AP Physics Math Review

Name: _____

Significant Figures and Scientific Notation Review

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

a. 6.001 Answer: _____
b. 27.00 Answer: _____
c. 0.0080 Answer: _____
d. 206,000 Answer: _____

2. Complete the calculations and express answers in scientific notation with the correct number of significant figures.

a. $(5.00\times10^{-8})(2.5\times10^{3})$ =

b. $3.25\times10^{7} + 7.5\times10^{5}$ =

c. $(3.00\times10^{-6})/(5.00\times10^{-5})$ =

d.

$$6.000\times10^{11}\,\frac{1.00\times10^{26}}{2.00\times10^{7}}$$

Unit conversions using factor-labeling method (dimensional analysis):

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

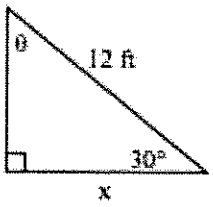
Symbol	Name	Numerical Equivalent
n		
μ		
m		
c	centi	10^{-2}
k		
M		
G		

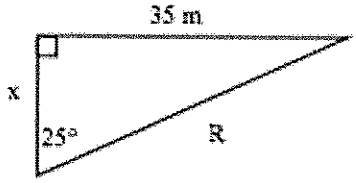
2. Perform the following unit conversions using factor-labeling:

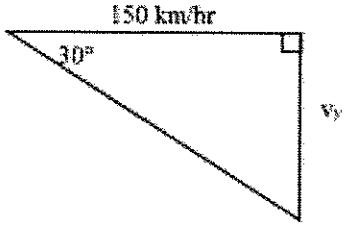
a. 16.7 kg = _____ g b. 560 nm = _____ m c. 3×10^{8} m/s = _____ km/h

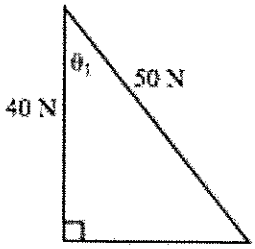
Right Triangle Trigonometry

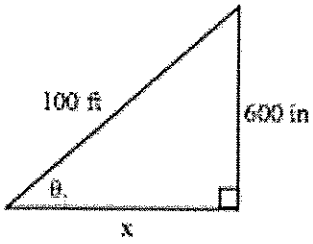
For each of the given right triangles, solve for all of the indicated quantities. Make sure your calculator is in mode. Be sure to include the correct units.

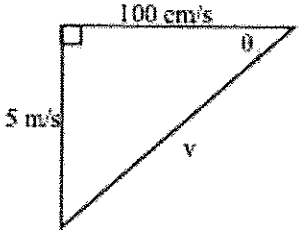


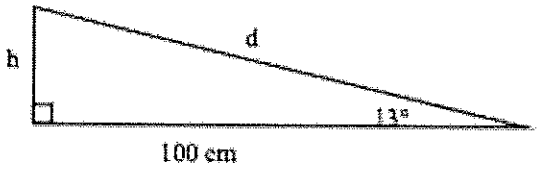


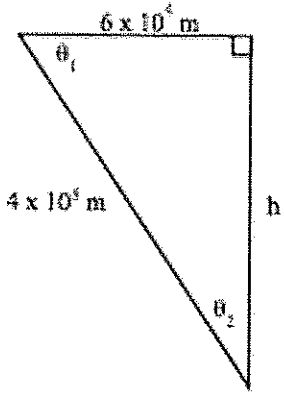












Substitution

For each of the following, substitute the indicated values and evaluate. Include the units in each step of your work and the answer.

1. $t = \sqrt{\frac{2y}{a}}$ (y = 800 m; a = 4 m/s^2)

2. $K = \frac{1}{2}mv^2$ (m = 4 x 10^3 kg; v = 2 x 10^5 m/s)

3. $T = 2\pi\sqrt{\frac{l}{g}}$ (l = 2.0 m; g = 10 m/s^2)

4. $F = m_1\left(a_1 - \left(\frac{m_2}{F_g} + a_2\right)4\right)$

(m_1 = 4 kg; m_2 = 5 kg; a_1 = 7 m/s^2; a_2 = 2.5 m/s^2; F_g = 5 kg·m/s^2)

5. $P = \frac{V^2}{R_1+R_2}$

(V = 200 V; R_1 = 80 Ω; R_2 = 20 Ω

6. $\mu = \frac{m_1 g + m_2 g}{(m_1+m_2)a}$

(m_1 = 2 kg; m_2 = 4 kg; g = 10 m/s^2; a = 5 m/s^2

7. $y = y_0 + v_0 t + \frac{1}{2}at^2$

(y_0 = -4 m; v_o = -5 m/s; a = 6 m/s^2; t = 4 s)

8. $a = \frac{m_1 g}{m_2} - \frac{m_2 g}{m_3}$

(m_1 = 5 kg, m_2 = 4 kg, m_3 = 12 kg; g = 10 m/s^2)

Solving Equations

Solve each equation symbolically for the indicated variable. Show all of your work.

1. $v = \frac{\Delta x}{\Delta t}$ (solve for Δt)

2. $y = y_0 + v_0 t + \frac{1}{2} a t^2$ (solve for **a**)

3. $F = ma$ (solve for **a**)

4. $F\Delta t = mv$ (solve for **v**)

5. $F_s = T - mg$ (solve for **m**)

6. $P = \frac{V^2}{R}$ (solve for **R**)

7. $K = \frac{1}{2} m v^2$ (solve for **v**)

8. $a_{cp} = \frac{v^2}{r}$ (solve for **v**)

9. $f = \frac{1}{T}$ (solve for **T**)

10. $T = 2\pi \sqrt{\frac{l}{g}}$ (solve for **l**)

11. $v^2 = v_0^2 + 2a(d - d_0)$ (solve for v_0)

12. $F_e = \frac{K q_a q_b}{r^2}$ (solve for **r**)

13.

$F_g = G\frac{m_1 m_2}{r^2}$ (solve for r)

14.

$T = 2\pi\sqrt{\frac{L}{g}}$ (solve for g)

15.

$\frac{1}{2}mv_f^2 + \frac{1}{2}kx^2 = \frac{1}{2}mv_i^2 + mgh_i$ (solve for x if $v_f = 0$)

16.

$\mathbf{1/R_T = 1/R_1 + 1/R_2}$ (solve for R_T)

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

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 _____.