



# P20 Unit 0 Assignment Pt B: Algebra and Trig Review

Pt. A: Solve for the given variable. Show your work, including units and significant digits. (1 mark each)

1)  $\vec{v} = \frac{\vec{d}}{t}$

A

$\vec{v} = 13 \text{ m/s}$

$t = 4.5 \text{ s}$

$\vec{d} = ?$

$13 \text{ m/s} = \frac{\vec{d}}{4.5 \text{ s}} \times 4.5 \text{ s}$

$\frac{13 \text{ m}}{1} \times 4.5 \text{ s} = \vec{d} = 58.5 \text{ m} = \underline{\underline{59 \text{ m}}}$

2)  $\vec{F} = m\vec{a}$

$\vec{F} = 12 \text{ N}$

$m = 4.5 \text{ kg}$

$\vec{a} = ?$

$12 \text{ N} = (4.5 \text{ kg})\vec{a} = \frac{12 \text{ N}}{4.5 \text{ kg}} = 2.6 \text{ m/s}^2 = \underline{\underline{2.7 \text{ m/s}^2}}$

3)  $\vec{v}_{ave} = \frac{\vec{v}_f - \vec{v}_i}{2}$

$\vec{v}_{ave} = 5.0 \text{ m/s}$

$\vec{v}_i = 2.5 \text{ m/s}$

$\vec{v}_f = ?$

$5.0 \text{ m/s} = \frac{\vec{v}_f - 2.5 \text{ m/s}}{2}$

$10 \text{ m/s} = \vec{v}_f - 2.5 \text{ m/s} \Rightarrow \vec{v}_f = 12.5 \text{ m/s} = \underline{\underline{13 \text{ m/s}}}$

4)  $\vec{a} = \frac{\vec{v}}{t}$

$\vec{a} = 0.250 \text{ m/s}^2$

$\vec{v} = 35 \text{ m/s}$

$t = ?$

$0.250 \text{ m/s}^2 = \frac{35 \text{ m/s}}{t}$

$(t)(0.250 \text{ m/s}^2) = 35 \text{ m/s} \Rightarrow t = \frac{35 \text{ m/s}}{0.250 \text{ m/s}^2} = 140 \text{ s} = \underline{\underline{1.4 \times 10^2}}$

5)  $T = \frac{1}{f}$

$T = 50 \text{ s}$

$f = ? \text{ (Hz)}$

$50 \text{ s} = \frac{1}{f}$

$(f)(50 \text{ s}) = \frac{1}{50 \text{ s}}$

$f = 0.020 \text{ Hz}$

6/24/14

6)  $E_k = \frac{1}{2} m \vec{v}^2$

$E_k = 50.0 \text{ J}$   
 $m = 100 \text{ kg}$   
 $\vec{v} = ?$

$50 \text{ J} = \frac{1}{2} (100 \text{ kg}) \vec{v}^2 \quad \sqrt{1} = \sqrt{\vec{v}^2}$

$\frac{100 \text{ J}}{100 \text{ kg}} = \frac{(100 \text{ kg}) \vec{v}^2}{100 \text{ kg}} \quad \vec{v} = \underline{1.00 \text{ m/s}}$

7)  $\vec{a}_c = \frac{\vec{v}^2}{r}$

$\vec{a}_c = 215 \text{ m/s}^2$   
 $r = 0.450 \text{ m}$   
 $\vec{v} = ?$

$215 \text{ m/s}^2 = \frac{\vec{v}^2}{0.45 \text{ m}} \times 0.45 \text{ m}$

$\vec{v} = \underline{9.84 \text{ m/s}}$

$\sqrt{96.75} = \sqrt{\vec{v}^2}$

8)  $T = 2\pi \sqrt{\frac{m}{k}}$

$T = 60 \text{ s}$   
 $k = 15 \text{ N/m}$   
 $m = ? \text{ (kg)}$

$60 \text{ s} = 2\pi \sqrt{\frac{m}{15 \text{ N/m}}}$

$m = 1367.8$

$(9.5493)^2 = \left( \sqrt{\frac{m}{15 \text{ N/m}}} \right)^2$

$= \underline{1.3 \times 10^3 \text{ kg}}$

$91.1891 = \frac{m \times 15}{15}$

9)  $\vec{d} = \frac{(\vec{v}_f + \vec{v}_i)t}{2}$

$\vec{d} = 0.55 \text{ m}$   
 $\vec{v}_f = 0.40 \text{ m/s}$   
 $t = 9.0 \text{ s}$   
 $\vec{v}_i = ?$

