Worksheet 6: 2D Kinematics

Name: _____ **Due October 16, 2024**

Partner: _____ Pencil only: use of Pen is forbidden.

As usual, turn your Excel document into the Google drive, with all three plots. The plots should use the template, AND have proper axis labels, rational sig-figs on the axes, labels, a good trendline, etc.
Remember that answers to the discussion questions are to be based on numbers, not guesses.

- Record $\theta_{0\text{-direct}}$ found using the protractor/plumb-bob.
- Find a linear fit ($x = c_1 t_{\text{orig}} + c_2$) for your x vs t_{orig} graph.
- Compute t_{offset} using c_1 and c_2.
- Make a new column for $t_{\text{true}} = t_{\text{orig}} + t_{\text{offset}}$.
- Find a linear fit ($x = c_3 t_{\text{true}} + c_4$) for your x vs t_{true} graph.
- Find a parabolic fit ($y = c_5 t^2_{\text{true}} + c_6 t_{\text{true}} + c_7$) for your y vs t_{true} graph.
- Using your c values, determine v_{0x}, v_{0y}, and a_y.
- Using your values for v_{0x} and v_{0y} to determine θ_0.

On the quiz, we didn't even bother to find c_3 or c_4. Based only on your values for c_1, c_2, c_3, and c_4, explain why we skipped that step.

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Quantity	Result
$\theta_{0\text{-direct}}$ (°)	±
c_1 (cm/s)	±
c_2 (cm)	±
t_{offset} (s)	±
c_3 (cm/s)	±
c_4 (cm)	±
c_5 (cm/s^2)	±
c_6 (cm/s)	±
c_7 (cm)	±
$v_x = v_{0x}$ (cm/s)	±
v_{0y} (cm/s)	±
a_y (cm/s^2)	±
$\theta_{0\text{-calc}}$ (°)	±

You expected that $a_y = -g$. Discuss the level of agreement of your result with this expectation.

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Discuss the level of agreement of your two values for θ_0.

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