1. *Prepare these numbers for conversion.*

A. *Ex.* 12 in	B. 6 m/sec	C. 4 sec	D. 19 mph	E. 3.7 meters
$\frac{12\text{ in}}{1}$	$\frac{6\text{ m}}{1\text{ s}}$	$\frac{4\text{ s}}{1}$	$\frac{19\text{ m}}{1\text{ hr}}$	$\frac{3.7\text{ m}}{1}$

2. *Find the mistakes in each of the following and write a corrected version underneath.*

A. $\frac{4\text{ mph}}{1\text{ hr}}\left(\frac{5{,}280\text{ ft}}{1\text{ mi}}\right)$

$\frac{4\text{ m}}{1\text{ hr}} \mid \frac{5280\text{ ft}}{1\text{ m}}$

B. $\frac{52.2\text{ m}}{1\text{ sec}}\left(\frac{1\text{ min}}{60\text{ sec}}\right)$

$\frac{52.2\text{ m}}{1\text{ sec}} \mid \frac{60\text{ sec}}{1\text{ min}}$

C. $\frac{82\text{ years}}{1}\left(\frac{320\text{ days}}{1\text{ year}}\right)$

$\frac{82\text{ yr}}{1} \mid \frac{365\text{ day}}{1\text{ yr}}$

D. $42\text{ in}\left(\frac{1\text{ ft}}{12\text{ in}}\right)$

$\frac{42\text{ in}}{1} \mid \frac{1\text{ ft}}{12\text{ in}}$

$\frac{m}{hr}$

3. *Perform the following functions (do the math).*

A. $\frac{2}{1}\left(\frac{4}{3}\right) = \frac{8}{1} = 8$

B. $\left(\frac{\text{km}}{1}\right)\left(\frac{\text{km}}{1}\right) = \frac{\text{km}^2}{1}$

C. $\left(\frac{\text{km}}{1}\right)\left(\frac{1}{\text{km}}\right) = \frac{1}{1}$

D. $\left(\frac{\text{m}}{\text{sec}}\right)\left(\frac{\text{sec}}{\text{min}}\right) = \frac{\text{m}}{\text{min}}$

E. $\frac{16\text{ m}}{1\text{ sec}}\left(\frac{1\text{ m}}{3.3\text{ ft}}\right) = \frac{16\text{ m}}{1\text{ sec}} \mid \frac{3.3\text{ ft}}{1\text{ m}} = \frac{52.8\text{ ft}}{\text{sec}}$

F. $\frac{220\text{ sec}}{1}\left(\frac{1\text{ min}}{60\text{ sec}}\right) = 3.7\text{ min}$

4. *Do the following conversions. Given: 1 in = 2.54 cm; 3.3 ft = 1 m; 12 in = 1 ft; 5,280 ft = 1 mi (mile)*

A. Convert 3.5 miles to feet

$\frac{3.5\text{ mi}}{1} \mid \frac{5280\text{ ft}}{1\text{ mi}} = 18{,}480\text{ ft}$

B. Convert 6 ft to meters

$\frac{6\text{ ft}}{3.3\text{ ft}} \mid \frac{1\text{ m}}{} = 1.82\text{ m}$

C. Convert 2.5 weeks to days

$\frac{2.5\text{ w}}{1\text{ w}} \mid \frac{7\text{ d}}{} = 17.5\text{ day}$

D. Convert 2500 seconds to minutes

$\frac{2500\text{ sec}}{60\text{ sec}} \mid \frac{1\text{ min}}{} = 41.7\text{ min}$

E. Convert 18 m/sec to m/min

$\frac{18\text{ m}}{\text{sec}} \mid \frac{60\text{ sec}}{1\text{ min}} \quad \frac{1080\text{ m}}{\text{min}}$

F. Convert 60 mph (miles) to m/hr (meters)

$\frac{60\text{ mi}}{\text{hr}} \mid \frac{5280\text{ ft}}{1\text{ mi}} \mid \frac{1\text{ m}}{3.3\text{ ft}} =$

96000 m/hr

5. Convert 120 m/min to m/hour.

$\frac{120\text{ m}}{\text{min}} \mid \frac{60\text{ min}}{1\text{ hr}} = \frac{7200\text{ m}}{\text{hr}}$

6. There are 1,000,000 micrometers (μm) per meter. How many meters is 48,000 μm?

$\frac{48000\text{ μm}}{1{,}000{,}000\text{ μm}} \mid \frac{1\text{ m}}{} = 0.048\text{ m}$

7. A. Convert 15 in/min to feet per min

$\frac{15\text{ in}}{\text{min}} \mid \frac{1\text{ ft}}{12\text{ in}} = 1.25\ \frac{\text{ft}}{\text{min}}$

B. Using the above answer, convert to feet per second.

$\frac{1.25\text{ ft}}{\text{min}} \mid \frac{1\text{ min}}{60\text{ sec}} = 0.02\ \frac{\text{ft}}{\text{sec}}$

8. A. Convert 540 cm/min to cm/sec

$\frac{540\text{ m}}{\text{s}} \mid \frac{100\text{ cm}}{1\text{ m}} = \frac{54{,}000\text{ cm}}{\text{s}}$

B. Convert to inches per second.

$\frac{5400\text{ m}}{\text{s}} \mid \frac{3.3\text{ ft}}{1\text{ m}} \mid \frac{12\text{ in}}{1\text{ ft}} = 21{,}384\ \text{in/s}$

