

Name _____ Desk _____
 Date _____ Laboratory Instructor _____

REPORT SHEET | EXPERIMENT Basic Laboratory Techniques | 1

A. The Meterstick

Length of this lab book _____ in. _____ cm _____ mm _____ m
 Width of this lab book _____ in. _____ cm _____ mm _____ m
 Using an equation (including units), show that the above measurements are equivalent.

Area of this lab book (show calculations) _____ cm^2

B. The Graduated Cylinder

Volume of water in graduated cylinder _____ mL
 Volume of water contained in largest test tube _____ mL

C. The Thermometer and Its Calibration

Observed temperature of water-and-ice mixture _____ $^{\circ}\text{C}$
 Temperature of boiling water _____ $^{\circ}\text{C}$
 Observed atmospheric pressure _____ mm Hg
 True (corrected) temperature of boiling water _____ $^{\circ}\text{C}$
 Thermometer correction _____ $^{\circ}\text{C}$

D. Using the Balance to Calibrate Your 10 mL Pipet

Temperature of water used in pipet _____ $^{\circ}\text{C}$
 Corrected temperature _____ $^{\circ}\text{C}$

	<i>Trial 1</i>	<i>Trial 2</i>	<i>Trial 3</i>
Mass of Erlenmeyer plus ~10 mL H_2O (gross mass)	_____	_____	_____ g
Mass of Erlenmeyer (tare mass)	_____	_____	_____ g
Mass of ~10 mL of H_2O (net mass)	_____	_____	_____ g

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Volume delivered by 10 mL
pipet (show calculations)

_____ mL

Mean volume delivered by 10 mL pipet (show calculations)

_____ mL

Individual deviations from the mean

Trial 1

Trial 2

Trial 3

Average deviation from the mean (show calculations)

_____ mL

Volume delivered by your 10 mL pipet

_____ mL $\pm$ _____ mL

E. Measuring the Density of Antifreeze

Temperature of antifreeze

_____ °C

Trial 1

Trial 2

Trial 3

Mass of flask + antifreeze

_____ g

Mass of empty flask

_____ g

Mass of antifreeze

_____ g

Density of antifreeze

_____ g

(show calculations)

