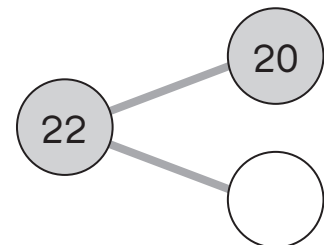


2. $22 + 64 = ?$

$20 + 64 = \underline{\hspace{2cm}}$

$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

So, $22 + 64 = \underline{\hspace{2cm}}$.



Add mentally. First, add the tens. Then, subtract the extra ones.

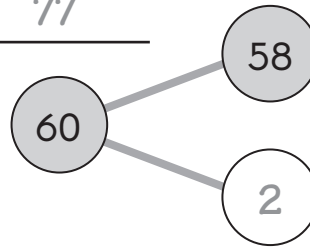
Example

$$19 + 58 = ?$$

$$19 + 60 = \underline{79}$$

$$\underline{79} - \underline{2} = \underline{77}$$

$$\text{So, } 19 + 58 = \underline{77}.$$



First, add 60.
Then, subtract 2.

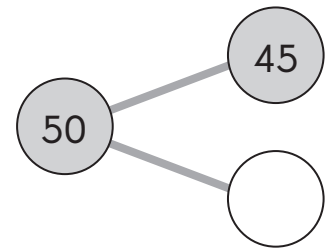


3. $37 + 45 = ?$

$$37 + 50 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 37 + 45 = \underline{\hspace{2cm}}.$$

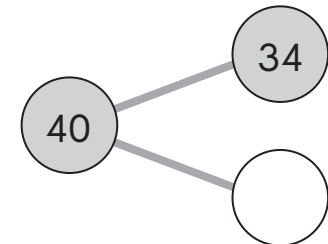


4. $46 + 34 = ?$

$$46 + 40 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 46 + 34 = \underline{\hspace{2cm}}.$$



Add mentally. Use number bonds to help you.

5. $41 + 43 = \underline{\hspace{2cm}}$

6. $31 + 64 = \underline{\hspace{2cm}}$

7. $15 + 47 = \underline{\hspace{2cm}}$

8. $46 + 48 = \underline{\hspace{2cm}}$

Practice 2 Mental Subtraction

Subtract mentally. First, subtract the tens. Then, subtract the ones.

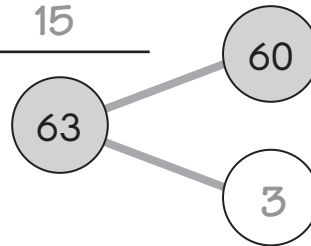
Example

$$78 - 63 = ?$$

$$78 - 60 = \underline{18}$$

$$\underline{18} - \underline{3} = \underline{15}$$

$$\text{So, } 78 - 63 = \underline{15}.$$



First, subtract 60.
Then, subtract 3.

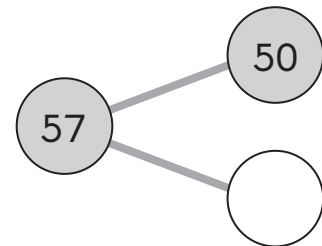


1. $89 - 57 = ?$

$$89 - 50 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 89 - 57 = \underline{\hspace{2cm}}.$$

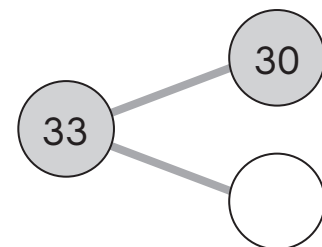


2. $75 - 33 = ?$

$$75 - 30 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 75 - 33 = \underline{\hspace{2cm}}.$$



Subtract mentally.
First, subtract the tens. Then, add the extra ones.

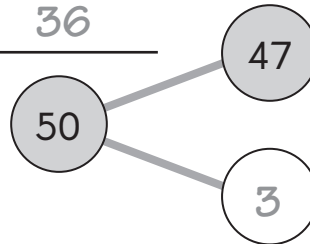
Example

$$83 - 47 = ?$$

$$83 - 50 = \underline{33}$$

$$\underline{33} + \underline{3} = \underline{36}$$

$$\text{So, } 83 - 47 = \underline{36}$$



First, subtract 50.
 Then, add 3.

