

Place Value Puzzle

Build four-digit numbers in more than one way.

GRADE 3 • MA.3.NSO.1.2

MA.3.NSO.1.2 "Compose and decompose four-digit numbers in multiple ways using thousands, hundreds, tens and ones. Demonstrate each composition or decomposition using objects, drawings and expressions or equations."

NAME _____

DATE _____

TRADE PLACE VALUES

Each digit tells how many thousands, hundreds, tens, and ones are in a number. You can trade 1 thousand for 10 hundreds, or 1 hundred for 10 tens, without changing the total. Use an equation to show each way.

WORKED EXAMPLE

Decompose 3,482 in two ways.
Write an equation for each way.

1. Read the places: 3 thousands, 4 hundreds, 8 tens, and 2 ones.
2. Write the standard decomposition:
 $3,000 + 400 + 80 + 2 = 3,482$.
3. Trade 1 thousand for 10 hundreds:
 $2,000 + 1,400 + 80 + 2 = 3,482$.

**Answer: $3,000 + 400 + 80 + 2 = 3,482$;
 $2,000 + 1,400 + 80 + 2 = 3,482$**

PRACTICE 6 problems

- 1** Compose 4 thousands, 6 hundreds, 2 tens, and 9 ones. Write an equation.

ANSWER _____

- 2** Decompose 7,305 by place value. Write an equation.

ANSWER _____

- 3** Decompose 5,640 in a different way using 4 thousands. Write an equation.

ANSWER _____

- 4** Complete the equation: $8,000 + \underline{\hspace{1cm}} + 70 + 2 = 8,572$

ANSWER _____

- 5** Compose 9 thousands, 0 hundreds, 3 tens, and 6 ones. Write an equation.

ANSWER _____

- 6** Write 9,090 as an equation using 8 thousands.

ANSWER _____

APPLY IT Show your work

- 1** At a robotics club, a parts cabinet holds 3 bins of 1,000 gears, 14 boxes of 100 gears, 8 packs of 10 gears, and 6 single gears. How many gears are there? Write an equation that shows the regrouped decomposition.

WORK SPACE

ANSWER _____

- 2** During an arcade challenge, Nia earns 5,670 tickets. She wants to show her score with 4 thousands. Write a new decomposition equation.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Ari says that $7,406 = 6,000 + 13 \text{ hundreds} + 10 \text{ ones}$. Is Ari correct? Explain using an equation, then write one correct decomposition of 7,406.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Compose 4 thousands, 6 hundreds, 2 tens, and 9 ones. Write an equation.	$4,000 + 600 + 20 + 9 = 4,629$
2	Decompose 7,305 by place value. Write an equation.	$7,000 + 300 + 0 + 5 = 7,305$
3	Decompose 5,640 in a different way using 4 thousands. Write an equation.	$4,000 + 1,600 + 40 = 5,640$
4	Complete the equation: $8,000 + \underline{\hspace{1cm}} + 70 + 2 = 8,572$	500
5	Compose 9 thousands, 0 hundreds, 3 tens, and 6 ones. Write an equation.	$9,000 + 0 + 30 + 6 = 9,036$
6	Write 9,090 as an equation using 8 thousands.	$8,000 + 1,000 + 90 = 9,090$

PART 2 • APPLY IT

- 4,486 gears; $3,000 + 1,400 + 80 + 6 = 4,486$** Fourteen boxes of 100 gears equal 1,400 gears. Add 3,000, 1,400, 80, and 6 to get 4,486.
- $4,000 + 1,600 + 70 = 5,670$** Trade 1,000 from the 5,000 for 10 hundreds. Then 1,000 plus 600 equals 1,600, so the total stays 5,670.

CHALLENGE

No. $6,000 + 1,300 + 10 = 7,310$, not 7,406. One correct decomposition is $7,000 + 400 + 6 = 7,406$.

Accept any equivalent composition or decomposition equation that has the correct total. Zero-value terms may be included or omitted when they do not change the value.