

Name: \_\_\_\_\_

Period: \_\_\_\_\_

IB Data Lab Practice: Practice with Max/Min Slopes Graphing (Page 11 IB Study Guide: Problem 9)

1. An object rolls from rest down an incline plane. The distance traveled by the object was measured at seven different times. A graph was constructed of the distance traveled against the time taken squared with error bars.

**Note:** Distance was measured to have an error of  $\pm 0.5$  cm

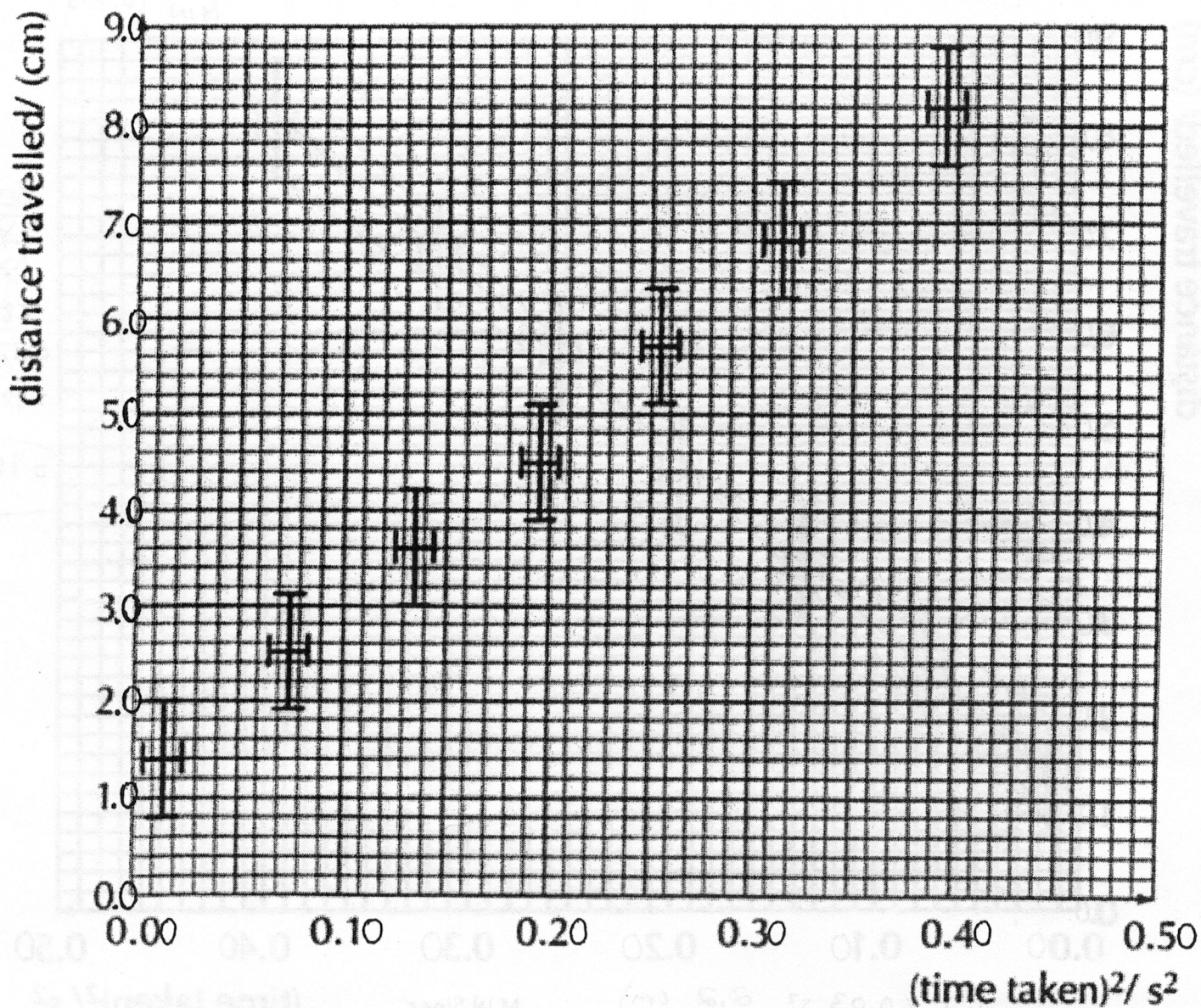
Time squared was determined to have an error of  $\pm 0.01$  sec<sup>2</sup>

Your calculations should reflect the correct number of significant digits in the data.