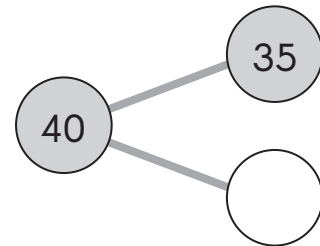


3. $92 - 35 = ?$

$$92 - 40 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 92 - 35 = \underline{\hspace{2cm}}.$$

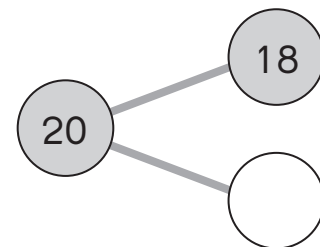


4. $87 - 18 = ?$

$$87 - 20 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

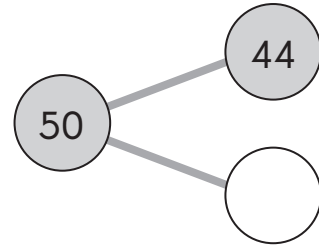
$$\text{So, } 87 - 18 = \underline{\hspace{2cm}}.$$



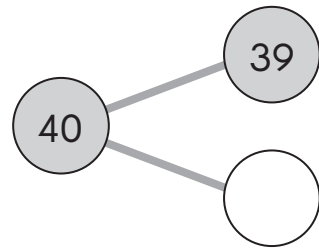
Name: _____

Date: _____

5. $72 - 44 = ?$
 $72 - 50 = \underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
So, $72 - 44 = \underline{\hspace{2cm}}$.



6. $88 - 39 = ?$
 $88 - 40 = \underline{\hspace{2cm}}$
 $\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$
So, $88 - 39 = \underline{\hspace{2cm}}$.



Subtract mentally. Use number bonds to help you.

7. $84 - 23 = \underline{\hspace{2cm}}$

8. $55 - 31 = \underline{\hspace{2cm}}$

9. $58 - 42 = \underline{\hspace{2cm}}$

10. $79 - 65 = \underline{\hspace{2cm}}$

11. $92 - 34 = \underline{\hspace{2cm}}$

12. $75 - 47 = \underline{\hspace{2cm}}$

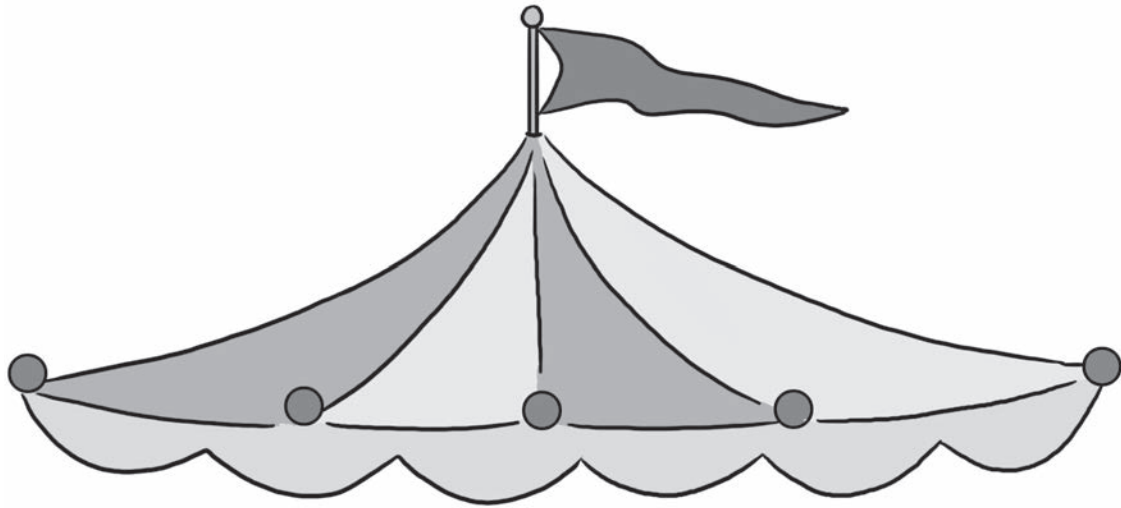
13. $61 - 26 = \underline{\hspace{2cm}}$

14. $82 - 33 = \underline{\hspace{2cm}}$

15. $93 - 48 = \underline{\hspace{2cm}}$

16. $81 - 45 = \underline{\hspace{2cm}}$

17. Complete the puzzle. Use mental math.



97	−	42	=	
−				
36	−	28	=	
=		−		
	−	19	=	
		=		−
				25
				=



Practice 3 More Mental Addition

Add mentally. First, add 100. Then, subtract the extra ones.

