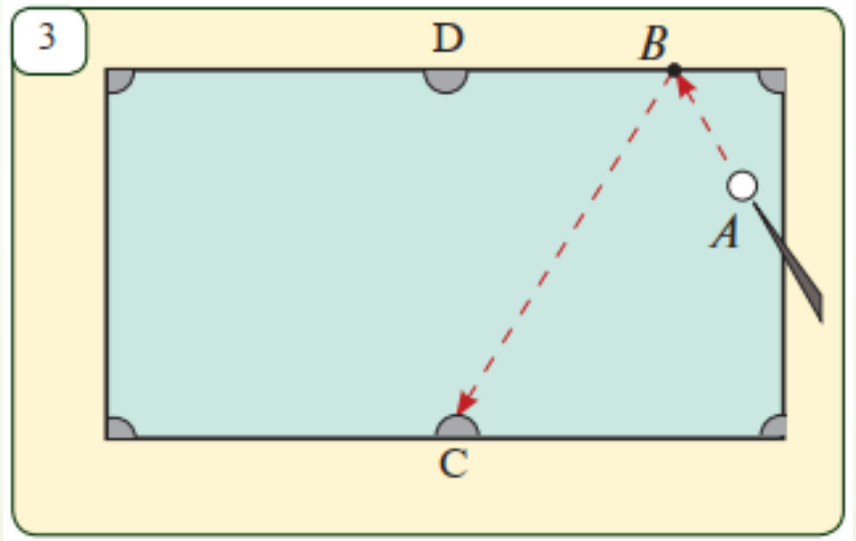
MAVZU: MUHANDISLIK SOHASIDA KOORDINATALAR SISTEMASI VA VEKTORGA OID MASALALARNI YECHISH.

- Bilyard o‘yinida *A* nuqtada turgan shar zarbadan keyin bilyard stoli tomoniga *B* nuqtada urildi va yo‘nalishini o‘zgartirib *C* nuqtadag savatchaga tushdi (*3-rasm*). Agar *AB*=40 *cm*, *BC*=150 *cm* va *ABD* =120° bo‘lsa, *AB* .*BC* scalar ko‘paytmani toping.



Yechish:

AB=40 cm

BC=150 cm

$\angle ABD = 120^0$

$\overline{AB} * \overline{BC}$=?

$90^0 - \frac{\alpha}{2} + \frac{\alpha}{2} + \frac{\alpha}{2} = 120^0$

$\frac{\alpha}{2} = 30^0$

$\alpha = 60^0$

$\overline{AB} * \overline{BC} = |\overline{BC}| * |\overline{AB}| * cos\alpha = 40 * 150 * \cos 60^0 = 40 * 150 * \frac{1}{2} = 20 * 150 = 3000$

Javob: $\overline{AB} * \overline{BC} = 3000.$

F(-3, 4) kuch ta’siri ostida nuqta *A*(5,1)holatdan *B*(2, 1) holatga o‘tdi. Bu jarayonda qanday ish bajarildi?

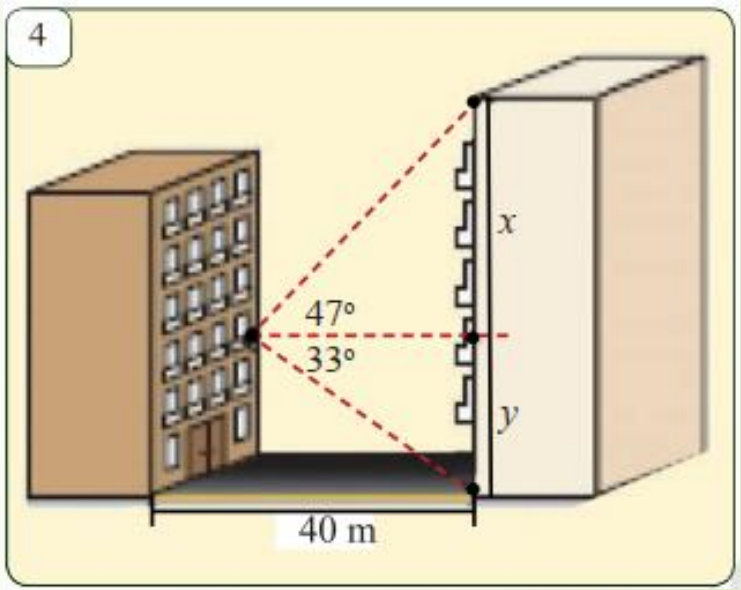
Yechish :