$0.55 \text{ m} = \frac{(0.40 \text{ m/s} + \vec{v}_i)(9 \text{ s})}{2}$

$0.1222 = 0.4 + \vec{v}_i$

$\underline{-0.28 \text{ m/s} = \vec{v}_i}$

$\frac{1.1}{9} = \frac{(0.4 \text{ m/s} + \vec{v}_i)(9 \text{ s})}{9}$

10)  $\vec{d} = \vec{v}_i t + \frac{1}{2} \vec{a} t^2$

$\vec{d} = -14 \text{ m}$   
 $\vec{v}_i = 3.5 \text{ m/s}$   
 $t = 12.0 \text{ s}$   
 $\vec{a} = ?$

$-14 \text{ m} = (3.5 \text{ m/s})(12 \text{ s}) + \frac{1}{2} \vec{a} (12 \text{ s})^2$

$-14 = 42 + \frac{1}{2} \vec{a} (144)$

$-28 = 84 + \vec{a} (144)$

$-112 = \vec{a} (144)$

$\vec{a} = \underline{-0.78 \text{ m/s}^2}$

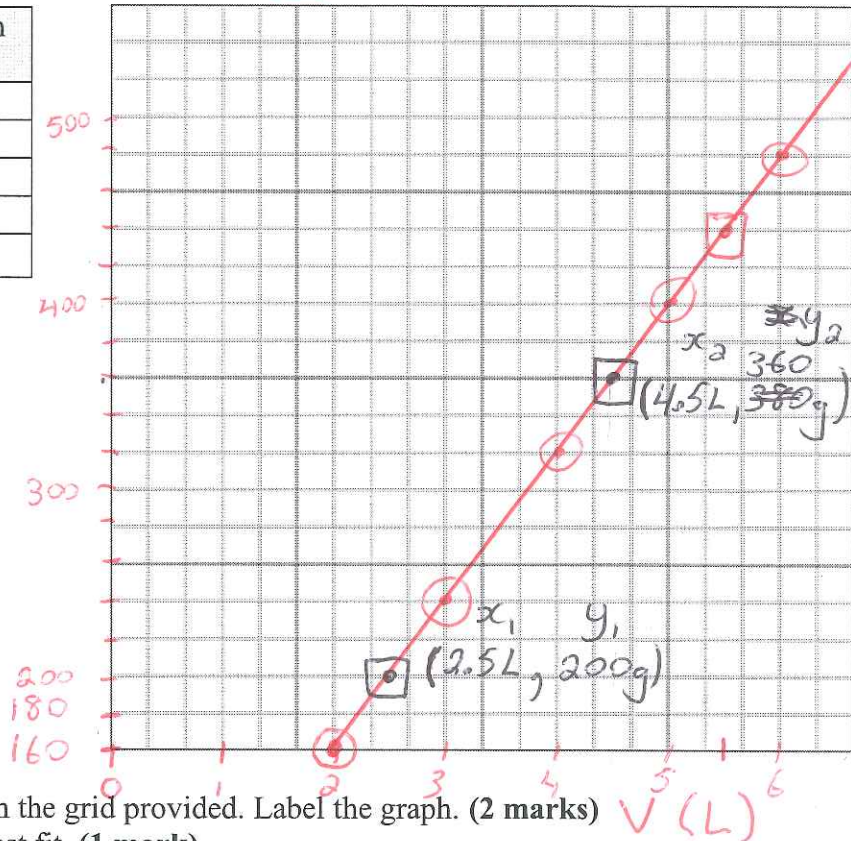
6/24/14

Pt. B: Graphing –the following data showing the amount of mass LD gains vs. the volume of pizza pops he eats:

