

Dougherty Valley High School
Measurement Practice
Chemistry

NAME:
DATE:
PERIOD:

SIGNIFICANT DIGITS

Significant figures are the digits in any measurement that are known with certainty plus one digit that is uncertain.

Rule 1: All non-zero digits are significant

3.1425 [5]
 3.14 [3]
 469 [3]

Rule 2: All zeros between significant digits are significant

7.503 [4]
 7053 [4]
 302 [3]

Rule 3: In a number with digits to the right of a decimal place, zeros to the right of the last non-zero digit are significant

43 [2]
 43.0 [3]
 43.00 [4]
 0.00200 [3]
 0.40050 [5]

Rule 4: Zeros to the left of the first non-zero digit that act, as placeholders are NOT significant.

0.0056 [2]
 0.0789 [3]
 0.000001 [1]

Rule 5: In a number that has no decimal point, and that ends in zeros (such as 3600), the zeros at the end may or may not be significant (it is ambiguous). To avoid ambiguity express the number in scientific notation showing in the coefficient the number of significant digits.

3.6×10^3 contains two significant digits

A. How many significant digits are in each of the following numbers?

1837	1)	205.8	2)
$3.14145E^4$	3)	1900.5	4)
6005	5)	1200.43	6)
0.08206	7)	6000.00	8)
0.000014	9)	632.0000	10)
149356.1	11)	14.163000	12)
8.7300	13)	14	14)
0.00743	15)	302400.00	16)
302400	17)	0.0019872	18)
8.732	19)	20000	20)
14.000	21)	426.1	22)
19.7342	23)	60	24)

B. Convert the following number into or out of scientific notation:

142.63	1)
1,500,000.00	2)
0.00336	3)
$1.63E^7$	4)
$3.11E^{-4}$	5)
0.00125	6)
86,400.00	7)
$1.01E^6$	8)
$9.81E^1$	9)
0.000000000000144	10)
4,633,310.56	11)

ROUNDING

GENERAL RULES FOR ROUNDING:

$XY \rightarrow X$
 When $Y > 5$, increase X by 1
 When $Y < 5$, don't change X

When $Y = 5$,

If X is odd, increase X by 1
 If X is even, don't change X

C. Round each of the following numbers to four significant digits:

6.16782	1)
6.19648	2)
0.0019872	3)
$3.14145E^4$	4)
213.25	5)
14.163000	6)
90210	7)
234.4	8)
1200.43	9)
0.0022475	10)
14.16300	11)
0.02315	12)
13.462	13)
135.69	14)
152.00	15)
395.55	16)

SIGNIFICANT DIGITS IN OPERATIONS

D. Add or subtract as indicated and state the answer with the correct number of significant digits

$85.26 \text{ cm} + 4.6 \text{ cm}$	1)
$1.07 \text{ m} + 0.607 \text{ m}$	2)
$186.4 \text{ g} - 57.83 \text{ g}$	3)
$60.08 \text{ s} - 12.2 \text{ s}$	4)
$4,285.75 - 520.1 - 386.255$	5)
$72.60 \text{ m} + 0.0950 \text{ m}$	6)

E. Multiply or divide as indicated and state that answer with the correct number of significant digits

$(5.5 \text{ m})(4.22 \text{ m})$	1)
$(0.0167 \text{ km})(8.525 \text{ km})$	2)
$2.6 \text{ kg} \div 9.42 \text{ m}^3$	3)
$0.632 \text{ m} \div 3.8 \text{ s}$	4)
$(8.95)(9.162) / (4.25)(6.3)$	5)
$0.0045 \text{ mm}^2 \div 0.90 \text{ mm}$	6)

F. Evaluate the following with answers expressed to proper number of significant digits.

$4.22\text{E}^5 + 3.11\text{E}^7 + 6.003\text{E}^6$	1)
$(9.11\text{E}^{-28})(6.02\text{E}^{23})$	2)
$2.160\text{E}^3 + 6.2000\text{E}^4 + 5.2\text{E}^1$	3)
$\frac{8.4\text{E}^7}{2.1\text{E}^4}$	4)
$\frac{8.4\text{E}^{-7}}{2.1\text{E}^4}$	5)
$\frac{8.4\text{E}^7}{2.1\text{E}^{-4}}$	6)
$\frac{8.4\text{E}^{-7}}{2.1\text{E}^{-4}}$	7)
$\frac{6.02\text{E}^{23}}{9.11\text{E}^{28}}$	8)

G. Given the following numbers (a-e), solve the following problems, expressing the answer to the proper number of significant digits.

- (a) 1.72 cm
- (b) 0.15 cm
- (c) 627.1 cm
- (d) 0.007 cm
- (e) 704.050 cm

$a + b + c + d + e$	1)
$a + c + e$	2)
$c - a$	3)
$e - b$	4)
$(a + c) - (b + d)$	5)
(a) (e)	6)
(c) (d)	7)
$(a + b)(b + e)$	8)
$c \div b$	9)
$e \div d$	10)
$(b + c) \div (e - c)$	11)
$(b)^3$	12)