$$\bar{S} = \overline{AB}=(-3;2)$$

$$A=\bar{F} * \bar{S}=(-3;4)*(-3;2)=9+8=17.$$

Javob: A=17.

- Lola ko‘p qavatli uyning 3-qavatida yashaydi. Uning oynasidan uyidan 40 *m* masofada turgan boshqa bir uy ko‘rinib turadi (4-rasm). Agar ro‘paradagi uyning tomi Lolaga 47^0 burchak ostida, partki asosi esa 33^0 burchak ostida ko‘rinsa, ro‘paradagi uyning balandligini toping.



- Yechish:

$$tg47^0=\frac{x}{40}$$

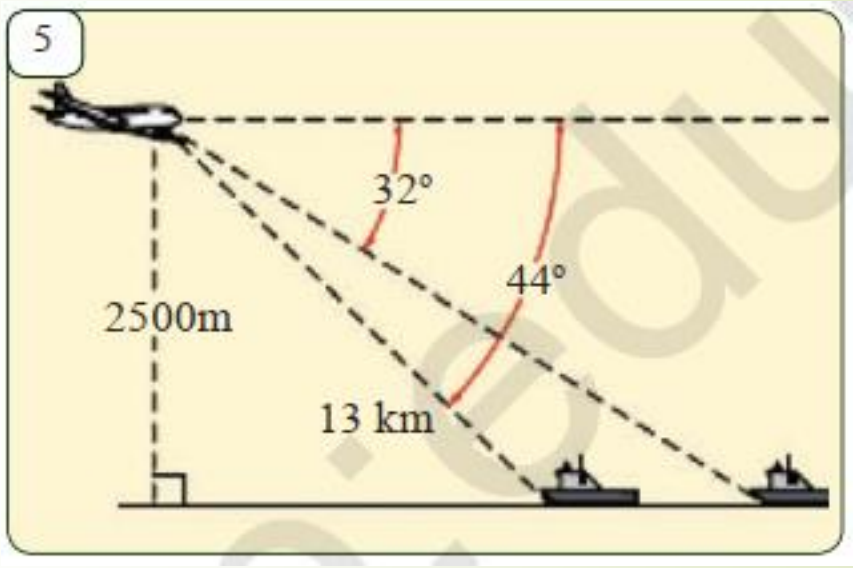
$$x=40*tg47^0$$

$$tg33^0=\frac{y}{40}$$

$$y=40*tg33^0$$

$$h=x+y=40tg47^0+40tg33^0=40(tg47^0+tg33^0)$$

- 2500 *m* balandlikda uchib borayotgan samolyotdan birinchi kema ufqqa nisbatan 44^0 burchak ostida, ikkinchi kema esa 32^0 burchak ostida ko‘rinadi (5-rasm). Kemalar orasidagi masofani toping.



- Yechish:

