Pre-Algebra Workbook Solutions

Decimals

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PLACE VALUE

■ 1. Identify the place value of the 2 in $4{,}562.387$.

Solution:

The 2 in $4{,}562.387$ is one place to the left of the decimal point, which means it's in the "ones" place.

■ 2. Identify the place value of the 0 in 307.119.

Solution:

The 0 in 307.119 is two places to the left of the decimal point, which means it's in the "tens" place.

■ 3. What is the number in the ten-thousandths place of $6{,}520.0019$?

Solution:

The number in the ten-thousandths place is four places to the right of the decimal point, which means it's the 9 in $6{,}520.0019$.

■ 4. What is the number in the tenths place of 0.89104?

Solution:

The number in the tenths place is one place to the right of the decimal point, which means it's the 8 in 0.89104.

■ 5. The further we move to the right of the decimal point, the ___________ (smaller or larger?) the value gets.

Solution:

smaller

■ 6. The further we move to the left of the decimal point, the ___________ (smaller or larger?) the value gets.

Solution:

larger

DECIMAL ARITHMETIC

■ 1. Find the sum.

$$4.5 + 3.75$$

Solution:

Line up the decimal points and then add the decimal numbers. There's no need to worry about the fact that one of the numbers has more digits to the right of the decimal point than the other number does.

We just pretend that there's a 0 after the 5 in 4.5 (we pretend that it's 4.50), so that the two decimal numbers we're adding have the same number of digits to the right of the decimal point.

$$\begin{array}{r} 4.50 \\ +\ \underline{3.75} \\ 8.25 \end{array}$$

■ 2. Find the difference.

$$7.87 - 4.9876$$

Solution:

Line up the decimal points and then subtract the decimal numbers. There's no need to worry about the fact that one of the numbers has more digits to the right of the decimal point than the other number does.

We just pretend that there's a 00 after the 7 in 7.87 (we pretend that it's 7.8700), so that the two decimal numbers we're subtracting have the same number of digits to the right of the decimal point.

$$\begin{array}{r} 7.8700 \\ -\ \underline{4.9876} \\ 2.8824 \end{array}$$

3. Find the product.

$$1.5 \cdot 8.8$$

Solution:

Multiply normally, ignoring the decimal points.

$$\begin{array}{r} 1.5 \\ \times\ \underline{8.8} \\ 120 \end{array}$$

$$+\ \underline{1200}$$

$$1320$$

Between the two given numbers, there are two digits to the right of the decimal place, the 5 in 1.5 and the 8 in 8.8, so we'll move the decimal point two places to the left, and 1320 becomes

$$13.20$$

4. Find the quotient.

$$5.65 \div 0.02$$

Solution:

To find the quotient, we'll do long division, but not until after we determine where to place the decimal point in our answer.

To figure out where it should go, we need to change both numbers into whole numbers. So 5.65 becomes 565 and 0.02 becomes 2. Then we can do the long division as if we were doing division with whole numbers, instead of decimal numbers.

$$282.5$$

$$2\,|\,\overline{565.0}$$

$$-\ \underline{4\quad\ \ }$$

$$
\begin{array}{r}
16 \\
-\ \underline{16} \\
5 \\
-\ \ \underline{4} \\
10 \\
-\ \underline{10} \\
0
\end{array}
$$

■ 5. Simplify the expression.

$$2.5783 + 5.789 - 3.25$$

Solution:

We'll start by adding $2.5783 + 5.789$. We just pretend that there's a 0 after the 9 in 5.789 (we pretend that it's 5.7890), so that the two decimal numbers we're adding have the same number of digits to the right of the decimal point.

$$
\begin{array}{r}
2.5783 \\
+\ \underline{5.7890} \\
8.3673
\end{array}
$$

Now to do the subtraction, line up the decimal points and then subtract.

$$\begin{array}{r} 8.3673 \\ -\ \underline{3.2500} \\ 5.1173 \end{array}$$

■ 6. Simplify the expression.

$$1.24 \cdot 2.61$$

Solution:

Multiply normally, ignoring the decimals.

$$\begin{array}{r} 1.24 \\ \times\ \ \underline{2.61} \\ 124 \\ +\ \ 7440 \\ +\ \underline{24800} \\ 32364 \end{array}$$

Between the two given numbers, there are four digits to the right of the decimal point, so we'll move the decimal point four places to the left to get 3.2364

REPEATING DECIMALS

■ 1. A finite decimal number is a number that ____________.

Solution:

ends

■ 2. Rewrite 0.888888 as a repeating decimal.

Solution:

$0.\overline{8}$

■ 3. Rewrite 0.1818181818 as a repeating decimal.

Solution:

$0.\overline{18}$

■ 4. What is the next digit in $3.\overline{142857}$?

Solution:

1

■ 5. What is the next digit in $0.41\overline{6}$?

Solution:

6

■ 6. Name an example of a decimal number that does not end, but does not repeat.

Solution:

π is an example of a non-repeating, non-finite decimal number.

ROUNDING

■ 1. If a number is ____________ or greater, we round up.

Solution:

5

■ 2. Round 11.451 to the nearest tenth.

Solution:

The 4 is the digit in the tenths place, so we'll use the 5 that follows the 4 to round up to 11.5.

■ 3. Round 691.014 to the tens place.

Solution:

The 9 is the digit in the tens place, so we'll use the 1 that follows the 9 to round down to 690.

■ 4. Round $11.\overline{6}$ to the nearest thousandth.

Solution:

If we extend the decimal to one digit past the thousandths place, we can write it as 11.6666. The third 6 is in the thousandths place, so we'll use the fourth 6 that follows it to round up to 11.667.

■ 5. When we round a number to the tenths place, we look at the digit in the ____________ place in order to determine which way to round the number.

Solution:

hundredths

■ 6. Judith types $2 \div 3$ into the calculator and gets the answer 0.66666666667. Judith tells her friend Andy that this is not a repeating decimal because there is a 7 at the end. Andy disagrees and says the calculator rounds the number and that is why there is a 7. Who is correct? Why?

Solution:

Andy is correct because calculators cannot show repeating decimals going on and on. So, it must round the number based on the number of digits that can fit on the screen. When the calculator rounds, 6 is higher than 5, so the number gets rounded up from a 6 to a 7.

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