

Significant Figures and Scientific Notation Review

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

a.) 6.001 Answer: _____ d.) 27.00 Answer: _____

b.) 0.0080 Answer: _____ e.) π Answer: _____

c.) 206,000 Answer: _____

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

2.) $(5.0 \times 10^{-8})(2.9 \times 10^2)$

3.) $(3.25 \times 10^4 + 7.4 \times 10^3)$

4.) $6.000 \times 10^{-11} \frac{1.00 \times 10^{26}}{2.00 \times 10^7}$

5.) $\frac{8400}{1.2 \times 10^7}$

6.) 16.7 kilograms is how many grams?

7.) 8.99 seconds is how many years?

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

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?

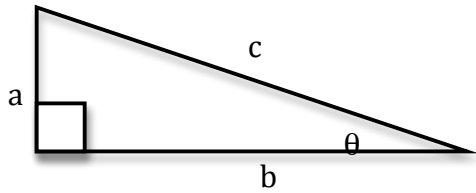
9.) 15 years is how many seconds?

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 9-14. Simplify as much as you can.



9.) Find c if given a and b .

10.) Find a if given c and θ .

11.) Find c if given b and θ .

12.) Find θ if given a and b .

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

14.) If $c = 10.0$ and $\theta = 60^\circ$, what is b ?

24.) Complete the table below without using a calculator.

θ	0°	30°	45°	60°	90°
$\sin \theta$					
$\cos \theta$					
$\tan \theta$					

25.) 360 degrees = _____ radians.

26.) 4.5 revolutions = _____ radians.

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

28.) 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 .

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

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

15.) $v_f^2 = v_i^2 + 2ad$ Solve for v_i .

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

A.) Solve for v_o .

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

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

$$33.) \quad F = m \frac{v_f - v_i}{t_f - t_i}$$

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

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

$$34.) \quad a_c = \frac{v^2}{r} \quad \text{Solve for } v.$$

$$35.) \quad mg \sin$$

$$36.) \quad \frac{1}{2}mv_f^2 + mgh_f = \frac{1}{2}mv_i^2 + mgh_i$$

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

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

$$37.) \quad Ft = mv_f - mv_i \quad \text{Solve for } v_f.$$

$$38.) \quad m_1v_{i,1} + m_2v_{i,2} = (m_1 + m_2)v_f \quad \text{Solve for } v_{i,2}.$$

$$39.) \quad m_1v_{i,1} + m_2v_{i,2} = m_1v_{f,1} + m_2v_{f,2} \quad \text{Solve for } v_{f,2} \text{ if } v_{i,1} = 0.$$

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

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

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

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

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

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

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

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

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 _____.

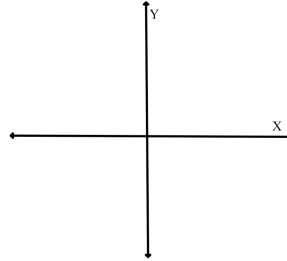
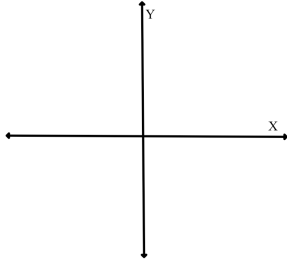
Graphing Equations

25.) If $r = c - x*t$ was graphed on an r vs. t graph, what would the following be?

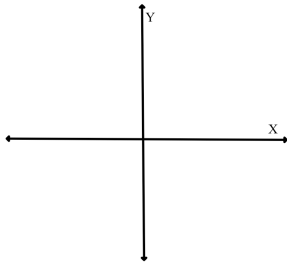
Slope: _____ y-intercept: _____

26.) On the y vs. x graphs below, sketch the relationships given.

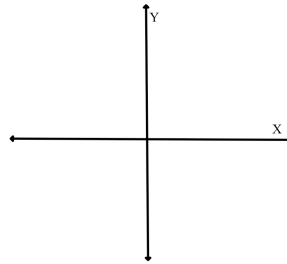
a.) $y = mx + b$, if $m > 0$ and $b = 0$. b.) $y = mx + b$, if $m < 0$ and $b > 0$.



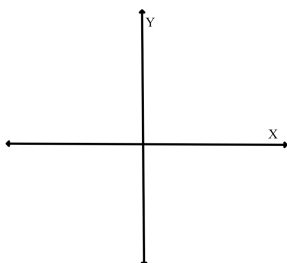
c.) $y = x^2$



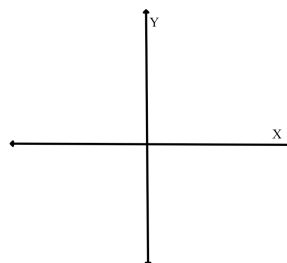
d.) $y = \sqrt{x}$



g.) $y = \sqrt{\frac{1}{x}}$



h.) $y = 1/x$



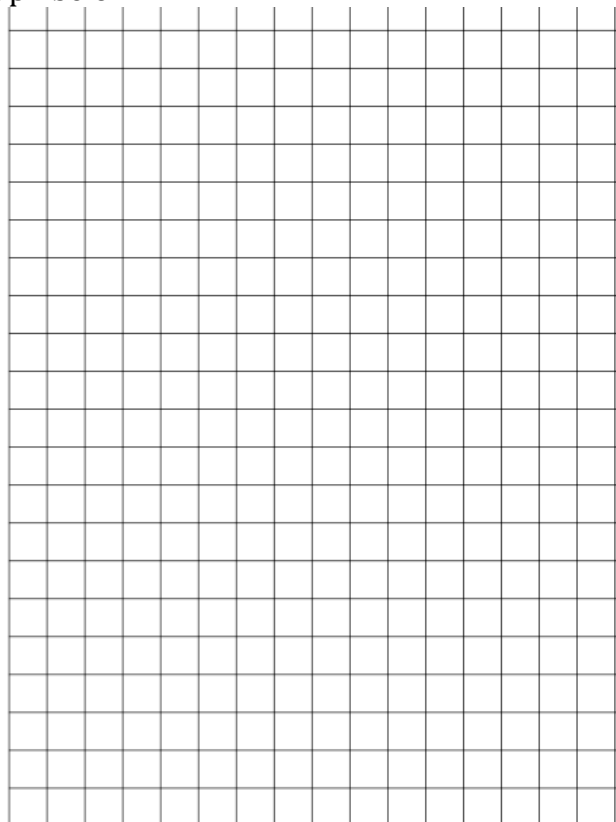
Marbles in Cylinder Lab

You received a graduated cylinder with three identical marbles and an unknown amount of water already in it. You placed extra identical marbles in the cylinder and obtained the data below. Use the data to graph a best-fit line showing the relationship between the water level and the number of marbles. The y-intercept should be visible on the graph. Label your axes and include units.

From the graph, determine a mathematical formula for the water level for any number of marbles. Lastly, give an explanation of your formula in words. Make sure to give an explanation of the slope and y-intercept of your formula.

Number of Marbles in Water	Water level (mL)
3	58
4	61
5	63
6	65
7	68

Graph below



33.) Formula: _____

34.) Explanation of the formula in words: (Include the meaning of the slope and y-intercept.)