$$\text{tg}46^0 = \frac{y}{2500}$$

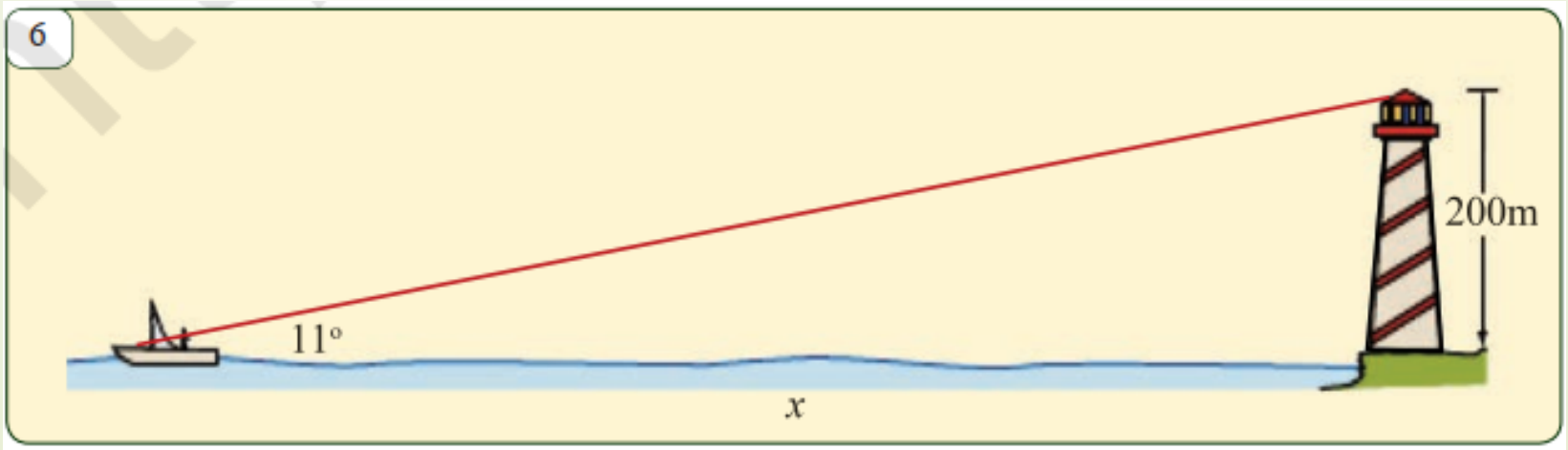
$$y = 2500 * \text{tg}46^0$$

$$\text{tg}58^0 = \frac{x+y}{2500}$$

$$x+y = 2500\ \text{tg}58^0$$

$$X = 2500\ \text{tg}58^0 - 2500\ \text{tg}46^0 = 2500(\text{tg}58^0 - \text{tg}46^0)$$

- Baliqchilar qayig‘idan balandligi 200 *m* bo‘lgan mayoq 11^0 burchak ostida ko‘rinadi (6-rasm). Qayiqdan qirg‘oqqacha bo‘lgan masofani toping.



Yechish:

$$\text{tg}11^0 = \frac{200}{x}$$

$$\text{x}= \frac{200}{tg11^0} = 200ctg11^0$$

Javob: x= $200ctg11^0$

- Uchlari $A(-2; 1)$, $B(0; 4)$, $C(4; 1)$ va $D(2; -2)$ nuqtalarda bo‘lgan $ABCD$ to‘rtburchakning parallelogramm ekanini isbotlang.

Yechish. Parallelogrammning alomatiga ko‘ra, to‘rtburchakning diagonallari kesishish nuqtasida teng ikkiga bo‘linsa, bu to‘rtburchak parallelogramm bo‘lishi ma’lum. Berilgan $ABCD$ to‘rtburchakning AC va BD diagonallari o‘rtasining koordinatalarini topamiz. AC kesmaning o‘rtasi quyidagi koordinataga ega:

$$x=\frac{-2+4}{2}=1, \quad y=\frac{1+1}{2}=1.$$

BD kesmaning o‘rtasi quyidagi koordinataga ega:

$$x=\frac{0+2}{2}=1, \quad y=\frac{4+(-2)}{2}=1.$$

Shunday qilib, AC va BD diagonallarning kesishish nuqtasi umumiy (1; 1) koordinataga ega ekan. Demak, parallelogramm alomatiga ko‘ra, $ABCD$ to‘rtburchak parallelogrammdir. Shuni isbotlash talab qilingan edi.

