General Physics I Laboratory, Section 7 Due September 11, 2024
Dr. Pogo

Quiz #2

Name:_____

For a single run of a cart on an inclined air track, you have made 96 measurements of position vs time. The units of position were in cm, and the units of time were in seconds. You've already entered the data into Excel and used `Linest` to determine the best fit parabola. Here is a screen shot of the results:

x vx. *t*	*a*	*b*	*c*
value:	24.99265	1.013058	-0.00382
uncert:	0.006669	0.014815	0.006893

1. What was the position of the cart when the time was $t = 0$? _____ cm

2. What was the corresponding uncertainty of the initial position? ± _____ cm

3. What was the velocity of the cart when the time was $t = 0$? _____ cm/s

4. What was the uncertainty of the initial velocity? ± _____ cm/s

5. What was the acceleration of the cart during this experiment? _____ cm/s^2
   Hint: see 4a on page 9 of the lab manual!

6. What is the corresponding uncertainty in the acceleration? ± _____ cm/s^2

7. This question won't use any of the linest results… it's a fresh start. Prior to the experiment, you measured that $\theta = (3.20 \pm 0.30)°$. Using this measurement, and knowing that $g \approx 980$ cm/s^2, determine the expected acceleration of the cart (see page 10) _____ cm/s^2

8. To determine the uncertainty associated with question #7, we use $\Delta a = |g\, \Delta\theta \cos\theta|$, where $\Delta\theta$ MUST be in radians. First convert $\Delta\theta$ to radians: $\Delta\theta =$ _____ rad

9. Now, determine Δa based on only the initial angle measurement given in question #7.
   $\Delta a = \pm$ _____ cm/s^2

10. Questions (5 with 6) and (7 with 9) represent two conclusions about the same quantity. Compare the quality and the level of agreement of these two results:

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