FREEZING POINT DEPRESSION SMART WORKSHEET

PART A. FREEZING POINT OF LAURIC ACID

	Data	Unit
Mass lauric acid, $mass_1$	1.971	g
T_f, trial 1	43.1	°C
T_f, trial 2	43.1	°C

	Unrounded Value	Rounded Value	Unit
1,2. Average T_f	43.1000	43.1	°C

YOUR PROGRESS ON FREEZING POINT OF LAURIC ACID

CORRECT 6 / 6 | POINTS AWARDED 17 / 17 | AUTOSOLVED 0 / 6 | NOT FINISHED 0 / 9

PART B. FREEZING POINT OF SOLUTION OF (LAURIC ACID + UNKNOWN)

UNKNOWN ID AND MASS

- K_f of lauric acid is 3.90 °C kg mol^{-1}
- Use your average freezing point for lauric acid

Unknown ID: A

Table to report mass values from experiment

	Data	Unit
Mass solvent, $mass_1$	1.971	g
Mass solute, $mass_2$	0.300	g

Note: report Labquest values as is for intercepts and slopes.

GRAPH DATA

Table to report graph data from Labquest

	Data	Unit
3. Slope of line 1, m_1	-2.157	°C min^{-1}

4. Intercept of line 1, b_1	44.893	°C
5. Slope of line 2, m_2	-0.3353	°C min^{-1}
6. Intercept of line 2, b_2	40.395	°C

CALCULATIONS

	Unrounded Value	Rounded Value	Unit
7.8. T_f'	39.5671	39.6	°C
9,10. ΔT_f	3.53290	3.5	°C
11,12. Molar mass of unknown	168.023	1.7×10^2	g mol^{-1}

Choose molar mass closest to your value: 152.2 g mol^{-1}

ERROR

	Unrounded Value	Rounded Value
13,14. % Error, molar mass	10.3962	1.0×10^1

The molar mass of the unknown ID you used is actually 128.2 g mol^{-1}

YOUR PROGRESS ON FREEZING POINT OF SOLUTION OF (LAURIC ACID + UNKNOWN)

CORRECT	POINTS AWARDED	AUTOSOLVED	NOT FINISHED
17 / 17	53 / 53	0 / 17	0 / 23

PART C. ADDITIONAL QUESTION

The molar mass of α-linolenic acid is 278.43 g mol^{-1}

If 0.207 g of *mass*$_4$ (α-linolenic acid) is disolved in 2.628 g of *mass*$_3$ (lauric acid), calculate the expected freezing point of the solution.

	Unrounded Value	Rounded Value
15,16. T_f'	41.9967	42.0

YOUR PROGRESS ON THE ADDITIONAL QUESTION

CORRECT	POINTS AWARDED	AUTOSOLVED	NOT FINISHED
2 / 2	8 / 10	0 / 2	0 / 2

YOUR OVERALL PROGRESS