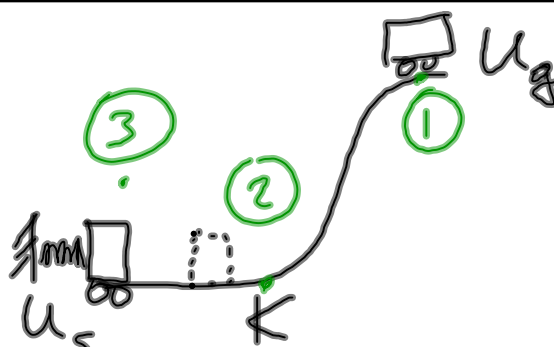


## Test 4 Scoring Guide.

| Points | AP Score |
|--------|----------|
| 0-2    | 1        |
| 3-6    | 2        |
| 7-10   | 3        |
| 11-14  | 3.5      |
| 15-20  | 4        |
| 21-35  | 5        |

Jan 16-7:46 AM

MC12



$$U_g = K = U_s$$

$$mgh = \frac{1}{2}mv_1^2 = \frac{1}{2}kx_1^2$$

Jan 16-8:13 AM

Con E ②-③

$$K_2 = U_{s3}$$

$$\frac{1}{2} m \underline{V_2^2} = \frac{1}{2} k x^2$$

WE NEED TO KNOW  $V_2$  IN ORDER TO COMPARE  $x_A$  &  $x_B$ .

TO GET  $V_2$  WE DO Con E ①-②

$$U_{g1} = K_2$$

$$mgh = \frac{1}{2} m V_2^2$$

$V_2$   
IT DOES NOT  
DEPEND ON  
MASS!

SO  $V_{2A} = V_{2B}!!!$

Jan 16-11:47 AM

$$\cancel{\frac{1}{2}} m_A V_2^2 = \cancel{\frac{1}{2}} k x_A^2$$

$$x_A^2 = \frac{m_A V_2^2}{k}$$

$$x_B^2 = \frac{m_B V_2^2}{k}$$

$$m_A = 2m_B!$$

$$\frac{x_A^2}{x_B^2} = \frac{\cancel{2} m_B \cancel{V_2^2}}{\cancel{m_B} \cancel{V_2^2} / \cancel{k}}$$

$$\frac{x_A^2}{x_B^2} = 2, \text{ so}$$

$x_A = \sqrt{2} x_B$



$$\frac{x_A}{x_B} = \sqrt{2}, \text{ so}$$

Jan 16-11:50 AM

Linearization HW problem.

GLIDER PROBLEM.

a)

$$U_s = K$$

$$\frac{1}{2} k x^2 = \frac{1}{2} m v^2$$

$$\frac{1}{2} (40) x^2 = \frac{1}{2} m v^2$$

$$20 x^2 = \frac{1}{2} m v^2$$

$x$  IS SET, SO IT'S AN INDEPENDENT VAR.

$v$  IS MEASURED, SO IT'S A DEPEND. VAR.

Jan 16-11:54 AM

SO EQUATION TYPE IS :

$$y = (\text{slope}) x$$

BUT IN OUR CASE :

