ANSWER KEY:

1. 0.4

2. -0.6

3. -52000

4. a) link:
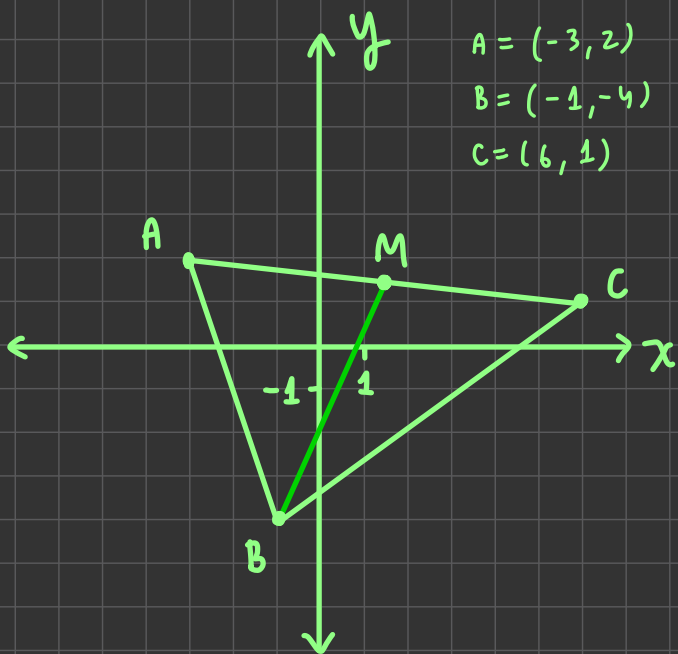https://katskreativity.github.io/space-escape/29-5829.html

      b) 29

5. 8.6

6. 58.2

7. true, 1, -6

8. link:
https://katskreativity.github.io/space-escape/1-8-731.html

9. ANSWER: THANOS!!

problem # 1, chapters 2 & 3

$A = (-3, 2)$
$B = (-1, -4)$
$C = (6, 1)$

Median from B to AC

$$M = \left(\frac{-3+6}{2}, \frac{2+1}{2} \right)$$

$$M = \left(\frac{3}{2}, \frac{3}{2} \right)$$

$$m_{BM} = \frac{\frac{3}{2} - (-4)}{\frac{3}{2} - (-1)} = \frac{\frac{3}{2} + \frac{8}{2}}{\frac{3}{2} + \frac{2}{2}} = \frac{\frac{11}{2}}{\frac{5}{2}} = \frac{11}{5}$$

$y = \frac{11}{5} x + b$, sub in $B = (-1, -4)$:

$$-4 = \frac{11}{5}(-1) + b$$

$$b = -4 + \frac{11}{5}$$

$$= -\frac{20}{5} + \frac{11}{5},$$

$$b = -\frac{9}{5}$$
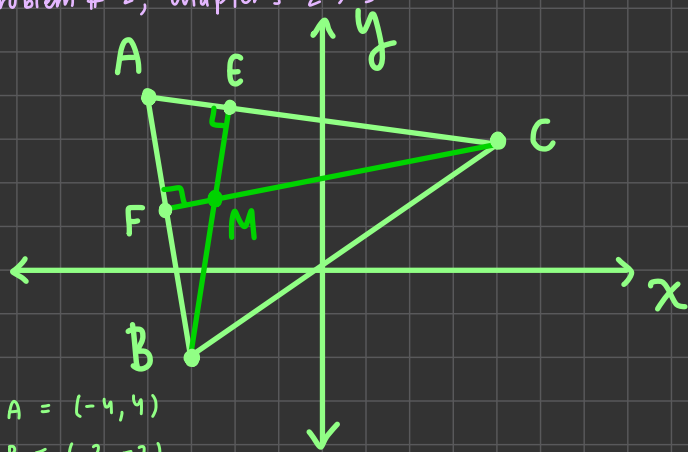
$$\therefore \quad y = \frac{11}{5} x - \frac{9}{5}$$

sum of m and b

$$= \frac{11}{5} - \frac{9}{5} = \frac{2}{5}$$

$$= 0.4$$

↰ answer

$A = (-4, 4)$
$B = (-3, -2)$
$C = (4, 3)$

$m_{AB} = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{4 - (-2)}{-4 - (-3)}$