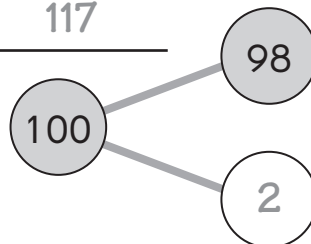
Example

$$19 + 98 = ?$$

$$19 + 100 = \underline{119}$$

$$\underline{119} - \underline{2} = \underline{117}$$

$$\text{So, } 19 + 98 = \underline{117}.$$



First, add 100.
Then, subtract 2.

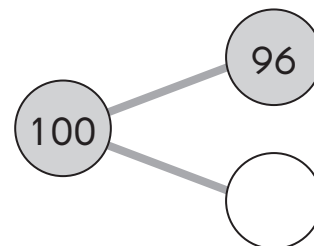


1. $26 + 96 = ?$

$$26 + 100 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 26 + 96 = \underline{\hspace{2cm}}.$$

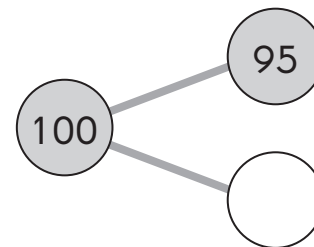


2. $38 + 95 = ?$

$$38 + 100 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 38 + 95 = \underline{\hspace{2cm}}.$$



Add mentally.

First, add the hundreds. Then, subtract the extra ones.

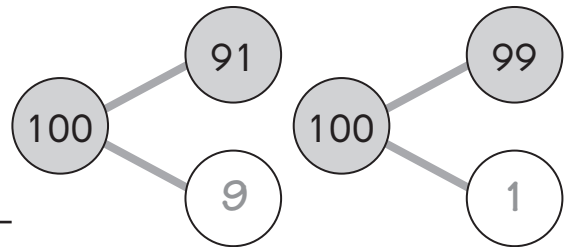
Example

$$91 + 99 = ?$$

$$100 + 100 = \underline{200}$$

$$91 + 99 = \underline{200} - \underline{9} - \underline{1}$$
$$= \underline{190}$$

$$\text{So, } 91 + 99 = \underline{190}.$$

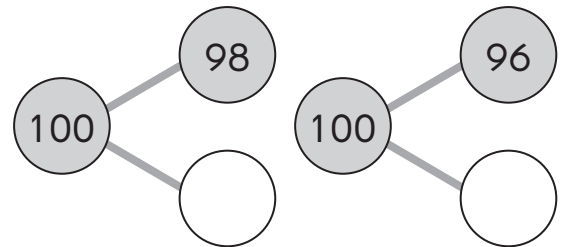


3. $98 + 96 = ?$

$$100 + 100 = \underline{\quad}$$

$$98 + 96 = \underline{\quad} - \underline{\quad} - \underline{\quad}$$
$$= \underline{\quad}$$

