Significant Figures Rules

There are three rules on determining how many significant figures are in a number:

1. Non-zero digits are always significant.
2. Any zeros between two significant digits are significant.
3. A final zero or trailing zeros in the DECIMAL PORTION ONLY are significant.

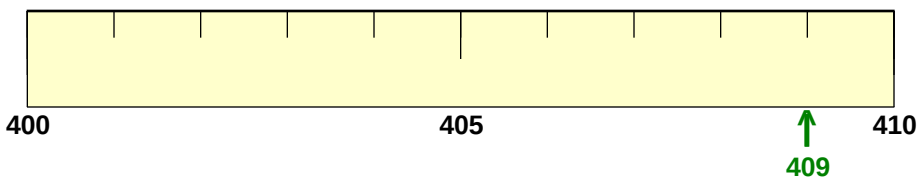
Please remember that, in science, all numbers are based upon measurements (except for a very few that are defined). Since all measurements are uncertain, we must only use those numbers that are meaningful. Not all of the digits have meaning (significance) and, therefore, should not be written down. In science, only the numbers that have significance (derived from measurement) are written.

Rule 1: Non-zero digits are always significant.

If you measure something and the device you use (ruler, thermometer, triple-beam, balance, etc.) returns a number to you, then you have made a measurement decision and that ACT of measuring gives significance to that particular numeral (or digit) in the overall value you obtain.
Hence a number like 46.78 would have four significant figures and 3.94 would have three.

Rule 2: Any zeros between two significant digits are significant.

Suppose you had a number like 409. By the first rule, the 4 and the 9 are significant. However, to make a measurement decision on the 4 (in the hundred's place) and the 9 (in the one's place), you HAD to have made a decision on the ten's place. The measurement scale for this number would have hundreds, tens, and ones marked.
Like the following example:



These are sometimes called "captured zeros."

Significant Figures Rules

Rule 3: A final zero or trailing zeros in the decimal portion ONLY are significant.

This rule causes the most confusion among students.
In the following example the zeros are significant digits and highlighted in blue.

0.0703**0**
0.008**00**

Here are two more examples where the significant zeros are highlighted in blue.

$4.7\mathbf{0} \times 10^{-3}$
$6.5\mathbf{00} \times 10^{4}$

When Zeros are Not Significant Digits

Zero Type # 1 : Space holding zeros in numbers less than one.
In the following example the zeros are NOT significant digits and highlighted in red.

0.09060
0.00400

These zeros serve only as space holders. They are there to put the decimal point in its correct location. They DO NOT involve measurement decisions.

Zero Type # 2 : Trailing zeros in a whole number.
In the following example the zeros are NOT significant digits and highlighted in red.

2**00**
25**000**

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How Many Significant Digits for Each Number?

1) 7003 = _____

2) 4.20×10^{6} = _____

3) 0.0475 = _____

4) 0.0109 = _____

5) 0.021 = _____

6) 900 = _____

7) 8600 = _____

8) 4070 = _____

9) 1020 = _____

10) 0.070 = _____

11) 5200 = _____

12) 0.0006 = _____

13) 5017 = _____

14) 7.500×10^{1} = _____

15) 6.710×10^{-3} = _____

16) 7.0×10^{-4} = _____

17) 5.87×10^{-8} = _____

18) 9.80×10^{3} = _____

19) 97.79 = _____

20) 0.87680 = _____

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How Many Significant Digits for Each Number?

1) 7003 = 4

2) 4.20×10^{6} = 3

3) 0.0475 = 3

4) 0.0109 = 3

5) 0.021 = 2

6) 900 = 1

7) 8600 = 2

8) 4070 = 3

9) 1020 = 3

10) 0.070 = 2

11) 5200 = 2

12) 0.0006 = 1

13) 5017 = 4

14) 7.500×10^{1} = 4

15) 6.710×10^{-3} = 4

16) 7.0×10^{-4} = 2

17) 5.87×10^{-8} = 3

18) 9.80×10^{3} = 3

19) 97.79 = 4

20) 0.87680 = 5

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Solve the Problems and Round Accordingly.

