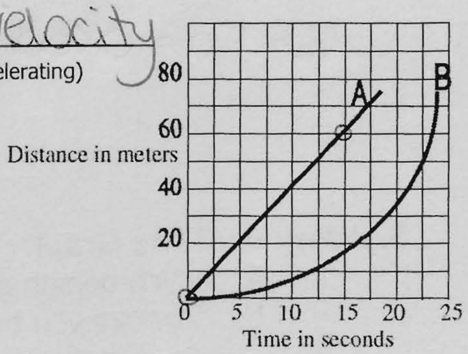
Graphing Relationships – Regents Review

Name: Key

1.) Distance vs. Time Graph

a. Describe the motion of Car A: constant velocity
(constant velocity / accelerating)



b. Determine the slope of Car A (include units!):

$\frac{\Delta y}{\Delta x} = \frac{60m}{15s} = 4 m/s$

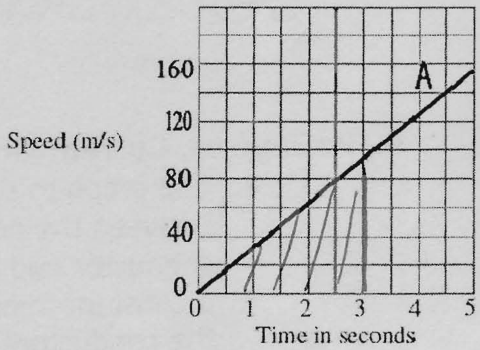
c. What does the slope represent? Look at the units!

Speed/velocity

d. Describe the motion of Car B: accelerating
(constant velocity / accelerating)

2.) Velocity vs. Time Graph

a. Determine the area under the curve between ~~1~~0.0 second and 3.0 seconds (include units!):



$\bar{v}t = \frac{1}{2}bh = \frac{1}{2}(100 m/s)(3s)$

$d = 150m$

b. What does the area represent? Look at the units!

distance

c. Determine the slope between 1.0 second and 5.0 seconds (include units!):

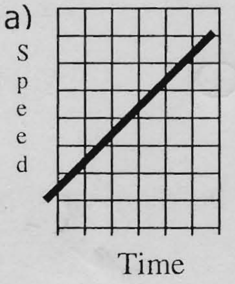
$\frac{\Delta y}{\Delta x} = \frac{140 m/s}{4.5s} = 31 m/s^2$

d. What does the slope represent? Look at the units! acceleration

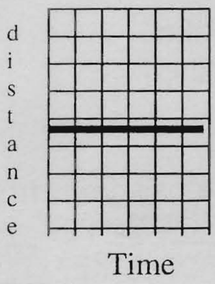
3.) Label each of the graphs below with the following labels. You may use some more than once or not at all.

(1) Constant Speed
(2) Constant Acceleration
(3) Not Moving
(4) Acceleration (not constant)

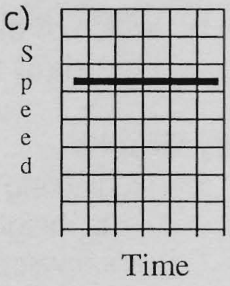
2 a)



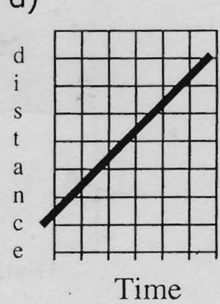
3 b)



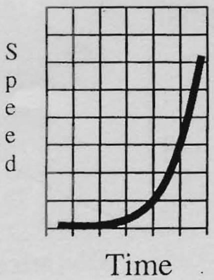
1 c)



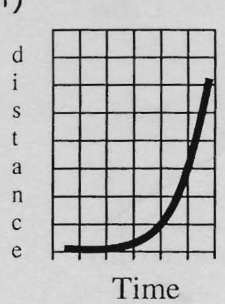
1 d)



4 e)



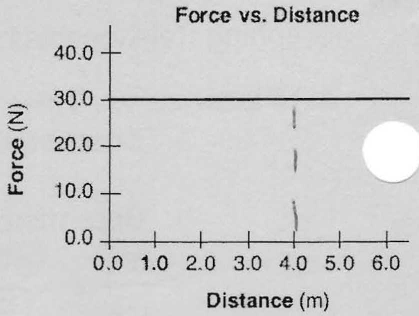
2 f)



4.) Force vs. Distance Graph

a. Determine the Work done as the box is pushed 4.0 m

$W = Fd = \text{area} = (30N)(4m) = 120J$


Force vs. Distance

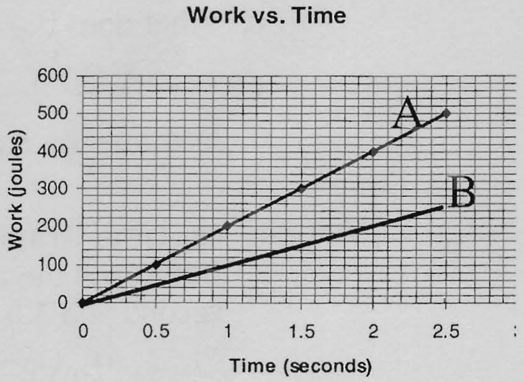
5.) Work vs. Time Graph

a. Which person generated more power? A

b. How can you tell?

Slope $\left(\frac{J}{s}\right)$ gives us power

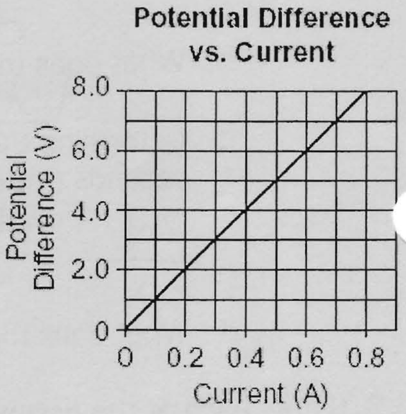
Steeper slope = more power


Work vs. Time

6.) Voltage vs. Current Graph

a. The graph to the right represents the relationship between the potential difference across a metal conductor and the current through the conductor at a constant temperature. What is the resistance of the conductor?

