Name: _____

Date: _____

MCHS Honors Physics 2014-2015

Significant Figures and Uncertainty

To review the rules concerning the use of significant figures, refer back to the notes as you proceed through the following examples.

Example A

How many significant figures are in the following numbers?

a) 136

Solution: None of the digits is zero. All the digits are significant. The answer to this question is 3.

b) 2.70×10^2

Solution: You now know that all non-zero numbers are always significant, so the only digit in question in this problem is the zero. Since it is to the right of the decimal point it is significant. The exponent, 2, is ignored when determining significant figures. There are three significant figures.

c) 0.450

Solution: Again, the digits 4 and 5 are significant, so you must the zeros. The zero at the left of the decimal point is *not* significant. The zero to the right of the decimal point is significant. There are three sig figs in this problem: the 4, 5, and final 0.

You Try It

1. How many significant figures are in each of the following measurements?

a) 32.4°C _____

b) 41.05 kg _____

c) 3,000,001 m _____

d) 0.00089 kg _____

e) 0.0340 dL _____

f) 7,301.00 g _____

Example B

Calculate the answer to the following problem and report the answer to the proper number of significant figures.

21.59 cm x 27.9 cm = _____

Solution: 21.59 cm x 27.9 cm = 602.361 cm^2

The number 602.361 has six significant figures, while the numbers 21.59 and 27.9 have four and three significant figures respectively. Because the answer can have no more significant figures than the least number of significant figures in any of the numbers you are multiplying, the answer here must be rounded off to three significant figures. The answer 602.361 cm^2 should be reported as 602 cm^2 or better yet, as 6.02×10^2 cm^2.

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You Try It

2. Perform the prescribed operations, giving your answers to the proper degree of precision. Be sure to include units. Remember that when you add or subtract numbers, you round the answer to the least precise digit. Then you multiply or divide numbers, your answer can have no more significant figures that the least number or significant figures in the problem.

a) 22 g + 14.3 g + 97.03 g = _____

b) 71.6 mL + 45.32 mL – 8 ml = _____

c) 3.14159 x 4.0 cm = _____

d) 27.2 g ÷ 2.0 cm^3 = _____

e) 25.4 dm x 2.00 = _____

f) 100.0 g x 1.00 cal/g·°C x 28.6°C = _____

3. Round off the follow numbers to the proper number of significant figures.

a) 1.034 (to 2 sig. fig) _____

b) 40.06 (to 3 sig. fig) _____

c) 0.0000624 (to 4 sig. fig) _____

d) 1.549 (to 2 sig. fig) _____

e) 739.51 (to 3 sig. fig) _____

f) 82.000 (to 1 sig. fig) _____

4. Perform the prescribed operations. Round your answers to the proper number of significant figures.

a) 44 g + 13.4 g + 87.40 g = _____

b) 21.6 mL + 43.57 mL – 1mL = _____

c) 6.79 cm x 13.5 cm = _____

d) 25.1 g ÷ 5.9 cm^3 = _____

e) 43.2 dm x 3.00 = _____

f) 3.14159 x 5.0 cm = _____

g) 2.00 x 10^2 x 1 cal/g·°C x 28.6°C = _____