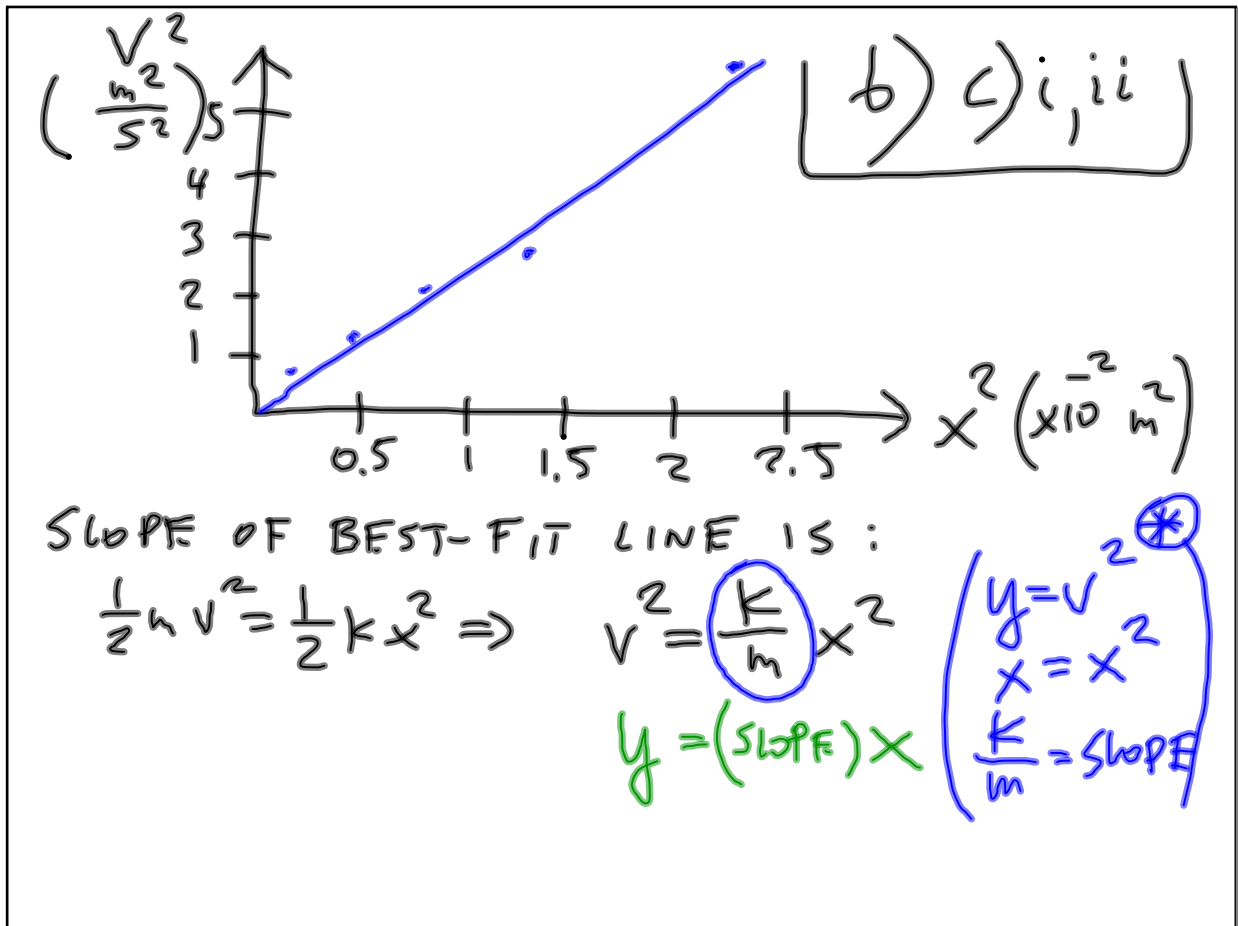
$$20 x^2 = \frac{1}{2} m y^2$$

TO MAKE THE GRAPH TO BE A STRAIGHT LINE,

$x$  AND  $y$  HAVE TO BE IN 1<sup>ST</sup> POWER.

SO WE NEED TO GRAPH  $\boxed{v^2}$  VS.  $\boxed{x^2}$

Jan 16-11:59 AM



Jan 16-12:02 PM

$$\text{SLOPE} = \frac{k}{m} \quad (\text{SLOPE} = 2.0 \times 10^2 \text{ s}^{-2})$$

$$2.0 \times 10^2 = \frac{k}{m} \Rightarrow m = \frac{k}{2.0 \times 10^2}$$

$$m = 0.20 \text{ kg}$$

RANGE:  
 0.18 - 0.22

Jan 16-12:08 PM

d) i  $U_s + U_g = K$

$$\frac{1}{2} k x^2 + mg(h + x \sin \theta) = \frac{1}{2} m v^2$$

d) ii NO

Expl.  $v^2$  VARIES WITH BOTH  
 $x^2$  AND  $x$

Jan 16-12:10 PM