AP Physics Summer Assignment

Algebra

1. (a) $2a - bc = c$

$+bc \quad +bc$

$\frac{2a}{2} = \frac{c+bc}{2}$

$a = \frac{c+bc}{2}$ or $\frac{(1+b)c}{2}$

(b) $2a - bc = c$

$-2a \quad -2a$

$\frac{+bc}{+c} = \frac{c-2a}{-c}$

$b = -1 + \frac{2a}{c}$

(c) $2a - bc = c$

$+bc \quad +bc$

$2a = c + bc$

$\frac{2a}{1+b} = \frac{(1+b)c}{1+b}$

$c = \frac{2a}{1+b}$

2 (a) $11 - t^2 = ac + bc$

$-bc \quad -bc$

$\frac{11 - t^2 - bc}{c} = \frac{ac}{c}$

$a = \frac{11 - t^2}{c} - b$

or

$a = \frac{11}{c} - \frac{t^2}{c} - b$

(b) $11 - t^2 = ac + bc$

$-ac \quad -ac$

$\frac{11 - t^2 - ac}{c} = \frac{bc}{c}$

$b = \frac{11 - t^2}{c} - a$

or

$b = \frac{11}{c} - \frac{t^2}{c} - a$

2 (c) $11-t^2 = ac+bc$

$\frac{11-t^2}{a+b} = \frac{(a+b)c}{a+b}$

$c = \frac{11-t^2}{a+b}$

(d) $11-t^2 = ac+bc$

$-11 \quad -11$

$-t^2 = ac+bc-11$

$\frac{-t^2}{-1} = \frac{ac+bc-11}{-1}$

$\sqrt{t^2} = \sqrt{-ac-bc+11}$

$t = \pm\sqrt{-ac-bc+11}$

3. $\frac{1}{3} = 0.\overline{33}$; $\frac{1}{10} = 0.1$; $\frac{1}{100} = 0.01$; $\frac{7}{1000} = 0.00\overline{7}$

4. $0.5 = \frac{1}{2}$; $0.25 = \frac{1}{4}$; $0.2 = \frac{1}{5}$; $0.06 = \frac{3}{50}$; 0.0

5. $3x^2 - 5x + 6 = 5$

$-5 \quad -5$

$3x^2 - 5x + 1 = 0$

$a = 3 \quad b = -5 \quad c = 1$

$x = \frac{5+\sqrt{13}}{6} \approx 1.43$

$x = \frac{5-\sqrt{13}}{6} \approx 0.23$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{-(-5) \pm \sqrt{(-5)^2-4(3)(}}{2(3)}$

