

Standard Algorithm and Decimal Placement

Decimal point placement within numbers affects the overall value of the product, or the answer to a multiplication problem. When changing the decimal point within an expression, the digits in the product will stay the same but the value of each of the digits will change.

In multiplication, ignoring the decimal point and multiplying the numbers as if they are whole numbers is a helpful strategy to solve decimal multiplication problems. Once you have the product, then place the decimal point based on a reasonable answer.

$$33 \times 53 = 1749 \quad \text{influences my answer for} \quad 3.3 \times 5.3 = 17.49$$

If I round the two decimals to the nearest whole numbers, I get 3 and 5. I know that $3 \times 5 = 15$, therefore it makes sense to put my decimal point after the 17. I guess multiplying an additional three-tenths by three-tenths is enough to create the two extra ones (e.g., $15 + 2 = 17$).

Directions: Look at the expression and follow the instructions.

1. 2.3 x 8.23		
<p>a. Ignore the decimal point and solve for the expression using whole numbers and the standard algorithm.</p> <p style="text-align: center; color: red; font-weight: bold; margin-top: 20px;">$23 \times 403 = 9,269$</p> <p>Whole number product: <u>9,269</u></p>	<p>b. Think about the decimal numbers and the whole number product. What would be a reasonable answer to the decimal multiplication expression?</p> <p style="color: red; font-weight: bold; margin-top: 20px;">A reasonable answer for this decimal problem is 9.269 because $2 \times 4 = 8$. Eight is closer to nine than any other number I would create if I put the decimal point somewhere else.</p> <p>Decimal product: <u>9.269</u></p>	<p>c. Discuss how you solved the multiplication problem and decided on the decimal placement. Write some notes here and then share your answer with a partner.</p> <p style="color: red; font-weight: bold; margin-top: 20px;">I solved the problem by turning the decimals into whole numbers and then multiplying the whole numbers to get 9,269. Then I multiplied the two numbers in the ones place from the decimals to get the product eight. My equation was $2 \times 4 = 8$. I placed the decimal point between the nine and two in the product to get 9.269, which is close to the product eight.</p>

2. 13.4 x 6.85		
<p>a. Ignore the decimal point and solve for the expression using whole numbers and the standard algorithm.</p> <p style="text-align: center; color: red; font-weight: bold; margin-top: 20px;">$134 \times 65 = 8,710$</p> <p>Whole number product: <u>8,710</u></p>	<p>b. Think about the decimal numbers and the whole number product. What would be a reasonable answer to the decimal multiplication expression?</p> <p style="color: red; font-weight: bold; margin-top: 10px;">(**Answers may vary depending on students' ability to round decimals to the nearest whole number.)</p> <p style="color: red; font-weight: bold; margin-top: 10px;">A reasonable answer for this decimal problem is 87.10 because $13 \times 7 = 91$. Eighty-seven is closer to ninety-one than any other number I would create if I put the decimal somewhere else.</p> <p>Decimal product: <u>87.10</u></p>	<p>c. Discuss how you solved the multiplication problem and decided on the decimal placement. Write some notes here and then share your answer with a partner.</p> <p style="color: red; font-weight: bold; margin-top: 20px;">I solved the problem by turning the decimals into whole numbers and then multiplying the whole numbers to get 8,710. Then I multiplied the two numbers in the ones place from the decimals to get the product 91. My equation was $13 \times 7 = 91$. I placed the decimal point between the seven and one in the product to get 87.10, which is close to the product 91.</p>

3. 45.1 x 5.7		
<p>a. Ignore the decimal point and solve for the expression using whole numbers and the standard algorithm.</p> <p style="text-align: center;">$451 \times 57 = 25,707$</p> <p>Whole number product: <u>25,707</u></p>	<p>b. Think about the decimal numbers and the whole number product. What would be a reasonable answer to the decimal multiplication expression?</p> <p><i>(**Answers may vary depending on students' ability to round decimals to the nearest whole number.)</i></p> <p>A reasonable answer for this decimal problem is 257.07 because $45 \times 6 = 270$. Two hundred seventy is closer to 257 than any other number I would create if I put the decimal somewhere else.</p> <p>Decimal product: <u>257.07</u></p>	<p>c. Discuss how you solved the multiplication problem and decided on the decimal placement. Write some notes here and then share your answer with a partner.</p> <p>I solved the problem by turning the decimals into whole numbers and then multiplying the whole numbers to get 25,707. Then I multiplied the two numbers in the ones place from the decimals to get the product 270. My equation was $45 \times 6 = 270$. I placed the decimal point between the seven and the zero in the product to get 257.07, which is close to the product 270.</p>

4. 2.5 x 10.5		
<p>a. Ignore the decimal point and solve for the expression using whole numbers and the standard algorithm.</p> <p style="text-align: center;">$25 \times 105 = 2,625$</p> <p>Whole number product: <u>2,625</u></p>	<p>b. Think about the decimal numbers and the whole number product. What would be a reasonable answer to the decimal multiplication expression?</p> <p><i>(**Answers may vary depending on students' ability to round decimals to the nearest whole number.)</i></p> <p>A reasonable answer for this decimal problem is 26.25 because $3 \times 10 = 30$. Thirty is closer to 26.25 than any other number I would create if I put the decimal somewhere else.</p> <p>Decimal product: <u>26.25</u></p>	<p>c. Discuss how you solved the multiplication problem and decided on the decimal placement. Write some notes here and then share your answer with a partner.</p> <p>I solved the problem by turning the decimals into whole numbers and then multiplying the whole numbers to get 2,625. Then I multiplied the two numbers in the ones place from the decimals to get the product 30. My equation was $3 \times 10 = 30$. I placed the decimal point between the six and the two in the product to get 26.25, which is close to the product 30.</p>