$$\text{So, } 98 + 96 = \underline{\quad}.$$

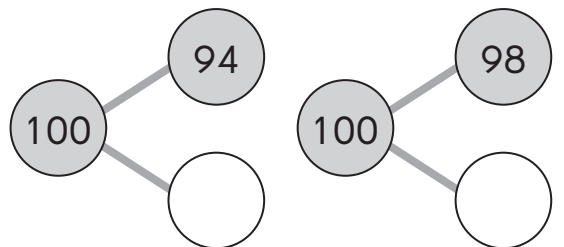


4. $94 + 98 = ?$

$$100 + 100 = \underline{\quad}$$

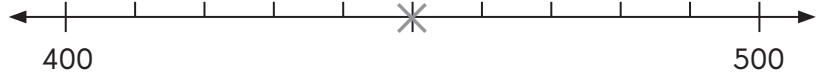
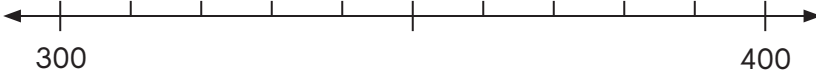
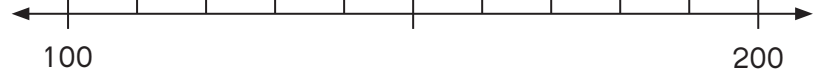
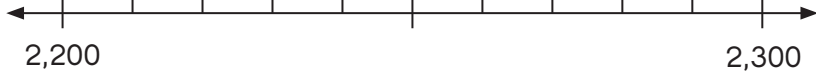
$$94 + 98 = \underline{\quad} - \underline{\quad} - \underline{\quad}$$
$$= \underline{\quad}$$

$$\text{So, } 94 + 98 = \underline{\quad}.$$



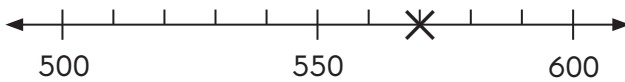
Practice 4 Rounding Numbers to Estimate

Mark (X) each number on the number line.

Number	Number line
Example 450	
1. 330	
2. 185	
3. 2,204	

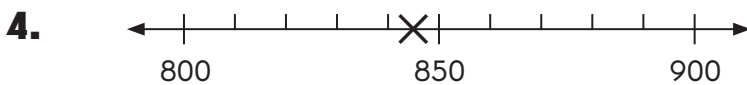
Fill in the blanks.

Example



570 is nearer to 600 than to 500.

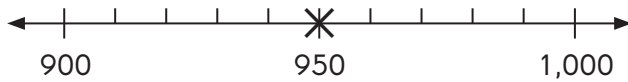
570 is 600 when rounded to the nearest hundred.



845 is nearer to _____ than to _____.

845 is _____ when rounded to the nearest hundred.

5.



950 is nearer to _____ than to _____.

950 is _____ when rounded to the nearest hundred.

**Decide whether to find an estimate or an exact answer.
Solve.**

Example

An organization has about 600 members.

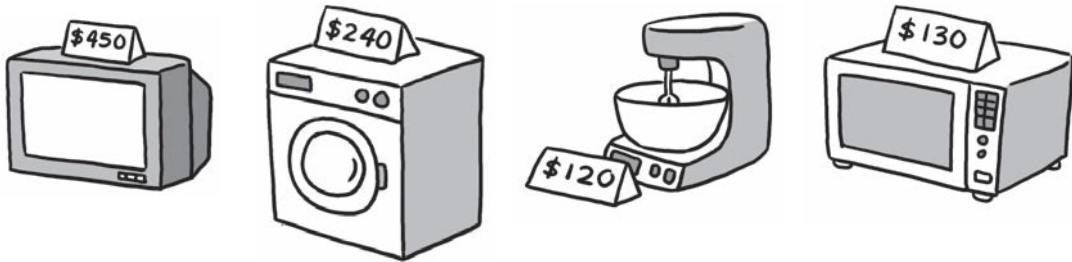
The greatest possible number of members this can be is 649.

The least possible number of members could be 550.

6. Tanya had \$900. After buying two of these items, she has \$210 left.

a. How much do the two items cost?

b. Which two items does she buy?



Find the sum or difference. Use rounding to check that each answer is reasonable.

Example

$$763 + 136 = \underline{899}$$

$$763 \text{ is about } \underline{800}$$

$$136 \text{ is about } \underline{100}$$

$$\underline{800} + \underline{100} = \underline{900}$$

$$\text{So, } 763 + 136 \text{ is about } \underline{900}$$

$$\underline{899} \text{ is close to } \underline{900}, \text{ so the answer is reasonable.}$$

7. $238 + 598 = \underline{\hspace{2cm}}$

$$238 \text{ is about } \underline{\hspace{2cm}}$$

$$598 \text{ is about } \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 238 + 598 \text{ is about } \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \text{ is close to } \underline{\hspace{2cm}}, \text{ so the answer is reasonable.}$$

8. $846 - 694 = \underline{\hspace{2cm}}$

$$846 \text{ is about } \underline{\hspace{2cm}}$$

$$694 \text{ is about } \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\text{So, } 846 - 694 \text{ is about } \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \text{ is close to } \underline{\hspace{2cm}}, \text{ so the answer is reasonable.}$$

9. $872 - 259 = \underline{\hspace{2cm}}$.

