Grade 4 Unit 4 worksheet: Partial products (answer key)

ANSWERS AT A GLANCE

1. (a) 438 (b) 3,408 (c) 15,740
2. (a) 300, 5, 420, 2,555 (b) 60, 27, 1,247
3. Pieces: 2,000 and 300 in the row for 50; 80 and 12 in the row for 2. (a) 2,392 (b) the row for 50; 46 × 50 = 2,300
4. 1,092 windows
5. 1,536 stamps
6. (a) 3,600 (b) 6; the number is 4,627.

WORKED SOLUTIONS

1. Find each product with partial products. Write every partial product, then add.

(a) 6 × 73 (b) 4 × 852 (c) 5 × 3,148

ANSWER

(a) 438 (b) 3,408 (c) 15,740

SOLUTION

(a) Split 73 as 70 + 3: 6 × 70 + 6 × 3 = 420 + 18 = 438.

(b) Split 852 as 800 + 50 + 2: 4 × 800 + 4 × 50 + 4 × 2 = 3,200 + 200 + 8 = 3,408.

(c) Split 3,148 as 3,000 + 100 + 40 + 8: 5 × 3,000 + 5 × 100 + 5 × 40 + 5 × 8 = 15,000 + 500 + 200 + 40 = 15,740.

2. Fill in each blank.

(a) $7 \times 365 = 7 \times \square + 7 \times 60 + 7 \times \square = 2{,}100 + \square + 35 =$ _____

(b) $43 \times 29 = 800 + 360 + \square + \square =$ _____

ANSWER

(a) 300, 5, 420, 2,555 (b) 60, 27, 1,247

SOLUTION

(a) In expanded form 365 = 300 + 60 + 5, so the blanks in the first sum are 300 and 5. Then 7 × 300 = 2,100, 7 × 60 = 420 and 7 × 5 = 35. The product is 2,100 + 420 + 35 = 2,555.

(b) Split 43 = 40 + 3 and 29 = 20 + 9. The pieces given are 40 × 20 = 800 and 40 × 9 = 360. The 3 must still meet both parts of 29: 3 × 20 = 60 and 3 × 9 = 27. The product is 800 + 360 + 60 + 27 = 1,247.

3. This area model is for 46 × 52. Fill in each piece.

×	**40**	**6**
50	_____	_____
2	_____	_____

(a) Add the four pieces to find 46 × 52.

(b) Which row of the model shows 46 × 50? What is 46 × 50?

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ANSWER

Pieces: 2,000 and 300 in the row for 50; 80 and 12 in the row for 2. (a) 2,392 (b) the row for 50; 46 × 50 = 2,300

SOLUTION

Each piece is its column number times its row number: 40 × 50 = 2,000, 6 × 50 = 300, 40 × 2 = 80 and 6 × 2 = 12.

(a) 2,000 + 300 + 80 + 12 = 2,392, so 46 × 52 = 2,392.

(b) The row for 50 holds 40 × 50 and 6 × 50, which is 46 × 50 split by the distributive property. Its pieces add to 2,000 + 300 = 2,300.

4. Mei's street has 7 apartment buildings that look exactly alike. Each building has 156 windows. How many windows do the buildings have in all? Write the partial products, then add.

ANSWER

1,092 windows

SOLUTION

The total is 7 × 156. In expanded form, 156 = 100 + 50 + 6. By the distributive property, multiply each part by 7 and add:

$$7 \times 156 = 7 \times 100 + 7 \times 50 + 7 \times 6 = 700 + 350 + 42 = 1{,}092$$

The buildings have 1,092 windows.

5. Jin fills a stamp album. Each page holds 32 stamps, and 48 pages are full. How many stamps are in the album? Use a four-part area model or partial products.

ANSWER

1,536 stamps

SOLUTION

The total is 32 × 48. Split both factors by place value: 32 = 30 + 2 and 48 = 40 + 8. Every part of one factor meets every part of the other, so there are four pieces:

×	**30**	**2**
40	1,200	80
8	240	16

Add all four pieces: 1,200 + 80 + 240 + 16 = 1,536. The album holds 1,536 stamps.

6. Lucas multiplies 6 by a 4-digit number with partial products. A sticker covers one digit of the 4-digit number: 4, ☐ 27. Another sticker covers one of his partial products:

$$24{,}000 + \square + 120 + 42 = 27{,}762$$

(a) What partial product is under the second sticker?

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(b) What digit is under the first sticker? Explain how you know.

ANSWER

(a) 3,600 (b) 6; the number is 4,627.

SOLUTION

(a) The partial products add up to the product, so the missing piece is what is left of 27,762 after the other three. They add to 24,000 + 120 + 42 = 24,162, and 27,762 − 24,162 = 3,600.

(b) The covered digit sits in the hundreds place, so the covered piece is 6 times that many hundreds. Since 6 × 600 = 3,600, the digit is 6 and the number is 4,627.

Check: 6 × 4,627 = 24,000 + 3,600 + 120 + 42 = 27,762.

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