Add a best fit line, and determine its slope to the correct number of significant digits (remember the rules we covered earlier about this)

Add a maximum slope line, and determine its slope

Add a minimum slope line, and determine its slope



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$$3.6 \pm 0.5 \text{ cm}$$

2 sig Figs

all siges should have

$$0.13 \pm 0.01 \text{ s}^2$$

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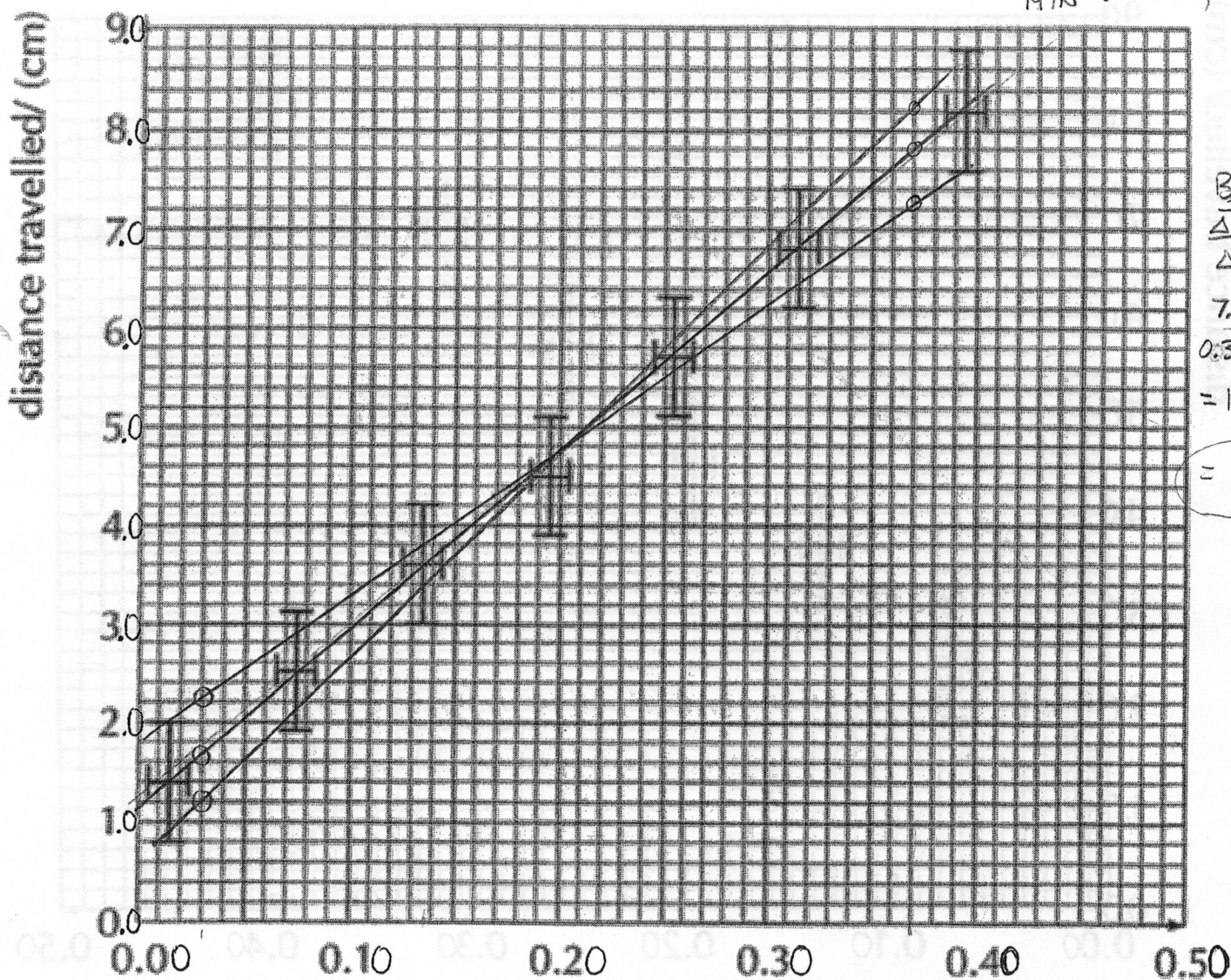
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$$\text{MAX } (0.37 \text{ s}^2, 8.2 \text{ cm})$$

$$\text{BEST } (0.37 \text{ s}^2, 7.8 \text{ cm})$$

$$\text{MIN } (0.37 \text{ s}^2, 7.3 \text{ cm})$$



Best Fit

$$\frac{\Delta y}{\Delta x} =$$

$$\frac{7.8 - 1.6 \text{ cm}}{0.37 - 0.03 \text{ s}^2}$$

$$= 18.25 \frac{\text{cm}}{\text{s}^2}$$

$$= 18 \frac{\text{cm}}{\text{s}^2}$$

$$\text{MIN } (0.03 \text{ s}^2, 2.2 \text{ cm})$$

$$\text{BEST } (0.03 \text{ s}^2, 1.6 \text{ cm})$$

$$\text{MAX } (0.03 \text{ s}^2, 1.2 \text{ cm})$$

$$18 \frac{\text{cm}}{\text{s}^2} \pm 3 \frac{\text{cm}}{\text{s}^2}$$

MIN Slope

$$\frac{\Delta y}{\Delta x} = \frac{7.3 - 2.2 \text{ cm}}{0.37 - 0.03 \text{ s}^2} = 15 \frac{\text{cm}}{\text{s}^2}$$

(time taken)<sup>2</sup>/s<sup>2</sup>

MAX Slope

$$\frac{\Delta y}{\Delta x} = \frac{8.2 - 1.2 \text{ cm}}{0.37 - 0.03 \text{ s}^2} = 20 \frac{\text{cm}}{\text{s}^2}$$