Multiplying Decimals by power of 10

$$\sqrt[b]{x^a} = x^{\frac{a}{b}}$$

You can easily **multiply by a power of 10** in your head by moving the decimal point left or right, depending on how many places you need to move.

You can also estimate products by rounding each number to its highest place value.

The following examples involve multiplying by 10, 100, and 1000 and multiplying by 0.1, 0.01, and 0.001.

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Multiply:

$10 \times 0.15 = 1.5$ move the decimal point one step to the right

$100 \times 0.15 = 15$ move the decimal point two steps to the right

$1000 \times 0.15 = 150$ move the decimal point three steps to the right

then add zeros if needed.

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Multiply:

$10 \times 0.15 = 1.5$ or $10^1 \times 0.15 = 1.5$

The exponent of 10 indicates the number of times.

$100 \times 0.15 = 15$ or $10^2 \times 0.15 = 15$

You have to move the decimal point to the right.

$1000 \times 0.15\ 15 = 150$ or $10^3 \times 0.15 = 150$

In **multiplying decimals by 0.1, 0.01, or 0.001**, we count the numbers of zeros in **0.1, 0.01, or 0.001**, then move the decimal point to the left based on the number of decimal places.

Multiply:

$15 \times 0.1 = 1.5$ or 15×10^{-1}

$15 \times 0.01 = 0.15$ or 15×10^{-2}

$15 \times 0.001 = 0.015$ or 15×10^{-3}

The negative exponent indicates the number of times you are going to move the decimal point to the left.