

Worksheet 6: Experimental Error

- How many significant figures does each of the following have?
 - 1.427×10^2
 - 9.250×10^5
 - 106
 - $4.3179 \times 10^{12} * 3.6 \times 10^{-19}$
 - $15 + 18.65$
 - $1.632 \times 10^5 - 4.107 \times 10^3 + 9.84 \times 10^5$
 - $34.60 / 2.46287$
- State the type of error and which statistical measure it would have the greatest effect on (Mean or Standard Deviation) for each of the following:
 - A pH meter that was incorrectly standardized
 - The air conditioner turns on and off during your experiment
 - The TA transposes two of the digits in the reported stock concentration
 - The manufacturer fails to calibrate a buret
 - Your lab partner reads between the lines on a graduated cylinder
- Label each of the following as either precise or not precise and accurate or not accurate.



A



B



C



D

- Using the table below, determine which volumetric flask you would use to make 32 mL of solution when:
 - Cost is the most important factor
 - Accuracy and precision are the most important factors
 - Your research advisor says you have to minimize cost but your results must be perfect

Capacity (mL)	Tolerance (\pm mL)
25	0.03
50	0.08
100	0.08
1000	0.06

- Using the table below, rank the 10mL pipets in terms of accuracy and in terms of precision.

	Pipet A	Pipet B	Pipet C
Trial 1	10.41	10.30	9.67
Trial 2	10.76	9.33	9.87
Trial 3	10.91	10.84	10.67
Trial 4	10.30	10.52	9.18
Trial 5	10.97	10.30	9.56

6. True or False

- Graduated cylinders are more accurate and precise than volumetric glassware.
- Dilution in one step is better than two.
- Larger glassware has less uncertainty.
- Mohr pipets are more precise than volumetric pipets.
- Glassware is designed to hold a specific volume no matter the temperature.