872 is about $\underline{\hspace{2cm}}$.

259 is about $\underline{\hspace{2cm}}$.

$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

So, $872 - 259$ is about $\underline{\hspace{2cm}}$.

$\underline{\hspace{2cm}}$ is close to $\underline{\hspace{2cm}}$, so the answer is reasonable.

10. Mrs. Ramsey wants to buy these four items.



a. Find the total cost of the items.
Then, use rounding to check that the total cost is reasonable.

b. Mrs. Ramsey has \$980. Does she have enough money to buy all the items?

Practice 5 Using Front-End Estimation

Write the leading digit.

1. 473 _____

2. 801 _____

3. 198 _____

4. 5,147 _____

5. 7,061 _____

6. 9,625 _____

Find the sum. Use front-end estimation to check that each answer is reasonable.

Example

Find $324 + 219$.

$$324 + 219 = \underline{543}$$

$$\begin{array}{r} 324 \\ \downarrow \\ 300 \end{array} + \begin{array}{r} 219 \\ \downarrow \\ 200 \end{array} = \underline{500}$$

The estimated sum is 500.

The answer 543 is reasonable.

7. Find $312 + 526$.

$$312 + 526 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 312 \\ \downarrow \\ \underline{\hspace{1cm}} \end{array} + \begin{array}{r} 526 \\ \downarrow \\ \underline{\hspace{1cm}} \end{array} = \underline{\hspace{2cm}}$$

The estimated sum is _____.

The answer _____ is reasonable.

Find the sum. Use front-end estimation to check that each answer is reasonable.

8. Find $364 + 509$.

$$364 + 509 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 364 \\ \downarrow \\ \underline{\hspace{1cm}} \end{array} + \begin{array}{r} 509 \\ \downarrow \\ \underline{\hspace{1cm}} \end{array} = \underline{\hspace{2cm}}$$

The estimated sum is $\underline{\hspace{2cm}}$.

The answer $\underline{\hspace{2cm}}$ is reasonable.

9. Find $286 + 473$.

$$286 + 473 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 286 \\ \downarrow \\ \underline{\hspace{1cm}} \end{array} + \begin{array}{r} 473 \\ \downarrow \\ \underline{\hspace{1cm}} \end{array} = \underline{\hspace{2cm}}$$

The estimated sum is $\underline{\hspace{2cm}}$.

The answer $\underline{\hspace{2cm}}$ is reasonable.

Find the difference. Use front-end estimation to check that each answer is reasonable.

Example

Find $349 - 126$.

$$349 - 126 = \underline{223}$$

$$\begin{array}{r} 349 \\ \downarrow \\ \underline{300} \end{array} - \begin{array}{r} 126 \\ \downarrow \\ \underline{100} \end{array} = \underline{200}$$

The estimated difference is $\underline{200}$.

The answer $\underline{223}$ is reasonable.

10. Find $618 - 372$.

$$618 - 372 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 618 \\ \downarrow \\ \end{array} \quad - \quad \begin{array}{r} 372 \\ \downarrow \\ \end{array}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

The estimated difference is _____.

The answer _____ is reasonable.

11. Find $936 - 528$.

$$936 - 528 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 936 \\ \downarrow \\ \end{array} \quad - \quad \begin{array}{r} 528 \\ \downarrow \\ \end{array}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

The estimated difference is _____.

The answer _____ is reasonable.

12. Find $759 - 236$.

$$759 - 236 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 759 \\ \downarrow \\ \end{array} \quad - \quad \begin{array}{r} 236 \\ \downarrow \\ \end{array}$$

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

The estimated difference is _____.

