

## MATH 34A UNITS, ERRORS, LIMITS, AND SUMMATION NOTATION

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1. (Mixing Problem). What amounts of 75% pure silver and 80% pure silver should be mixed to obtain 14 grams of 78% pure silver?

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### I. Unit Conversion

2. If a car travels 35 miles per gallon of fuel how many kilometers does it travel per liter of fuel? Hint: Use the conversions 1miles= 1.6km, 1gallon= 8pints, and  $1L = 2\text{pints}$ .

3. If a sphere has volume  $40\text{cm}^3$  what is its volume in  $\text{m}^3$ ?

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### II. Error, Relative Error, and Percentage Error

What are the formulae for error, relative error, and percentage error?

4. You thought you would only get 80 points on the test but you actually got a 95 points. What is the error? What is the percentage error?

### III. Limits

What does the following symbol mean?

$$\lim_{x \rightarrow a} f(x) = L$$

#### Different ways to compute a limit:

5. (Numerically)  $\lim_{x \rightarrow \infty} \frac{2x+9}{9x-1}$

6. (Graphically) a)  $\lim_{x \rightarrow 0} |x|$  and b)  $\lim_{x \rightarrow 3} \frac{\ln(x)}{x^2+1}$

7. (Algebraically) a)  $\lim_{x \rightarrow 2} (x^2 + 1)$  and b)  $\lim_{x \rightarrow 2} \frac{x^2-4}{x-2}$

### IV. Summation Notation

Why use a summation notation?

8.  $\sum_{n=2}^5 n^2$

9.  $\sum_{x=-1}^4 f(x)$

10.  $\frac{1}{4} \sum_{k=3}^6 x_k$

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