$= \dfrac{6}{-1} = -6$

$m_{CF} = -\left(\dfrac{1}{-6}\right) = \dfrac{1}{6}$

$y = \dfrac{1}{6} x + b$

sub in $C = (4, 3)$

$3 = \dfrac{1}{6}(4) + b$

$b = 3 - \dfrac{4}{6}$

$b = \dfrac{9}{3} - \dfrac{2}{3}$

$b = \dfrac{7}{3}$

$m_{AC} = \dfrac{4 - 3}{-4 - 4} = -\dfrac{1}{8}$

$m_{BE} = -\left(\dfrac{1}{-\frac{1}{8}}\right) = 8$

$y = 8x + b \rightarrow$ sub in
$\qquad\qquad B = (-3, -2)$

$-2 = 8(-3) + b$

$b = 24 - 2$

$b = 22$

$\boxed{y = 8x + 22}$

$y = 8\left(-\dfrac{118}{47}\right) + 22$

$= -\dfrac{944}{47} + \dfrac{1034}{47}$

$= \boxed{\dfrac{90}{47}}$

$\boxed{y = \dfrac{1}{6} x + \dfrac{7}{3}}$

$8x + 22 = \dfrac{1}{6} x + \dfrac{7}{3}$

$\dfrac{48 - 1}{6} x = \dfrac{7}{3} - \dfrac{66}{3}$

$\dfrac{47}{6} x = -\dfrac{59}{3}$

$x = -\dfrac{59}{3} \cdot \dfrac{\cancel{6}^{2}}{47} \,,\; \boxed{x = -\dfrac{118}{47}}$

$\boxed{\begin{array}{l}\text{orthocenter:} \\ \left(-\dfrac{118}{47}, \dfrac{90}{47}\right)\end{array}}$

sum $= -\dfrac{118}{47} + \dfrac{90}{47}$

$= -\dfrac{28}{47} \approx \boxed{-0.6}$ answer

$$(4x-7)^2 + (2x+1)^2$$

$$= 16x^2 - 2(4)(7)x + 49$$
$$+ 4x^2 + 2(2)(1)x + 1$$

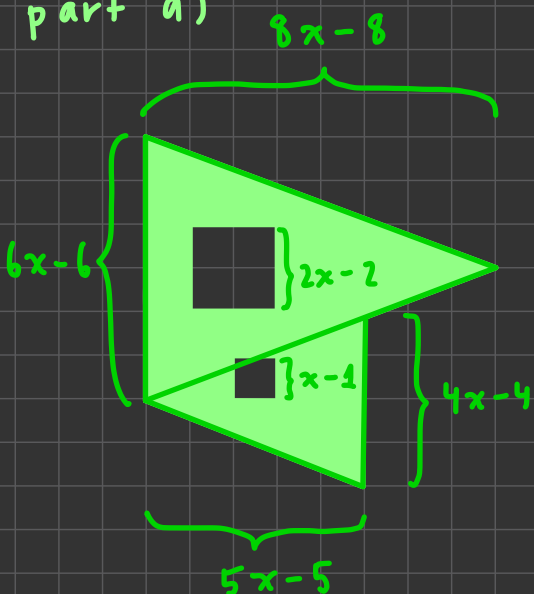$$= 16x^2 + 4x^2 - 2(28)x + 4x$$
$$+ 49 + 1$$

$$= 20x^2 - 56x + 4x + 50$$

$$= \boxed{20x^2 - 52x + 50}$$

product:

$$20 \cdot -52 \cdot 50$$

$$= \boxed{-52000} \quad \leftarrow \text{answer}$$

part a)