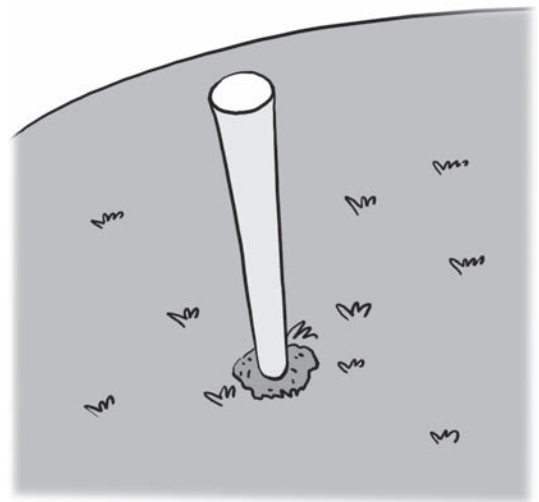
The answer _____ is reasonable.

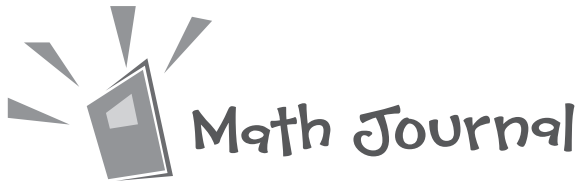
Solve.

- 13.** The length of a train engine is 439 centimeters.
The length of the carriage is about 558 centimeters.
Estimate the total length of the train and the carriage.



- 14.** A wooden pole is 356 centimeters long.
104 centimeters of it is driven into the ground.
About what height of the wooden pole is above the ground?





Fill in the blanks that show the steps to add or subtract mentally. You may use the numbers more than once.

1. $35 + 48 = ?$

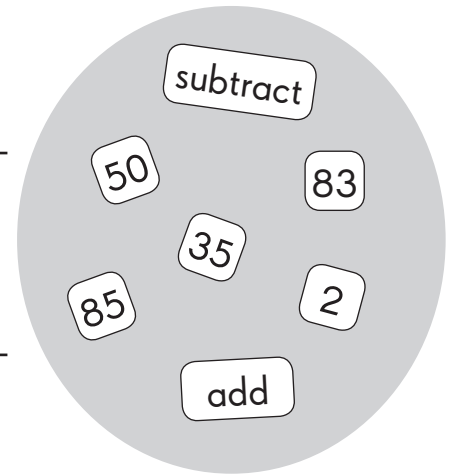
Step 1 Add _____ to _____.

_____ + _____ = _____

Step 2 Subtract _____ from _____.

_____ - _____ = _____

So, $35 + 48 =$ _____.



2. $72 - 18 = ?$

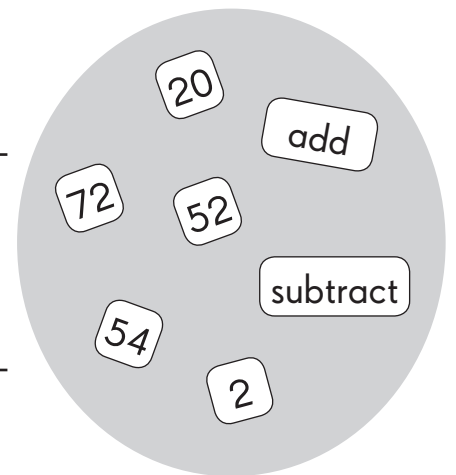
Step 1 Subtract _____ from _____.

_____ - _____ = _____

Step 2 Add _____ to _____.

_____ + _____ = _____

So, $72 - 18 =$ _____.



Complete.

3. Explain how to round 458 to the nearest hundred. Include a number line in your explanation.

4. Use front-end estimation to estimate the difference. Write the steps to your solution and check that your answer is reasonable.

$$905 - 178$$

5. John used front-end estimation to estimate the sum of $317 + 268$. Do you agree with his answer? Explain.

$$317 + 268 = 585$$

So, $317 + 268$ is about 600.



Put On Your Thinking Cap!



Challenging Practice

1. Two numbers are rounded to the nearest hundred, then added.
The estimated sum is 500.
One number is 235. What is the greatest possible value of the other number?

2. I am a 3-digit number.
When you round me to the nearest ten and to the nearest hundred, the answer is the same.
What number can I be?

There are many possible answers.



