Long multiplication

Study Development Worksheet

## Example

What is 345 $×$ 67?

## Answer

We begin by placing the numbers into the long multiplication style grids:

|  |  |  |  |
| --- | --- | --- | --- |
| $$×$$ | 300 | 40 | 5 |
| 60 |  |  |  |
| 7 |  |  |  |

We then fill in the squares:

|  |  |  |  |
| --- | --- | --- | --- |
| $$×$$ | 300 | 40 | 5 |
| 60 | 18,000 | 2,400 | 300 |
| 7 | 2,100 | 280 | 35 |

Finally, we sum the numbers in the squares:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 8 | 0 | 0 | 0 |
|  |  | 2 | 4 | 0 | 0 |
|  |  | 2 | 1 | 0 | 0 |
|  |  |  | 3 | 0 | 0 |
|  |  |  | 2 | 8 | 0 |
| + |  |  |  | 3 | 5 |
|  | 2 | 3 | 1 | 1 | 5 |
|  | ~~1~~ | ~~1~~ | ~~1~~ |  |  |

Therefore, we have found that 345 $×$ 67 = 23,115

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## Questions

1. What is 32 $×$ 17?
2. What is 24 $×$ 4 $×$ 9?
3. What is the area of a rectangle with sides of length 13 and 55?
4. What is 109 $×$ 12.5?
5. What is 580 $×$ 165?

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## Answers

1. Begin by setting up the grid:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 30 | 2 |
| 10 |  |  |
| 7 |  |  |

Fill in the squares:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 30 | 2 |
| 10 | 300 | 20 |
| 7 | 210 | 14 |

Sum these values:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 3 | 0 | 0 |
|  | 2 | 1 | 0 |
|  |  | 2 | 0 |
| + |  | 1 | 4 |
|  | 5 | 4 | 4 |
|  |  |  |  |

So, we have found that 32 $×$ 17 = 544.

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1. We will do this calculation in two steps. Begin by setting up the first grid:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 20 | 4 |
| 4 |  |  |

Fill in the blank squares:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 20 | 4 |
| 4 | 80 | 16 |

Add the values you have found:

|  |  |  |
| --- | --- | --- |
|  | 8 | 0 |
| + | 1 | 6 |
|  | 9 | 6 |

Now, we use this value for our second table:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 90 | 6 |
| 9 |  |  |

Fill in the blank squares:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 90 | 6 |
| 9 | 810 | 54 |

Add these values:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 8 | 1 | 0 |
| + |  | 5 | 4 |
|  | 8 | 6 | 4 |

Therefore, we have found that 24 $×$ 4 $×$ 9 = 864.

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1. The area of a rectangle is equal to its longer side length multiplied by its shorter side length. So, we want to calculate 13 $×$ 55. Again, we set up the grid and fill in the blank squares:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 10 | 3 |
| 50 | 500 | 150 |
| 5 | 50 | 15 |

The sum of these values is:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 5 | 0 | 0 |
|  | 1 | 5 | 0 |
|  |  | 5 | 0 |
| + |  | 1 | 5 |
|  | 7 | 1 | 5 |
|  | ~~1~~ |  |  |

Therefore, the area of the rectangle is 715 (units2).

Long multiplication

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1. Set up the grid:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 100 | 9 |
| 10 |  |  |
| 2 |  |  |
| 0.5 |  |  |

Fill in the blank squares:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 100 | 9 |
| 10 | 1000 | 90 |
| 2 | 200 | 18 |
| 0.5 | 50 | 4.5 |

Sum these values:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 0 | 0 | 0 | . | 0 |
|  |  | 2 | 0 | 0 | . | 0 |
|  |  |  | 9 | 0 | . | 0 |
|  |  |  | 5 | 0 | . | 0 |
|  |  |  | 1 | 8 | . | 0 |
| + |  |  |  | 4 | . | 5 |
|  | 1 | 3 | 6 | 2 | . | 5 |
|  |  | ~~1~~ | ~~1~~ |  |  |  |

Therefore, we have that 109 $×$ 12.5 = 1,362.5

Long multiplication

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1. Set up the grid and fill in the blanks:

|  |  |  |
| --- | --- | --- |
| $$×$$ | 500 | 80 |
| 100 | 50,000 | 8,000 |
| 60 | 30,000 | 4,800 |
| 5 | 2,500 | 400 |

Add up the values:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 5 | 0 | 0 | 0 | 0 |
|  | 3 | 0 | 0 | 0 | 0 |
|  |  | 8 | 0 | 0 | 0 |
|  |  | 4 | 8 | 0 | 0 |
|  |  | 2 | 5 | 0 | 0 |
|  |  |  | 4 | 0 | 0 |
|  | 9 | 5 | 7 | 0 | 0 |
|  | ~~1~~ | ~~1~~ |  |  |  |

So, we have found that 580 $×$ 165 = 95,700.

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