AP Physics 1 Summer Packet

You will need to complete and turn-in the "Summer Work" (numbered pages) on the first day of class.

AP Physics 1 Summer Work

Name _____ Period _____

The exercises below are a review of the prerequisite math skills that you need to succeed in AP Physics 1. Make sure to read all directions throughout the packet. All work must be completed on the pages below in the area provide. Final answers can be in terms of mathematical constants (π, e, i, etc.).

Your work must be legible and linear, and I must be able to follow it easily. Please no incoherent jumping around the page. Mark your final answers by either **circling** or **boxing** them.

Your completed summer work is due the first day of class.

Do not copy work from another student for your own integrity and for your own benefit. Use a math book or internet for reference. No physics is needed for this packet. If you have difficulty, please do not hesitate to email me at jrhody@lcscmail.com

Significant Figures and Scientific Notation Review

1.) How many significant figures do the following numbers have?

a.) 6.001 Answer: _____

b.) 0.0080 Answer: _____

c.) 206,000 Answer: _____

d.) 27.00 Answer: _____

e.) π Answer: _____

Directions: Find the following. Final answers should be in scientific notation with the correct number of significant figures.

2.) $(5.0\times10^{-8})(2.9\times10^{2})$

3.) $(3.25\times10^{4} + 7.4\times10^{3})$

4.) $6.000\times10^{-11}\dfrac{1.00\times10^{26}}{2.00\times10^{7}}$

5.) $\dfrac{8400}{1.2\times10^{7}}$

Unit Conversions Review

6.) Finish the SI prefix table below. Follow the example of the centi- prefix. You will need to memorize these.

Symbol	Name	Numerical Equivalent
n		
μ		
m		
c	centi	10^{-2}
k		
M		
G		

7.) 16.7 kilograms is how many grams?

8.) 560 nm is how many meters?

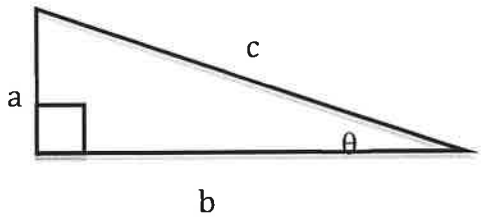
9.) 15 years is how many seconds?

10.) 8.99×10^{9} seconds is how many years?

11.) 2.998×10^{8} m/s is how many kilometers per hour?

Trigonometry Review

Directions: Use the figure below to answer problems 15-25. Simplify as much as you can.



12.) Find c if given a and b.

13.) Find a if given b and c.

14.) Find a if given c and θ.

15.) Find b if given a and θ.

16.) Find c if given b and θ.

17.) Find θ if given b and c.

18.) Find θ if given a and b.

19.) If $a = 2.0$ and $c = 7.0$, what is b?

20.) If $c = 10.0$ and $\theta = 60°$, what is b?

21.) If $a = 12.0$ and $\theta = 30°$, what is b?

22.) 360 degrees = _____ radians.

23.) 4.5 revolutions = _____ radians.

24.) Find the length of an arc with a radius of 6.0 m swept across 2.5 radians.

25.) Find the length of an arc with a radius of 10.0 m swept across 100 degrees.

Algebra Review

Directions: Solve the following equations for the given variable and conditions. Simplify if needed.

Example: $2x+xy=z$. Solve for x.

$$x(2+y)=z$$

$$\boxed{x=\frac{z}{2+y}}$$

26.) $v_1+v_2=0$. Solve for v_1.

27.) $a=\frac{v}{t}$. Solve for t.

28.) $v_f^{\,2}=v_i^{\,2}+2ad$

A.) Solve for v_i.

B.) Solve for d.

29.) $d_f = d_i + v_o t + \frac{1}{2} a t^2$

A.) Solve for v_o.

B.) Solve for t, if $v_o = 0$.

C.) Solve for t, if $d_i = d_f$.

30.) $F = m\frac{v_f - v_i}{t_f - t_i}$

A.) Solve for v_f, if $t_i = 0$.

B.) Solve for t_f, if $v_f = 0$ and $t_i = 0$.

31.) $a_c = \frac{v^2}{r}$. Solve for v.

32.) $mg\sin\theta = \mu mg\cos\theta$. Solve for θ.

33.) $\frac{1}{2}mv_f^2 + mgh_f = \frac{1}{2}mv_i^2 + mgh_i$

A.) Solve for h_f, if $h_i = 0$ and $v_f = 0$.

B.) Solve for v_f, if $h_f = 0$.

34.) $Ft = mv_f - mv_i$. Solve for v_f.

35.) $m_1v_{i,1} + m_2v_{i,2} = (m_1 + m_2)v_f$. Solve for $v_{i,2}$.

36.) $m_1v_{i,1} + m_2v_{i,2} = m_1v_{f,1} + m_2v_{f,2}$. Solve for $v_{f,2}$ if $v_{i,1} = 0$.

37.) $(F_1 \sin\theta)r_1 + (-F_2 \sin\phi)r_2 = 0$. Solve for r_2.

38.) $-kx + m(-g) = 0$. Solve for m.

39.) $F_g = G\frac{m_1m_2}{r^2}$. Solve for r.

40.) $L - L\cos\theta = \frac{v^2}{2}$ Solve for *L*.

41.) $\frac{mv^2}{R} = G\frac{Mm}{R^2}$. Solve for *v*.

42.) $T = 2\pi\sqrt{\frac{L}{g}}$. Solve for *g*.

43.) $\frac{1}{2}mv_f^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv_i^2 + mgh_i$. Solve for *x* if $v_f = 0$.

44.) $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$. Solve for R_T

Miscellaneous

Directions: Simplify without using a calculator. Remember to show all of your work.

45.) $\frac{1}{4} + \frac{1}{6}$

46.) $\frac{1}{3} + \frac{1}{18}$

47.) Consider $z = \frac{x}{y}$, $c = ab$, $l = m - n$, or $r = \frac{s^2}{t^2}$.

a.) As *x* increases and *y* stays constant, *z* _____.

b.) As *y* increases and *x* stays constant, *z* _____.

c.) As *x* increases and *z* stays constant, *y* _____.

d.) As *a* increases and *c* stays constant, *b* _____.

e.) As *c* increases and *b* stays constant, *a* _____.

f.) As *b* increases and *a* stays constant, *c* _____.

g.) As *n* increases and *m* stays constant, *l* _____.

h.) As *l* increases and *n* stays constant, *m* _____.

i.) If *s* is tripled and *t* stays constant, *r* is multiplied by _____.

j.) If *t* is doubled and *s* stays constant, *r* is multiplied by _____.

Systems of equations

Conceptual Question:

48.) How many equations are needed to solve...

a.) for 1 unknown variable? _____

b.) for 2 unknown variables? _____

c.) for 3 unknown variables? _____

Use the equations in each problem to solve for the specified variable in the given terms. Simplify.

49.) $F_f = \mu F_N$ and $F_N = mg\cos\theta$. Solve for μ in terms of F_f, m, g, and θ.

50.) $F_1 + F_2 = F_T$ and $F_1 \cdot d_1 = F_2 \cdot d_2$. Solve for F_1 in terms of F_T, d_1, and d_2.

51.) $F_c = ma_c$ and $a_c = \frac{v^2}{r}$. Solve for r in terms of F_c, m, and v.

52.) $T = 2\pi\sqrt{\frac{L}{g}}$ and $T = \frac{1}{f}$. Solve for L in terms of π, g, and f.