$8x - 8$

$6x - 6$

$2x - 2$

$x - 1$

$4x - 4$

$5x - 5$

$$\frac{b_1 h_1}{2} = \frac{(6x-6)(8x-8)}{2}$$

$$= \frac{48x^2 - 48x - 48x + 48}{2}$$

$$= 24x^2 - 48x + 24$$

$$\frac{b_2 h_2}{2} = \frac{(4x-4)(5x-5)}{2}$$

$$= \frac{20x^2 - 20x - 20x + 20}{2}$$

$$= 10x^2 - 20x + 10$$

$24x^2 - 48x + 24$
$+ 10x^2 - 20x + 10$
$= 34x^2 - 68x + 34$
total △ area

$\square \rightarrow (2x-2)^2$

$$= 4x^2 - 4x - 4x + 4$$

$$= 4x^2 - 8x + 4$$

$\square \rightarrow (x-1)^2$

$$= x^2 - x - x + 1$$

$$= x^2 - 2x + 1$$

$4x^2 - 8x + 4 + x^2 - 2x + 1$

$$= 5x^2 - 10x + 5$$

total $\square$ area

$34x^2 - 68x + 34$
$-(5x^2 - 10x + 5)$

$$\boxed{29x^2 - 58x + 29}$$

∴ the area of the shaded region is $29x^2 - 58x + 29$

answer 1: $\boxed{29 - 5829}$

part b) $x = 2$ cm,

$29(2)^2 - 58(2) + 29$

$$= 116 + 29 - 116$$

$$= \boxed{29 \text{ cm}^2} \leftarrow \text{answer 2}$$
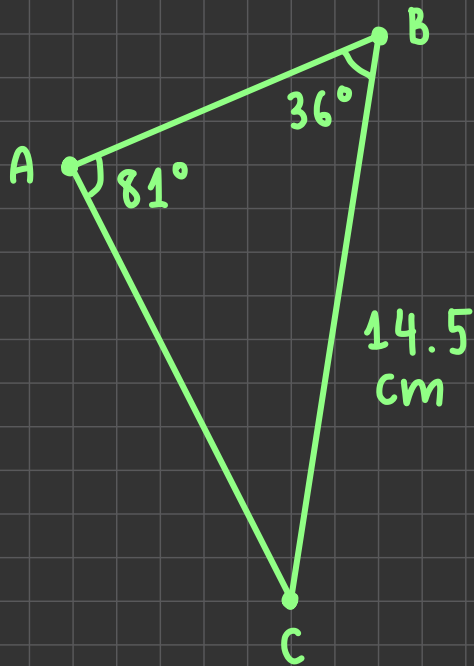
$$\frac{\sin(81°)}{14.5} = \frac{\sin(36°)}{AC}$$

$$\frac{AC\left(\frac{\sin(81°)}{14.5}\right) = \sin(36°)}{\frac{\sin(81°)}{14.5}}$$
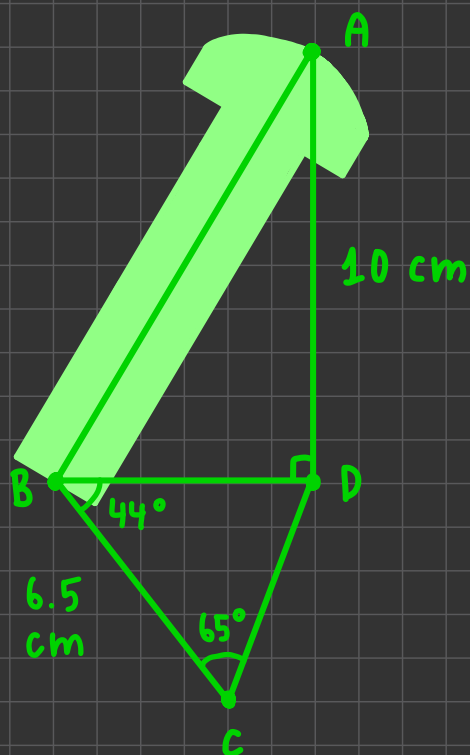
$$AC = \frac{\sin(36°)}{\frac{\sin(81°)}{14.5}}$$