- $x^2 - 4x + y^2 + 2y - 11 = 0$ tenglama bilan berilgan aylana markazining koordinatalari va radiusini aniqlang.

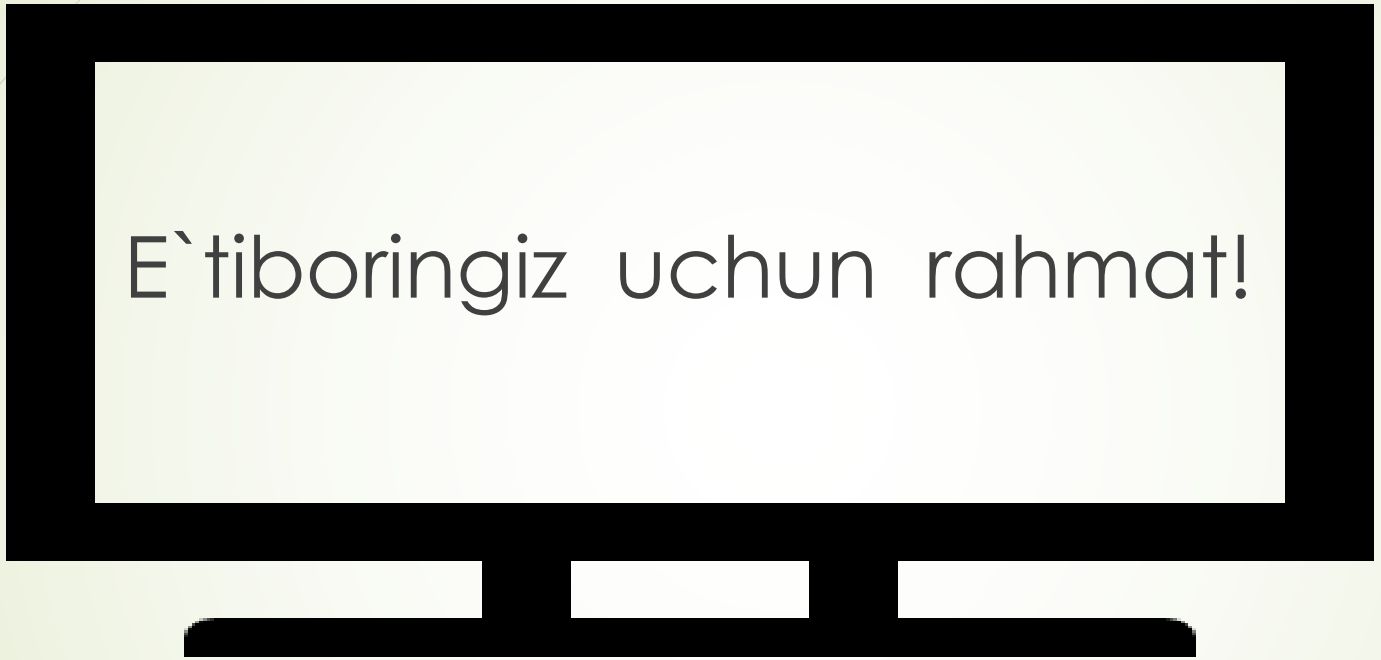
Yechish: Berilgan tenglamani (x-a)^2 + $(y - b)^2 = R^2$ ko‘rinishga keltiramiz.

$x^2 - 4x$ *ni* $(x - 2)^2 - 4$ ko`rinishda, $y^2 + 2y$ ni esa (y+1)$^2$ − 1 ko`rinishida yozib olamiz. Bu ifodalarni berilgan tenglamalarga qo`yib, hosil qilamiz:

$(x - 2)^2 - 4$ + (y+1)^2 − 1 − 11 = 0 yoki $(x - 2)^2$+(y+1)^2=4^2.

Bu tenglama markazi C(2; -1) nuqtada va radiusi 4 bo‘lgan aylana tenglamasini beradi.

Javob: (2; -1), *R* = 4.


E`tiboringiz uchun rahmat!