Mean (average) density

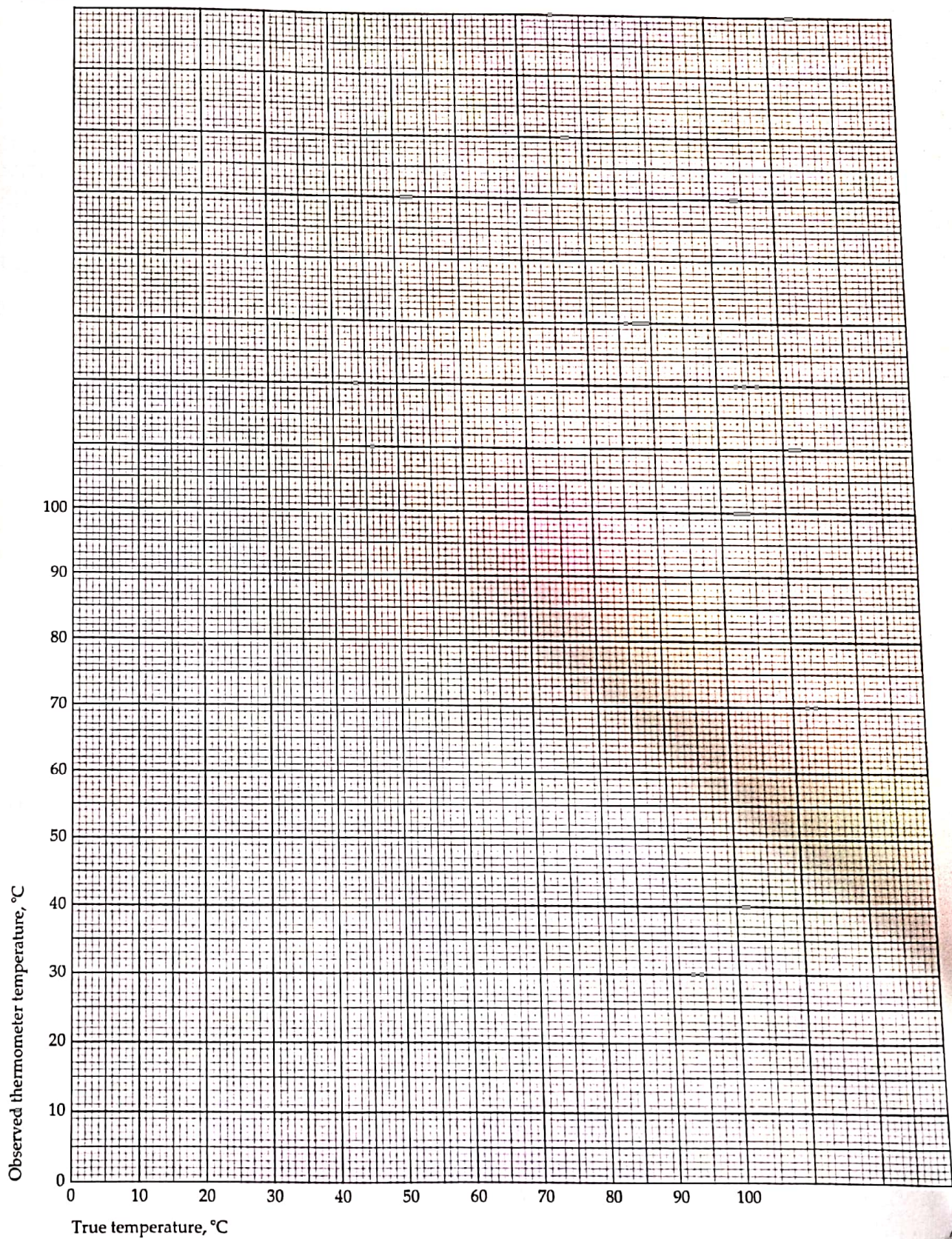
Average deviation from the mean
(show calculations)

QUESTIONS

1. Identify each of the following as measurements of length, area, volume, mass, density, time, or temperature:
(a) ns, (b) 10.0 kg/m^3 , (c) 1.2 pm, (d) 750 km^2 , (e) 83 K, and (f) 4.0 mm^3 .
2. Carry out the following operations and express the answer with the appropriate number of significant figures and units: (a) $(5.231 \text{ mm})(6.1 \text{ mm})$, (b) $72.3 \text{ g}/1.5 \text{ mL}$, (c) $12.21 \text{ g} + 0.0132 \text{ g}$, and (d) $31.03 \text{ g} + 12 \text{ mg}$.
3. Drug medications are often prescribed on the basis of body mass. The adult dosage of Elixophyllin, a drug used to treat asthma, is 6 mg/kg of body mass. Calculate the dose in milligrams for a 160 lb person.
4. A man who is 5 ft 10 in. tall weighs 160. lb. What is his height in centimeters and his mass in kilograms?
5. Determine the boiling point of water at 672 mm Hg.
6. A pipet delivers 9.98 g of water at 19°C . What volume does the pipet deliver?
7. A pipet delivers 10.4 mL, 10.2 mL, 10.8 mL, and 10.6 mL in consecutive trials. Find the mean volume and the average deviation from the mean.
8. A 141 mg sample was placed on a watch glass that has a mass of 9.203 g. What is the mass of the watch glass and sample in grams?

9. (a) Using the defined freezing and boiling points of water, make a plot of degrees Fahrenheit versus degrees Celsius on the graph paper provided.
- (b) Determine the Celsius equivalent of 40°F using your graph. The relationship between these two temperature scales is linear (that is, it is of the form $y = mx + b$). Consult Appendix C regarding linear relationships and determine the equation that relates degrees Fahrenheit to degrees Celsius.
- (c) Compute the Celsius equivalent of 40°F using this relationship.

Thermometer Calibration Curve



Fahrenheit—Celsius Graph

