

# Significant Figures Worksheet

*Perfect numbers like perfect men are very rare*  
-Rene Descartes

## I. Determining the Number of Significant Digits

Give the correct number of significant digits for each of the following:

- |                      |            |
|----------------------|------------|
| a. 409.10            | b. 305     |
| c. 0.25              | d. 0.4020  |
| e. 0.00056030        | f. 371 883 |
| g. 308 000           | h. 85.00   |
| i. $2.0 \times 10^2$ | j. 59.98   |

## II. Addition and Subtraction

- |                           |                                                                |
|---------------------------|----------------------------------------------------------------|
| a. $78 + 88 + 4$          | b. $123.4 + 0.06 + 100.0$                                      |
| c. $83 + 55.89 + 72$      | d. $114.21 + 3041 + 0.42 + 349.5$                              |
| e. $82 - 55 + 72$         | f. $1.234 \times 10^1 + 5 \times 10^{-3} - 6.0 \times 10^{-1}$ |
| g. $123.09 - 1.7$         | h. $42.306 - 1.22 + 14.33 - 0.5$                               |
| i. $102.45 + 5.0 - 0.022$ | j. $2.3000 + 0.00695$                                          |

## III. Multiplication, Division and Trigonometry

- |                                                                            |                                          |
|----------------------------------------------------------------------------|------------------------------------------|
| a. $3030.0 \times 290$                                                     | b. $70 \div 120$                         |
| c. $\sqrt{123.07}$                                                         | d. $27.90 \div 4060$                     |
| e. $\frac{(9.008 \times 10^4)(6.5227 \times 10^7)}{(6.53 \times 10^{-4})}$ | f. $\sqrt{(1.460 \times 10^3)(53.1209)}$ |
| g. $\tan \frac{\sqrt{2}}{3.0}$ (in degrees)                                | h. $\sec 58.22$ (in degrees)             |

#### IV. Logarithms and Antilogarithms

a.  $\log 3.00$

b.  $10^{3.895}$

c.  $\log 5$

d.  $\log 455$

e.  $79.21 = \ln x$

f.  $\ln (2.0 \times 10^4)$

#### V. Multi-operation Problems

a.  $\frac{(7.1 \times 10^2) + 924}{7.508 \times 10^4}$

b.  $(4.1 - 0.0093) \times (0.082 \times 273)$

c.  $22.414 - (0.082 \times 273)$

d.  $512.3 + 30 \times 16 - 3$

e.  $\sin \frac{15.88 - 7.0 + 2.12}{8.9076}$  (in degrees)

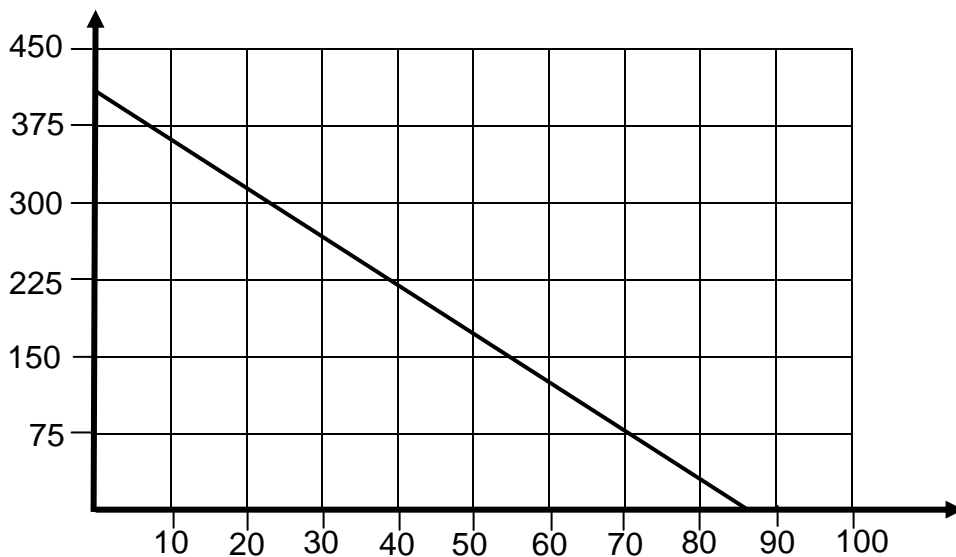
f.  $\frac{1}{2} \log(891.57 + 60)$

g.  $\sqrt{7402 - 20.0 \times 6680 + 23.1}$

h.  $\frac{0.00390 \times 2.0098}{2.02} - \frac{39.04 \times 1.009}{3}$

#### VI. Word Problems

- Determine the volume of a regular pyramid with a base that has a perimeter of 20 cm and a height of 21 cm.
- An empty flask has a mass of 15.246 g. When a student pipettes a 10.0 mL sample of ethanol into this flask, the mass of the flask and the sample combined is 23.136 g. What is the density of ethanol?
- What is the equation of the line illustrated in the graph below:



4. With a lab thermometer, marked in degrees Fahrenheit, you measure the temperature of a solution. The thermometer reads  $52^{\circ}\text{F}$ , what is the temperature of solution in degrees Kelvin?
  - a. [Remember that  $^{\circ}\text{F} = 1.8(^{\circ}\text{C}) + 32^{\circ}$  and  $\text{K} = ^{\circ}\text{C} + 273$ ]
5. A child's sandbox is 1.5 m wide, 1.5 m long and 75 cm deep. If there are on average 55 grains of sand per  $\text{mm}^3$ , how many grains of sand are there in the sandbox?
6. Two airplanes leave an airport, and the angle between their flight paths is  $40^{\circ}$ . An hour later, one plane has traveled 300 km while the other has traveled 200 km. How far apart are the planes at this time?
7. Solve for  $x$  in the equation  $(8e^{2x} - 3) = 625$
8. Suppose that you test apple juice and find that the hydrogen ion concentration is  $[\text{H}^+] = 0.0003$ . Find the pH value and determine whether the juice is basic or acidic.
9. A heavy desk is moved by applying a force of 668 N at an angle of  $25^{\circ}$ . How much of the force is actually used in the movement of the desk?
10. A strain of bacteria doubles every 5.0 minutes. A single bacterium was placed in a sealed Petri dish at 9AM. The agar in the Petri dish was completely covered at 10 AM. At what time was the agar only half covered?

### ANSWER KEY:

#### Section I:

a) 5   b) 3   c) 2   d) 4   e) 5   f) 6   g) 3   h) 4   i) 2   j) 4

#### Section II:

a) 171   b) 223.5   c) 211   d) 3505   e) 100   f) 11.8   g) 121.4   h) 54.9   i) 107.4   j) 2.3070

#### Section III:

a) 880 000   b) 0.6   c) 11.094   d)  $6.87 \times 10^{-3}$    e)  $9.00 \times 10^{15}$    f) 278.5   g)  $8 \times 10^{-3}$    h) 1.899

#### Section IV:

a) 0.477   b)  $7.85 \times 10^3$    c) 0.7   d) 2.658   e) 2.5   f) 9.90

#### Section V:

a)  $2.18 \times 10^{-2}$    b) 92   c)  $2.8 \times 10^{-2}$    d) 989   e) 1.23   f) 1.49   g) 375.533   h) 13

#### Section VI:

1)  $2 \times 10^2 \text{ cm}^3$    2) 0.789 g/mL   3)  $y = -4.7 + 400$    4) 284   5)  $9.3 \times 10^{10}$  grains  
 6) 200 km   7)  $x = 2$    8) 3.5   9)  $6.1 \times 10^2 \text{ N}$    10) 55 minutes