↙ answer

$$\boxed{AC \approx 8.6 \text{ cm}}$$

∴ the length
of AC is 8.6 cm.

problem #6, chapters 7 & 8

$\angle BDC = 180° - 44° - 65°$
$= 71°$

$$\frac{\sin(71°)}{6.5} = \frac{\sin(65°)}{BD}$$

$$\frac{BD\left(\frac{\sin(71°)}{6.5}\right) = \sin(65°)}{\frac{\sin(71°)}{6.5}}$$

$$BD = \frac{\sin(65°)}{\frac{\sin(71°)}{6.5}}$$

$$\boxed{BD \approx 6.2 \text{ cm}}$$

10 cm

6.5 cm

44°

65°

$\tan(\angle ABD)$

$= \frac{AD}{BD}$

$= \frac{10}{6.2}$

$\tan^{-1}\left(\frac{10}{6.2}\right) = \angle ABD$

$$\boxed{\angle ABD \approx 58.2°}$$

↳ answer

∴ the angle of the toggle switch compared to the board is approximately 58.2°.
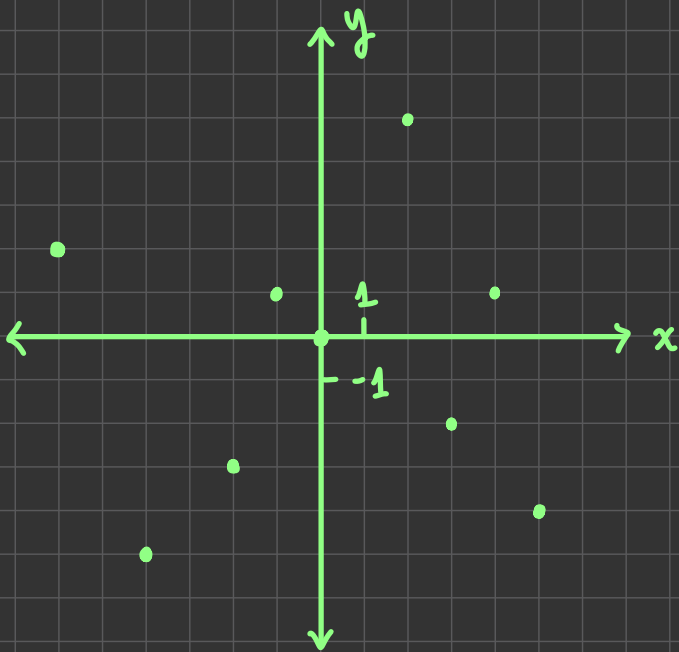
$$D = \{-6, -4, -2, -1, 0, 2, 3, 4, 5\}$$

sum of nums =   1

$$R = \{-5, -4, -3, -2, 0, 1, 2, 5\}$$

sum of nums = -6

answer: true, 1, -6

$$\frac{k^2 + 6k - 7}{k^2 + 4k - 21} \div \frac{k^2 + 7k - 8}{k^2 + 5k - 24}$$

take reciprocal

$$= \frac{k^2 + 7k - k - 7}{k^2 - 3k + 7k - 21} \cdot \frac{k^2 + 8k - 3k - 24}{k^2 - k + 8k - 8} \longrightarrow k \neq 3, -8$$

$$= \frac{(k-1)(k+7)}{(k+7)(k-3)} \cdot \frac{(k-3)(k+8)}{(k+8)(k-1)} \longrightarrow k \neq -8, 1$$

$$\longrightarrow k \neq -7, 3$$

$$= \boxed{1}$$

RESTRICTIONS: $\boxed{k \neq -8, -7, 3, 1}$

↑ answer