Partial products: the method

Split each number into its place values, multiply every part of one by every part of the other, add the pieces. The area model is the same method drawn: a rectangle cut by place value, each piece's area a partial product.

24 × 3 (2-digit by 1-digit)

24 = 20 + 4. 20 × 3 = 60. 4 × 3 = 12. 60 + 12 = 72.

	20	4
3	20 × 3 = 60	4 × 3 = 12

23 × 45 (2-digit by 2-digit): four products

23 = 20 + 3, 45 = 40 + 5. 20 × 40 = 800. 20 × 5 = 100. 3 × 40 = 120. 3 × 5 = 15. Sum = 1,035.

	20	3
40	20 × 40 = 800	3 × 40 = 120
5	20 × 5 = 100	3 × 5 = 15

In a column, biggest product first:

```
   23
 × 45
 -----
  800   (20 × 40)
  100   (20 × 5)
  120   (3 × 40)
   15   (3 × 5)
 -----
 1035
```

Against the standard algorithm: the first line 23 × 5 = 115 is 100 + 15 combined; the second line 23 × 40 = 920 is 800 + 120 combined. Same arithmetic, adding done early.

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Practice

A. Write the partial products, then add

[ ] 1. 36 × 7

[ ] 2. 58 × 6

[ ] 3. 47 × 4

[ ] 4. 31 × 24

[ ] 5. 68 × 29

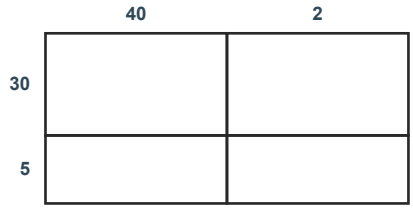
[ ] 6. 52 × 37

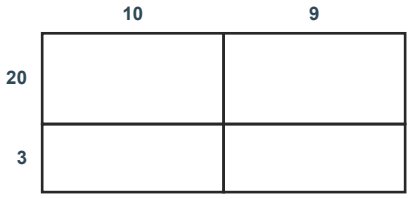
[ ] 7. 124 × 6

[ ] 8. 47 × 50

B. Draw the area model

9. 42 × 35 10. 19 × 23 (label every piece with its product)





Answers

1) 210 + 42 = 252. 2) 300 + 48 = 348. 3) 160 + 28 = 188. 4) 600 + 120 + 20 + 4 = 744. 5) 1,200 + 540 + 160 + 72 = 1,972. 6) 1,500 + 350 + 60 + 14 = 1,924. 7) 600 + 120 + 24 = 744. 8) 2,000 + 350 = 2,350. 9) 1,200 + 200 + 60 + 10 = 1,470. 10) 200 + 30 + 180 + 27 = 437.

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