1) 54.7278 + 6.558 = _____

2) 89.5 - 1.974 = _____

3) 45.8142 + 24.8 = _____

4) 9.6 + 75.7348 = _____

5) 32.3671 - 3.88 = _____

6) 48.7599 + 77.3 + 47.227 = _____

7) 54.9924 + 76.6 = _____

8) 97.5158 - 8.1938 = _____

9) 5.6848 + 69.4177 + 7.7 = _____

10) 9.216 - 1.79 = _____

11) 3.3 + 63.8489 + 5.3565 = _____

12) 8.791 + 59.4 + 88.8365 = _____

13) 5.1519 + 68.42 + 7.14 = _____

14) 11.3 + 7.5 + 86.1212 = _____

15) 47.488 - 43.8842 = _____

16) 15.594 + 2.9 = _____

17) 1.68 + 89.5 = _____

18) 16.2627 - 9.9935 = _____

19) 98.868 + 3.988 + 66.6799 = _____

20) 14.636 - 9.72 = _____

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Solve the Problems and Round Accordingly.

1) 54.7278 + 6.558 = 61.286

2) 89.5 - 1.974 = 87.5

3) 45.8142 + 24.8 = 70.6

4) 9.6 + 75.7348 = 85.3

5) 32.3671 - 3.88 = 28.49

6) 48.7599 + 77.3 + 47.227 = 173.3

7) 54.9924 + 76.6 = 131.6

8) 97.5158 - 8.1938 = 89.3220

9) 5.6848 + 69.4177 + 7.7 = 82.8

10) 9.216 - 1.79 = 7.43

11) 3.3 + 63.8489 + 5.3565 = 72.5

12) 8.791 + 59.4 + 88.8365 = 157.0

13) 5.1519 + 68.42 + 7.14 = 80.71

14) 11.3 + 7.5 + 86.1212 = 104.9

15) 47.488 - 43.8842 = 3.604

16) 15.594 + 2.9 = 18.5

17) 1.68 + 89.5 = 91.2

18) 16.2627 - 9.9935 = 6.2692

19) 98.868 + 3.988 + 66.6799 = 169.536

20) 14.636 - 9.72 = 4.92

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Solve the Problems and Round Accordingly.

1) 8040 ÷ 4.847 = _____

2) 0.5 x 63.45 = _____

3) 6030 ÷ 39.52 = _____

4) 1.13 x 0.009 = _____

5) 8.827 x 26 x 9900 = _____

6) 83.6 x 0.92 x 50 = _____

7) 99 x 94.4 x 5070 = _____

8) 0.047 x 0.02 = _____

9) 300 ÷ 3.3 = _____

10) 9000 ÷ 5.70 = _____

11) 5200 ÷ 64.26 = _____

12) 7300 ÷ 26.96 = _____

13) 0.35 x 14.2 x 2080 = _____

14) 79.1 x 0.085 x 8600 = _____

15) 0.009 x 700 = _____

16) 340 ÷ 43.67 = _____

17) 47 x 0.7 = _____

18) 0.005 x 59.158 = _____

19) 5.519 x 0.0057 x 3020 = _____

20) 100 x 5 = _____

Name : _____ Score : _____

Teacher : _____ Date : _____

Solve the Problems and Round Accordingly.

1) 8040 ÷ 4.847 = 1,660

2) 0.5 x 63.45 = 30

3) 6030 ÷ 39.52 = 153

4) 1.13 x 0.009 = 0.01

5) 8.827 x 26 x 9900 = 2,300,000

6) 83.6 x 0.92 x 50 = 4,000

7) 99 x 94.4 x 5070 = 47,000,000

8) 0.047 x 0.02 = 0.0009

9) 300 ÷ 3.3 = 90

10) 9000 ÷ 5.70 = 2,000

11) 5200 ÷ 64.26 = 81

12) 7300 ÷ 26.96 = 270

13) 0.35 x 14.2 x 2080 = 10,000

14) 79.1 x 0.085 x 8600 = 58,000

15) 0.009 x 700 = 6

16) 340 ÷ 43.67 = 7.8

17) 47 x 0.7 = 30

18) 0.005 x 59.158 = 0.3

19) 5.519 x 0.0057 x 3020 = 95

20) 100 x 5 = 500