$x$                        $y$

Pizza Pop Intake (L)	Mass gain (g)
2	160
3	240
4	320
5	400
6	480

7                      560  
8                      640  
                            mass  
                            (g)



- a) Graph the data on the grid provided. Label the graph. (2 marks)  
b) Make a line of best fit. (1 mark)  
c) Interpolate how much mass would be gained if LD ate 5.5 L of Pizza Pops. (1 mark)

440g

- d) Extrapolate how much mass would be gained if LD ate 8 L of Pizza Pops. (1 mark)

640g

- e) Calculate the slope of the line and determine what it means. (2 marks)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{360g - 200g}{4.5L - 2.5L} = \frac{160g}{2L} = \frac{80g}{1L}$$

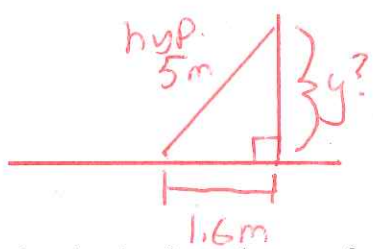
for every 1 L of pizza pops  
ate, LD gains 80g.



6/24/14

Pt. C: Show all work, including a diagram, to receive full marks.

1. If the bottom of a 5.0 m ladder is 1.6 m from a wall, how high on the wall does it reach? (1 mark)



$$a^2 + b^2 = c^2 \leftarrow \text{hyp.}$$

$$(1.6\text{m})^2 + b^2 = (5\text{m})^2$$

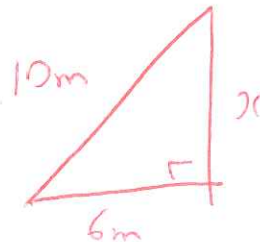
$$2.56\text{m}^2 + b^2 = 25\text{m}^2$$

$$-2.56\text{m}^2 \quad -2.56\text{m}^2$$

$$\sqrt{b^2} = \sqrt{22.44\text{m}^2}$$

$$b = \underline{\underline{4.7\text{m}}}$$

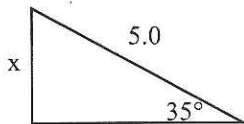
2. A wire from the top of a telephone pole to a point on the ground 6.0 m from the pole is 10 m long. How high is the pole? (1 mark)



$$x = \sqrt{10\text{m}^2 - 6\text{m}^2}$$

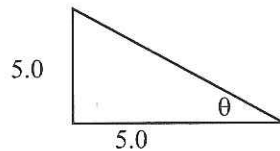
$$= \underline{\underline{8\text{m}}}$$

3. Using trigonometric ratios not the Pythagorean theorem) solve for  $\theta$  or the identified variable ( $x$  or  $\theta$ ) for the following right triangles. (1 mark each)



$$\sin 35^\circ = \frac{x}{5}$$

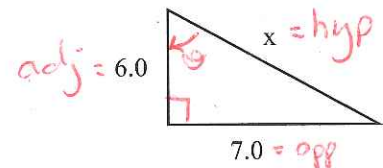
$$x = \underline{\underline{2.9}}$$



$$\tan \theta = \frac{5}{5}$$

$$\theta = \tan^{-1}\left(\frac{5}{5}\right)$$

$$= \underline{\underline{45^\circ}}$$



$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan \theta = \frac{7.0}{6.0}$$

$$\theta = 49^\circ$$

$$\cos(49^\circ) = \frac{6}{x}$$

$$x = \frac{6}{\cos 49^\circ} = \underline{\underline{9.1}}$$

Bonus Questions: Answer only ONE!!!

Fair Bonus Question: Solve each equation from part A for the letter which comes first in the alphabet. Disregard any Greek symbols.

Unfair Bonus Question: Who is the American songwriter in the photo on the first page and what was his first album titled?

Randy Newman.