

Physics 11 Worksheet - Mathematics warm-up

Part 1 Math Equations for the expression below,

SOLVE FOR x

1) $3 = 5 + x$ $x = -2$

4) $5 = \frac{x}{2}$ $x = 10$

2) $6 = -2x + 4$ $x = -1$

5) $9 = \frac{18}{x}$ $x = 2$

3) $4 - 5x = 14$ $x = -2$

6) $4 = \frac{16}{x+2}$ $x = 2$

Part 2 Physics Equations Solve for the unknown variable:

1) $\frac{x}{9} = \frac{8}{20}$ $x = 3.6$

2) $E_p = mgh$ $E_p = 1225$ $g = 9.8$ $h = 305$ **find m** $m = 0.41$

3) $E = mc^2$ $m = 50$, $c = 300$ **find E** $4,500,000$

4) $E_k = \frac{1}{2}mv^2$ $m = 4$, $v = 22$ **find E_k** 968

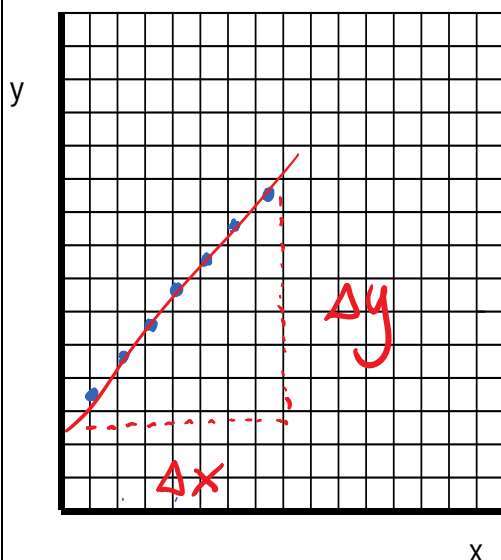
5) $d = v_i t + \frac{1}{2}at^2$ $d = 12$ $t = 2.1$ $a = -4.3$, **find v_i** 10.23

6) $v_f^2 = v_i^2 + 2ad$ $v_f = 13.7$, $a = -2.25$, $d = 154$ **find v_i** 29.68

Graphing

Graph the following data on the graph below:

X	1.2	2.2	3.3	4.2	5.3	6.2	7.4
Y	3.5	4.4	5.6	6.4	7.3	8.3	9.2



$$\text{RISE} = 5.7$$

$$\text{RUN} = 6.2$$

- Plot the points given.
- (Draw a “line of best fit” through the points).

(APPROXIMATELY)

a) Determine the **slope** of the line from the graph

$$\text{SLOPE} = \frac{\text{RISE}}{\text{RUN}} = 1$$

b) Using the graph estimate the **y-intercept**.

= 2.5 (WHERE LINE CROSSES y-AXIS)

c) Using the formula $y=mx+b$, write the equation for the line on the graph
(where m = slope of the line and b is the y-intercept)

$$y = 1x + 2.5$$

↑

SLOPE

↑

y-INTERCEPT.

Unit conversions

- 1) 3500 m into km
- 2) 2.4 hours into seconds
- 3) 4 cm into meters
- 4) 178 cm into meters
- 5) 22.3 meters/second into km/hr

- 1) 3.5 km
- 2) 8640 sec.
- 3) 0.04 m
- 4) 1.78 m
- 5) 80.28 km/h

Convert the following into **scientific notation** or back to standard form

- 6) 43126
- 7) .0042
- 8) 700000
- 9) 0.0000150
- 10) 7.5×10^3
- 11) 9.70×10^{-4}
- 12) 5.16×10^{-5}

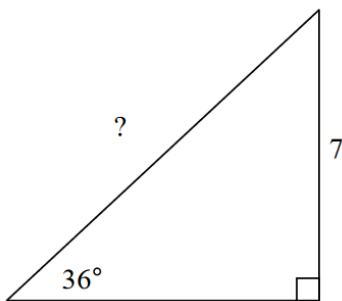
- 6) 4.3×10^4
- 7) 4.2×10^{-3}
- 8) 7.0×10^5
- 9) 1.5×10^{-5}
- 10) 7500
- 11) 0.00097
- 12) 0.0000516

Round the following to the number of figures shown

- 13) 6.349 round to 2 decimal places
- 14) 1.03433 round to 2 decimal places

- 13) 6.35
- 14) 1.03

Find the missing side using the angle and side given:

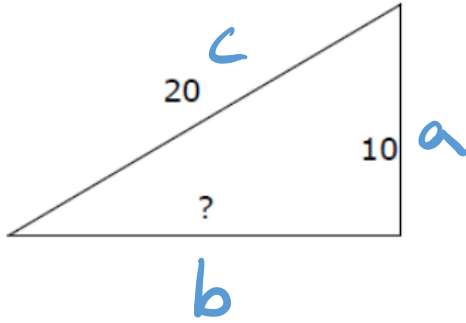


$$\sin \theta = \frac{O}{H}$$
$$\sin 36 = \frac{7}{H}$$
$$0.588 = \frac{7}{H}$$

$$H = 11.91$$

$$y = 9.01 \quad x = 41$$

Find the length of the missing side using Pythagorean Theorem:



$$c^2 = a^2 + b^2$$

$$20^2 = 10^2 + b^2$$

$$b = 17.32$$

10

8

These next ones are *super* hard – only try them if you want a challenge and have the time!

$$F_g = \frac{Gm_1m_2}{r^2}$$

$$G = 6.67 \times 10^{-11}, m_1 = 3.45 \times 10^{16}, m_2 = 1.34 \times 10^7, F_g = 1.26 \times 10^4, \text{ find } r$$

$$49469.74$$

$$L = L_0 \sqrt{1 - \frac{v^2}{c^2}}$$

$$L = 13.0, v = 2.1 \times 10^8, c = 3.0 \times 10^8, \text{ find } L_0$$

$$18.2$$

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$m = 2.5 \times 10^6, m_0 = 2.2 \times 10^6, c = 3.0 \times 10^8, \text{ find } v$$

$$1.4 \times 10^8$$

$$N_1 \sin \theta_1 = N_2 \sin \theta_2 \quad N_1 = 1.35, N_2 = 1.04, \theta_1 = 24, \text{ find } \theta_2$$

$$31.87^\circ$$