$R = \frac{V}{I} = \text{Slope} = \frac{8V}{0.8A} = 10\Omega$

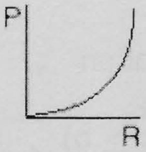

Potential Difference vs. Current

7.) Power vs. Resistance Graph

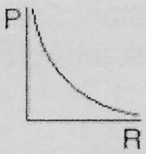
a. What is the equation that relates resistance and power?

$P = \frac{V^2}{R}$

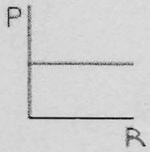
b. Which of the graphs to the right show this relationship?



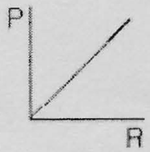
(1)



[✓ (2)]



(3)

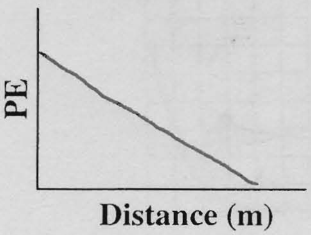


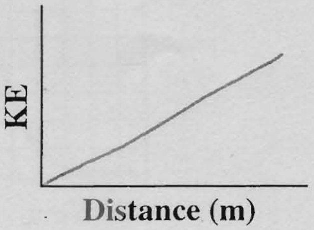
(4)

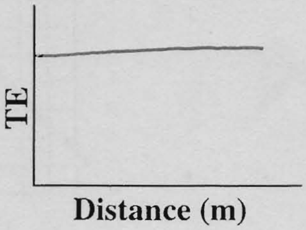
8.) Energy Graphs

a. Neglecting friction, as a ball drops from a 10 m high building, what happens to its
   i. height? decreases PE? decreases
   ii. velocity? increases KE? increases
   iii. total mechanical energy? constant

b. Draw the following graphs:



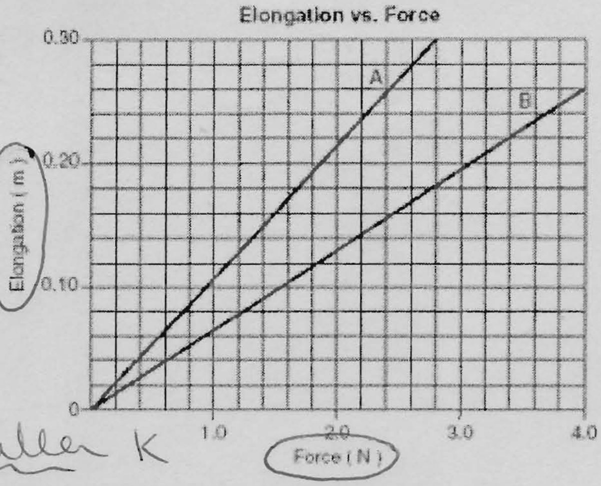




9.) Hooke's law

a. The graph to the right shows elongation as a function of the applied force for two springs, *A* and *B.* Compared to the spring constant for spring *A*, the spring constant for spring *B* is

(1) Smaller
[✓ (2) Larger]
(3) The same



$K = \frac{F}{X}$

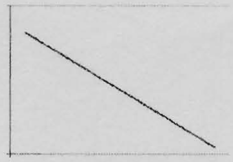
$\frac{1}{K} = \frac{X}{F}$

greater slope = smaller K

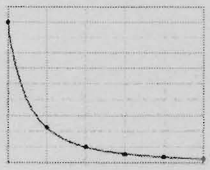
10.) Graphs and Relationships

Identify the graph that shows the relationship between the graphed quantities to be…

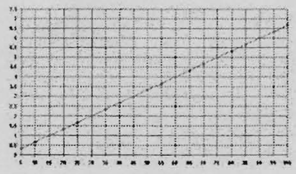
a. Direct	b. Inverse	c. Direct squared	d. Inverse Squared
Y	W	Z	X



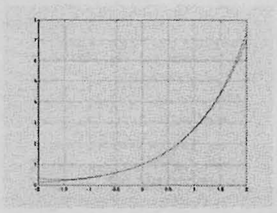
Graph W



Graph X



Graph Y



Graph Z

Which graph would be appropriate to describe the relationship between… (some may be used more than once)

a. V and I in the V = IR equation. direct (Y)

b. I and R in the V = IR equation. inverse (W)

c. D and t in the D = ½ at^2 equation. direct squared (Z)

d. F_G and r in the $F_G = Gm_1m_2/r^2$ equation. inverse squared (X)

e. PE and x in the PE = ½ kx^2 equation. direct squared (Z)

f. F_E and r in the $F_E = kq_1q_2/r^2$ equation. inverse squared (X)

g. λ and f in the v = λf equation. inverse (W)

h. E and f in E = hf equation. direct (Y)

Identify any connections between what the equation looks like and the type of graph that matches it:

V = IR
E = hf
↑ ↑
direct! opposite sides of the equation

V = IR
V = λf
↑↓
inverse! Same side of the equation

$d = \frac{1}{2}at^{\textcircled{2}}$ $PE = \frac{1}{2}kx^{\textcircled{2}}$
direct squared!
* square*

$F_g = \frac{Gmm}{\textcircled{r^2}}$ $F_E = \frac{kqq}{\textcircled{r^2}}$
inverse squared!
square, bottom of fraction