$x = \frac{5 \pm \sqrt{25-12}}{6}$

$x = \frac{5 \pm \sqrt{13}}{6}$

6.(a) $y = 3x$; $2x + 2y = 32$

$2x + 3x = 32$

$\frac{5x}{5} = \frac{32}{5}$

$x = \frac{32}{5}$

$y = 3x$

$y = 3\left(\frac{32}{5}\right)$

$y = \frac{96}{5}$

Solution $\left(\frac{32}{5}, \frac{96}{5}\right)$

$(6.4, 19.2)$

6 (b) $f - g = 5$; $3f + 2g = 5$

$+g \quad +g$

$f = 5 + g$

$3(5+g) + 2g = 5$

$15 + 3g + 2g = 5$

$-15 \quad -15$

$\frac{5g}{5} = \frac{-10}{5}$

$g = -2$

$f = 5$

$f = 5 +$

$f = 3$

$(f, g) = (3,$

Solutio

7 (a) $v = v_0 + at$

$-v_0 \quad -v_0$

$\frac{v - v_0}{t} = \frac{at}{t}$

$a = \frac{v - v_0}{t}$

(b) $v^2 = v_0^2 + 2a\Delta x$

$-v_0^2 \quad -v_0^2$

$\frac{v^2 - v_0^2}{2\Delta x} = \frac{2a\Delta x}{2\Delta x}$

$a = \frac{v^2 - v_0^2}{2\Delta x}$

(c) $\frac{PV}{nR} = \frac{nRT}{nR}$

$T = \frac{PV}{nR}$

(d) $KE = \frac{1}{2}mv^2$

$*2 \quad *2$

$\frac{2KE}{m} = \frac{mv^2}{m}$

$\sqrt{v^2} = \sqrt{\frac{2KE}{m}}$

$v = \sqrt{\frac{2KE}{m}}$

(e) $T = 2\pi\sqrt{\frac{l}{g}}$

$\frac{T}{2\pi} = \frac{2\pi}{2\pi}\sqrt{\frac{l}{g}}$

$\left(\frac{T}{2\pi}\right)^2 = \left(\sqrt{\frac{l}{g}}\right)^2$

$g * \left(\frac{T}{2\pi}\right)^2 = \frac{l}{g} * g$

$l = g$

(f) $F_g = \frac{Gm_1m_2}{r^2}$

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

$r = \sqrt{\frac{Gm_1m_2}{F_g}}$

7. (g) $B = \frac{\mu_0 I}{2\pi r}$

$\frac{2\pi r B}{\mu_0} = \frac{\mu_0 I}{\mu_0}$

$I = \frac{2\pi r B}{\mu_0}$

(h) $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$

$-\frac{1}{d_o} \quad -\frac{1}{d_o}$

$\frac{1}{f} - \frac{1}{d_o} = \frac{1}{d_i}$

$\frac{d_o - f}{f d_o} = \frac{1}{d_i}$

$\frac{d_i(d_o - f)}{d_o - f}$

$d_i = \frac{f}{d_o}$

or

$d_i = \left(\frac{1}{f}\right.$

Geometry and Trig

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

$4^2 + b^2 = 6^2$

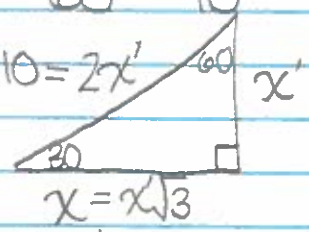
$16 + b^2 = 36$

$-16 \quad -16$

$\sqrt{b^2} = \sqrt{20}$

$b = 2\sqrt{5} \approx 4.47$

9. $30°-60°-90°$



$\frac{10}{2} = \frac{2x'}{2}$ $\quad x = x'\sqrt{3}$

$x' = 5$ $\quad x = 5\sqrt{3}$

10. $\sin\theta = \frac{opp}{hyp}$ $\quad \cos\theta = \frac{adj}{hyp}$

$\sin 50° = \frac{d}{2\sqrt{2}}$ $\quad \cos 50° = \frac{s}{2\sqrt{2}}$

$d = 2\sqrt{2}\sin 50°$ $\quad s = 2\sqrt{2}\cos 50°$

$d \approx 2.17$ $\quad s \approx 1.82$

Scientific Notation

11. $2.45 \times 10^9 = 2,450,000,000.$
Twenty-four billion, five-hundred million

12. (a) $3.1 \times 10^4 = 31,000.$
(b) $0.000205 \times 10^6 = 205.$
(c) $64.2 \times 10^7 = 642,000,000.$
(d) $15,000. \times 10^{-6} = 0.015000$
(e) $7.14 \times 10^6 = 7,140,000$
(f) $8.450 \times 10^{-3} = .008450$

Unit conversion

13. 160. cm
(a) 1.60 m
(b) 1600 mm
(c) 0.00160 km
(d) $160 \text{ cm} \left| \frac{1 \text{ in}}{2.54 \text{ cm}} \right. = 62.9921 \approx 63.0 \text{ in}$
(e) $62.9921 \text{ in} \left| \frac{1 \text{ ft}}{12 \text{ in}} \right. = 5.2493 \approx 5.2 \text{ ft}$

14. one year

(a) 365 days

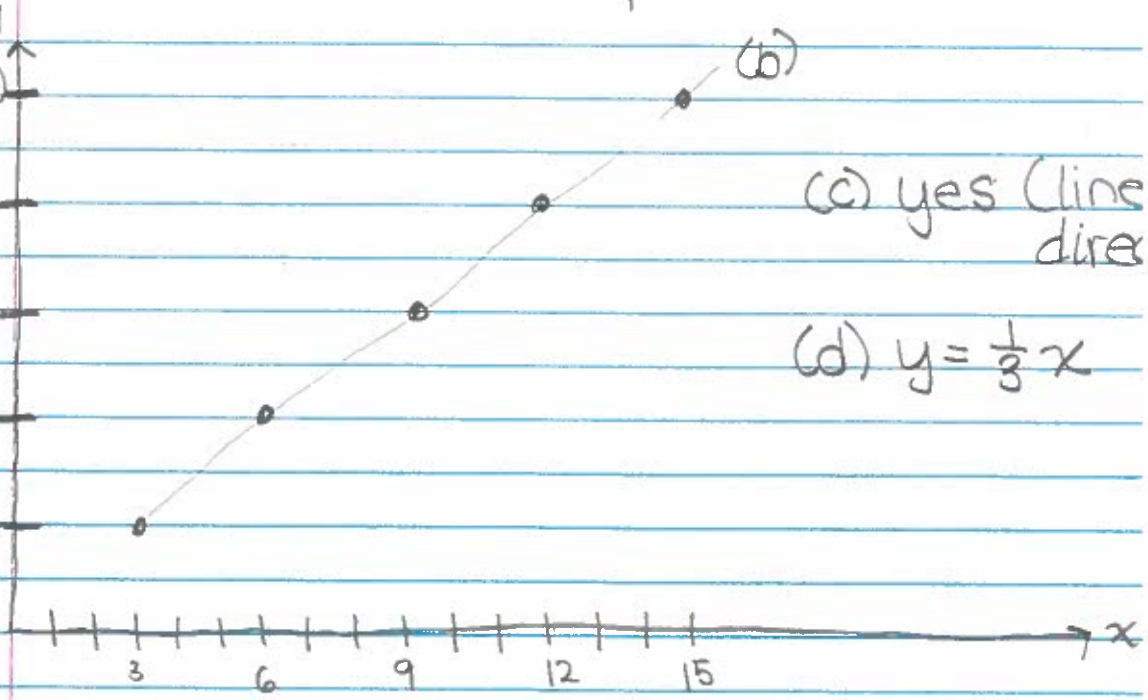
(b) $\frac{365 \text{ days}}{1 \text{ day}} \mid \frac{24 \text{ hr}}{} = 8760 \text{ hr}$

