

1. Indicate the number of significant figures in:

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|----------|---|------------------------|----------|-------------|---|
| (a) 27 | 2 | (d) 340 | 2 (or 3) | (g) 83.01 | 4 |
| (b) 207 | 3 | (e) 9.80×10^2 | 3 | (h) 6000.0 | 5 |
| (c) 207. | 3 | (f) 651.0 | 4 | (i) 83.10 | 4 |
| | | | | (j) 0.00100 | 3 |

Express in Scientific Notation:

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|------------|--------------------|------------|----------------------|------------|---|
| (a) 27 | 2.7×10^1 | (d) 19.1 | 1.91×10^1 | (g) 1.001 | 1.001×10^0 |
| (b) 271000 | 2.71×10^5 | (e) 59851 | 5.9851×10^4 | (h) 10.009 | 1.0009×10^1 |
| (c) 0.07 | 7×10^{-2} | (f) 0.1400 | 1.4×10^{-1} | (i) 0.1000 | 1.000×10^{-1} |
| | | | | (j) 15750 | 1.575×10^4
(or 1.5750×10^4) |

3. Add and express to correct significant figures:

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|--|-------------------|--|------------------------|
| (a) $25.74 + 4.9$ | 30.6 | (e) $19.81 \times 10^{-2} + 8.08 \times 10^{-3}$ | 2.062×10^{-1} |
| (b) $16.71 + 18.90$ | 35.61 | (f) $9.382 \times 10^3 + 1.09 \times 10^2$ | 9.491×10^3 |
| (c) $161.006 + 4.05$ | 165.06 | (g) $3.98 \times 10^2 + 4.1 \times 10^3$ | 4.5×10^3 |
| (d) $7.60 \times 10^2 + 5.2 \times 10^3$ | 6.0×10^3 | (h) $16.2 \times 10^4 + 3.09 \times 10^3$ | 1.65×10^5 |

4. Subtract and express to correct significant figures:

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|--|-------------------|--|-----------------------|
| (a) $25.74 - 4.9$ | 20.8 | (e) $16.2 \times 10^4 - 3.09 \times 10^3$ | 1.59×10^5 |
| (b) $18.90 - 16.71$ | 2.19 | (f) $8.00 \times 10^2 - 4.1 \times 10^1$ | 7.59×10^2 |
| (c) $161.006 - 4.05$ | 156.96 | (g) $8.00 \times 10^{-2} - 4.0 \times 10^{-3}$ | 7.60×10^{-2} |
| (d) $4.1 \times 10^3 - 3.98 \times 10^2$ | 3.7×10^3 | | |

5. Multiply and express to correct significant figures:

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|--------------------------------------|---------------------|--|-----|
| (a) 4.9×25.74 | 1.3×10^2 | (c) $161.006 \times 405 \times 10^{-2}$ | 652 |
| (b) $16.71 \times 1.890 \times 10^1$ | 3.158×10^2 | (d) $8.00 \times 10^2 \times 4.1 \times 10^{-3}$ | 3.3 |

6. Divide and express to correct significant figures.:

- | | | | |
|---------------------|-------|---|-------------------|
| (a) $25.74 / 4.9$ | 5.3 | (c) $161.006 / 4.05$ | 39.8 |
| (b) $18.90 / 16.71$ | 1.131 | (d) $8.00 \times 10^2 / 4.1 \times 10^{-3}$ | 2.0×10^5 |

A. Addition

$$\begin{array}{r} 23.23 \pm 0.01 \text{ g} \\ + 16.24 \pm 0.01 \text{ g} \\ \hline \end{array}$$

$$\begin{array}{r} 0.03 \pm 0.01 \text{ g} \\ + 0.12 \pm 0.01 \text{ g} \\ \hline \end{array}$$

$$\begin{array}{r} 1.26 \pm 0.01 \text{ g} \\ + 0.10 \pm 0.01 \text{ g} \\ \hline \end{array}$$

$$\begin{array}{r} 126.20 \pm 0.01 \text{ g} \\ + 62.20 \pm 0.01 \text{ g} \\ \hline \end{array}$$

$$\begin{array}{r} 26.22 \pm 0.02 \text{ mL} \\ + 21.20 \pm 0.02 \text{ mL} \\ \hline \end{array}$$

$$\begin{array}{r} 662.1 \pm 0.5 \text{ mL} \\ + 500.2 \pm 0.5 \text{ mL} \\ \hline \end{array}$$

B. Subtraction

$$\begin{array}{r} 21.61 \pm 0.01 \text{ g} \\ - 1.40 \pm 0.01 \text{ g} \\ \hline \end{array}$$

$$\begin{array}{r} 6.20 \pm 0.01 \text{ g} \\ - 6.15 \pm 0.01 \text{ g} \\ \hline \end{array}$$

$$\begin{array}{r} 21.21 \pm 0.01 \text{ g} \\ - 21.19 \pm 0.01 \text{ g} \\ \hline \end{array}$$

$$\begin{array}{r} 625.2 \pm 0.5 \text{ mL} \\ - 502.6 \pm 0.5 \text{ mL} \\ \hline \end{array}$$

C. Uncertainties

Use the following experimental results to answer the questions below.

Mass of sample before heating: 48.05 \pm 0.02 g
 Mass of sample after heating: 38.95 \pm 0.02 g

- What is its initial maximum mass? _____
- What is its initial minimum mass? _____
- What is its final maximum mass? _____
- What is its final minimum mass? _____
- What is the maximum mass loss due to heating? _____
- What is the minimum mass loss due to heating? _____
- What is the substance's final (average) mass? _____
- What is the substance's final (average) mass loss? _____
- What is the uncertainty in the mass loss? _____