

## Division: Listing Multiples **ANSWERS**

**Multiples may vary, but the quotient should be the same.**

List multiples for the divisor when you are solving division problems so you can quickly find the best factor in this standard algorithm approach. Directions:

1. List the product for the divisor times a factor (10, 100, etc.) of your choice.
2. Double the product and factor twice to create a list of multiples.
3. Circle the closest multiple to the dividend and follow the standard algorithm.
4. Continue steps 1-4 until your dividend is less than the divisor.
5. Answer the open-response question after each division problem.

Standard Algorithm	Listed Multiples		
$4,938 \div 19$ $\begin{array}{r} 259R17 \\ 19 \overline{) 4938} \\ \underline{-3800} \\ 1138 \\ \underline{-950} \\ 188 \\ \underline{-171} \\ 17 \end{array}$	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px solid black;"> <math>\underline{\quad} \times 19 =</math> # close to 4,938?            100 x 19 = 1900            200 x 19 = 3800 ✓            400 x 19 = 7600         </td> <td style="width: 50%;"> <math>\underline{\quad} \times 19 =</math> # close to 1,138?            10 x 19 = 190            20 x 19 = 380            30 x 19 = 570            40 x 19 = 760            50 x 19 = 950 ✓            60 x 19 = 1,140         </td> </tr> </table>	$\underline{\quad} \times 19 =$ # close to 4,938? 100 x 19 = 1900 200 x 19 = 3800 ✓ 400 x 19 = 7600	$\underline{\quad} \times 19 =$ # close to 1,138? 10 x 19 = 190 20 x 19 = 380 30 x 19 = 570 40 x 19 = 760 50 x 19 = 950 ✓ 60 x 19 = 1,140
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The multiples of 19 are doubled so that I can easily add it by itself to get the new product. There are two sets of listed

multiples 100 and 10. I think listing multiples is helpful when I need to solve for a larger number, but it can be a waste of time if I already know compatible numbers.

1. Standard Algorithm	Listed Multiples																										
$2,122 \div 13$ $\begin{array}{r} 163R3 \\ 13 \overline{) 2122} \\ \underline{-1300} \\ 822 \\ \underline{-780} \\ 42 \\ \underline{-39} \\ 3 \end{array}$	<p>What <math>x \times 13 =</math> a number close to 2,122?</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="border-bottom: 1px solid black;"><del>100</del></td><td><math>\times 13 = 1300</math> ✓</td></tr> <tr><td style="border-bottom: 1px solid black;">200</td><td><math>\times 13 = 2600</math></td></tr> <tr><td style="border-bottom: 1px solid black;">400</td><td><math>\times 13 = 5200</math></td></tr> </table> <p>What <math>x \times 13 =</math> # close to <u>822</u> ?</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="border-bottom: 1px solid black;">10</td><td><math>\times 13 = 130</math></td></tr> <tr><td style="border-bottom: 1px solid black;">20</td><td><math>\times 13 = 260</math></td></tr> <tr><td style="border-bottom: 1px solid black;">30</td><td><math>\times 13 = 390</math></td></tr> <tr><td style="border-bottom: 1px solid black;">40</td><td><math>\times 13 = 520</math></td></tr> <tr><td style="border-bottom: 1px solid black;">50</td><td><math>\times 13 = 650</math></td></tr> <tr><td style="border-bottom: 1px solid black;">60</td><td><math>\times 13 = 780</math> ✓</td></tr> <tr><td style="border-bottom: 1px solid black;">70</td><td><math>\times 13 = 910</math></td></tr> </table> <p>What <math>x \times 13 =</math> # close to <u>42</u> ?</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="border-bottom: 1px solid black;">5</td><td><math>\times 13 = 65</math></td></tr> <tr><td style="border-bottom: 1px solid black;">4</td><td><math>\times 13 = 52</math></td></tr> <tr><td style="border-bottom: 1px solid black;">3</td><td><math>\times 13 = 39</math> ✓</td></tr> </table>	<del>100</del>	$\times 13 = 1300$ ✓	200	$\times 13 = 2600$	400	$\times 13 = 5200$	10	$\times 13 = 130$	20	$\times 13 = 260$	30	$\times 13 = 390$	40	$\times 13 = 520$	50	$\times 13 = 650$	60	$\times 13 = 780$ ✓	70	$\times 13 = 910$	5	$\times 13 = 65$	4	$\times 13 = 52$	3	$\times 13 = 39$ ✓
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Do you think listing the multiples is helpful? Why or why not? Student answers will vary.

It may have been easier to find a factor even closer to 2,122 after discovering  $200 \times 13 = 2600$ . I know the quotient will be less than 200 at this point.

## 2. Standard Algorithm

$$1,906 \div 10$$

$$\begin{array}{r} 190 \text{ R}6 \\ 10 \overline{) 1906} \\ \underline{-1000} \\ 906 \\ \underline{-900} \\ 6 \end{array}$$

## Listed Multiples

\_\_\_\_\_ x 10 = # close to 1,906?

$$100 \times 10 = 1,000 \checkmark$$

$$200 \times 10 = 2,000$$

\_\_\_\_\_ x 10 = # close to 906?

$$10 \times 10 = 100$$

$$20 \times 10 = 200$$

$$30 \times 10 = 300$$

$$40 \times 10 = 400$$

$$50 \times 10 = 500$$

$$60 \times 10 = 600$$

$$70 \times 10 = 700$$

$$80 \times 10 = 800$$

$$90 \times 10 = 900 \checkmark$$

Do you think listing the multiples is helpful? Why or why not? *Student answers will vary.*

*Listing multiples can be helpful even though I already know that  $90 \times 10 = 900$ . The multiples remind me of the true values of the numbers I am subtracting when completing the standard algorithm.*