(c) $\frac{8760 \text{ hr}}{1 \text{ hr}} \mid \frac{60 \text{ min}}{} = 525{,}600 \text{ min}$

(d) $\frac{525{,}600 \text{ min}}{1 \text{ min}} \mid \frac{60 \text{ sec}}{} = 31{,}536{,}000 \text{ s}$

Variable Relationships

15. (a)

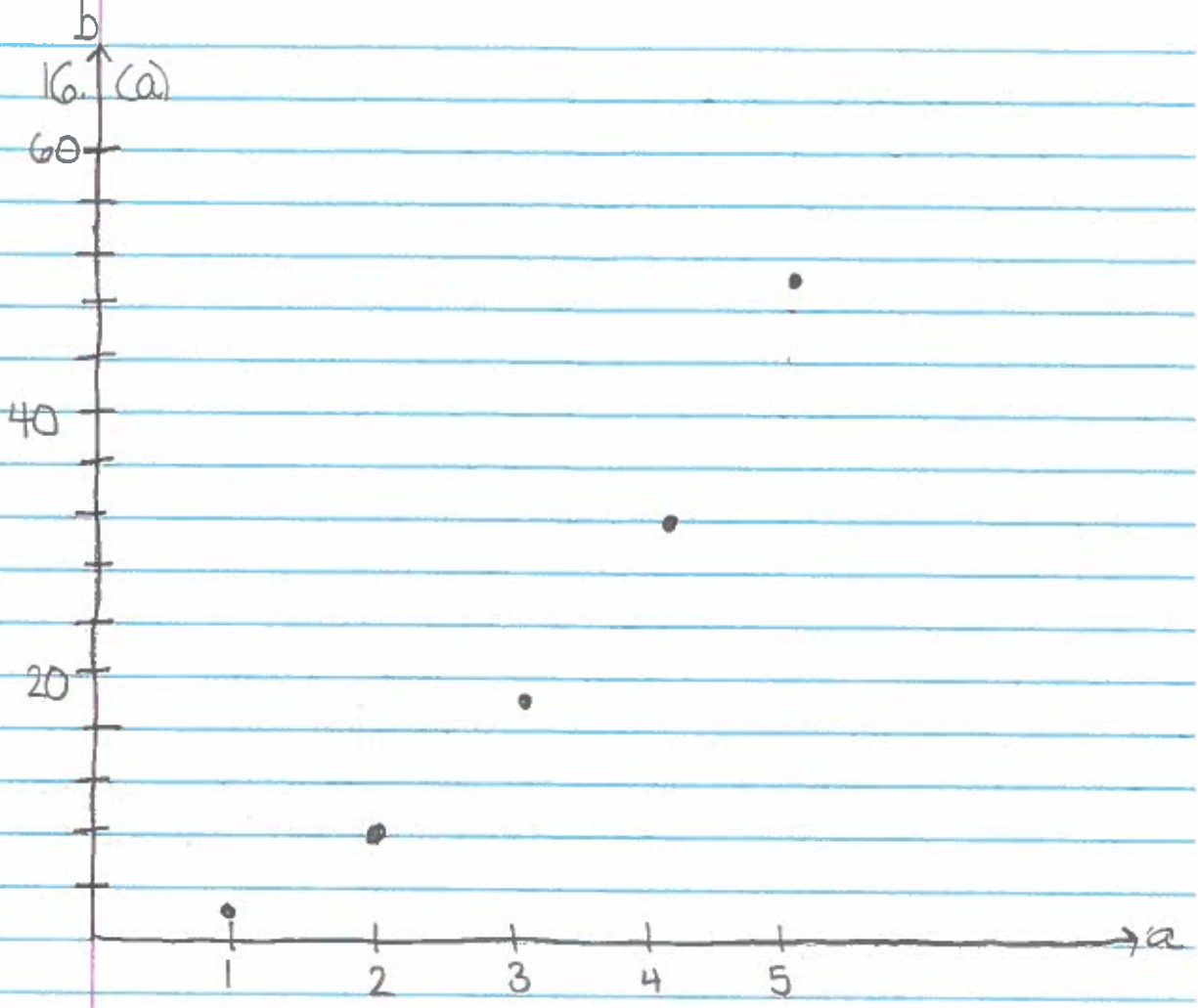


(b)

(c) yes (line
dire

(d) $y = \frac{1}{3}x$

16. (a)



(b) no

(c) non-linear / quadratic

(d) yes; $b = 2a^2$