

Practice Problems with Answers:

1. Without changing the number of significant figures, express each of the following values in scientific notation. Within the parentheses, state how many significant figures are in that value.

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|---------------|---------------------------|--------------|-------------|-----------------------|--------------|
| a) 123,430.0 | 1.234300×10^5 | (7 sig figs) | f) 12.34 | 1.234×10^1 | (4 sig figs) |
| b) 33375 | 3.3375×10^4 | (5 sig figs) | g) 0.0007 | 7×10^{-4} | (1 sig fig) |
| c) 506.43 | 5.0643×10^2 | (5 sig figs) | h) 8677.5 | 8.6775×10^3 | (5 sig figs) |
| d) 0.0100 | 1.00×10^{-2} | (3 sig figs) | i) 350.053 | 3.50053×10^2 | (6 sig figs) |
| e) 0.03000111 | 3.000111×10^{-2} | (7 sig figs) | j) 0.000070 | 7.0×10^{-5} | (2 sig figs) |

2. Perform the mathematical operation indicated. Express each answer with the appropriate number of significant figures/decimal places.

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|----|---|---|-----------------------|---------------------------------|
| a) | $0.3133 \times 3.91 \times 3.200 \times 444$ | = | 1.74×10^3 | (3 sig figs) |
| b) | $\frac{(0.0072)(4.022 \times 10^3)}{(9.03 \times 10^2)}$ | = | 0.032 | (2 sig figs) |
| c) | $\frac{(1.23 \times 10^4)(1.90 \times 10^{-3})}{(0.033)(5.00 \times 10^2)}$ | = | 1.4 | (2 sig figs) |
| d) | $44.79 - 2.3 - 0.0045$ | = | 42.5 | (uncertainty in “tenths” place) |
| e) | $234.56 + 1.11 + (3.2 \times 10^2)$ | = | 5.6×10^2 | (uncertainty in “tens” place) |
| f) | $123 + 33.0033 + (2.3 \times 10^{-1}) - (7.900 \times 10^3)$ | = | -7744 | (uncertainty in “ones” place) |
| g) | $\frac{(5.004 \times 10^1)(-1.314 \times 10^{-3})}{(5.89 \times 10^7)(6.2 \times 10^{-3})}$ | = | -1.8×10^{-7} | (2 sig figs) |

3. Work the following unit conversions.

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|----|---|-----------------------------|
| a) | 5.6×10^1 mL to quarts | 0.059 quarts |
| b) | 98.76 inches to m | 2.508 meters |
| c) | 7.7×10^1 μm to inches | 3.0×10^{-3} inches |
| d) | 1.234 kg to milligrams | 1.234×10^6 mg |
| e) | 5432.6 micrograms to mg | 5.4326 mg |
| f) | 123.8 micrometers to cm | 1.238×10^6 cm |
| g) | 1.25 grams/mL to kg/L | 1.25 kg/L |

In Section 3, please note that these are *ANSWERS*, and *NOT WORKED SOLUTIONS*. In working problems for an exam or laboratory report, you *MUST* show work to support your answer, clearly indicating the conversion factors with their units, and expressing your result with units and with the appropriate number of significant figures/decimal places.