9. Convert 12 mph (miles) to m/s (meters).

$\frac{12\text{ mi}}{\text{hr}} \mid \frac{5280\text{ ft}}{1\text{ mi}} \mid \frac{1\text{ m}}{3.3\text{ ft}} \mid \frac{1\text{ hr}}{60\text{ min}} \mid \frac{1\text{ min}}{60\text{ sec}}$

5.3 m/sec

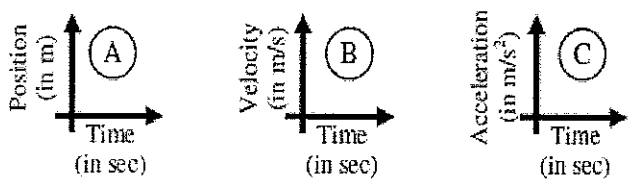
Key

1. m, b, x, or y?

A. y vertical axis.	F. b Gives initial condition.
B. m Slope	G. x Independent variable
C. b y-intercept	H. m Rate of change of y.
D. x horizontal axis	I. m, b Are constants.
E. y Dependent variable.	J. x, y Are variables.

2. Write the equation for slope. $m = \frac{\Delta y}{\Delta x}$

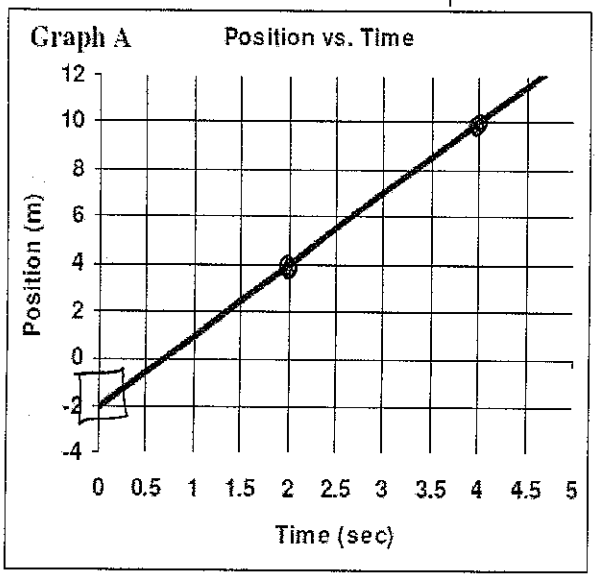
3. Write the equation that defines a line. $y = mx + b$

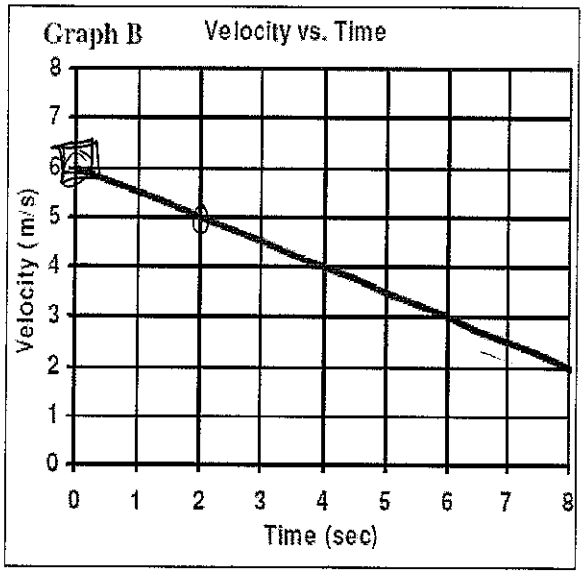


4. Use the graphs above to answer the following.
   A. What is the y variable for graph C? acceleration
   B. What is the x variable for graph B? Time
   C. What is y for graph A? Position
   D. What is x for graph B? Time
   E. In the linear equation what is y for graph B? Velocity

5. Use the two graphs *below* to answer the following questions.
   A. What is the y variable for Graph B? Velocity
   B. What is the x variable for Graph A? Time
   C. What is the y-intercept for Graph A? -2
   D. What is the y-intercept for Graph B? 6
   E. Over time, what changes in Graph A? Position
   F. So, what does the slope of Graph A show? Speed
   G. Over time what changes in Graph B? velocity
   H. So, what does the slope of Graph B show? acceleration

$y = 1, \frac{6}{2} = 3$





$\frac{-1}{2} = -.5$

6. Use Graph A above to answer the following questions.
   A. On the above graph, calculate the line's slope. 3
   B. Put a square around the y-intercept.
   C. Write the linear equation variables for this line:

      m = 3
      b = -2
      y = Position
      x = Time

   D. Write the linear equation for this line: Position = 3t + -2

   E. Meters would go into what part of this linear equation? y

   F. At what time will the object be at 15 meters?

      $15m = 3t - 2$ $\quad \frac{17m}{3} = \frac{3t}{3}$ $\quad t = 5.7\,sec$

   G. What is the initial position of the object? -2m

7. Use Graph B above to answer the following questions.
   A. On the above graph, calculate the line's slope. -.5
   B. Put a square around the y-intercept.
   C. Write the linear equation variables for this line:

      m = -.5
      b = 6
      y = V
      x = t

   D. Write the linear equation for this line: $y = mx + b$

      $V = -.5t + 6$

   E. Seconds would go into what part of this linear equation? x

   F. How fast is the object going after 10.5 seconds?

      $V = -.5(10.5) + 6$ $\quad 0.75\,m/s$

   G. What is the initial velocity of the object? 6m/s