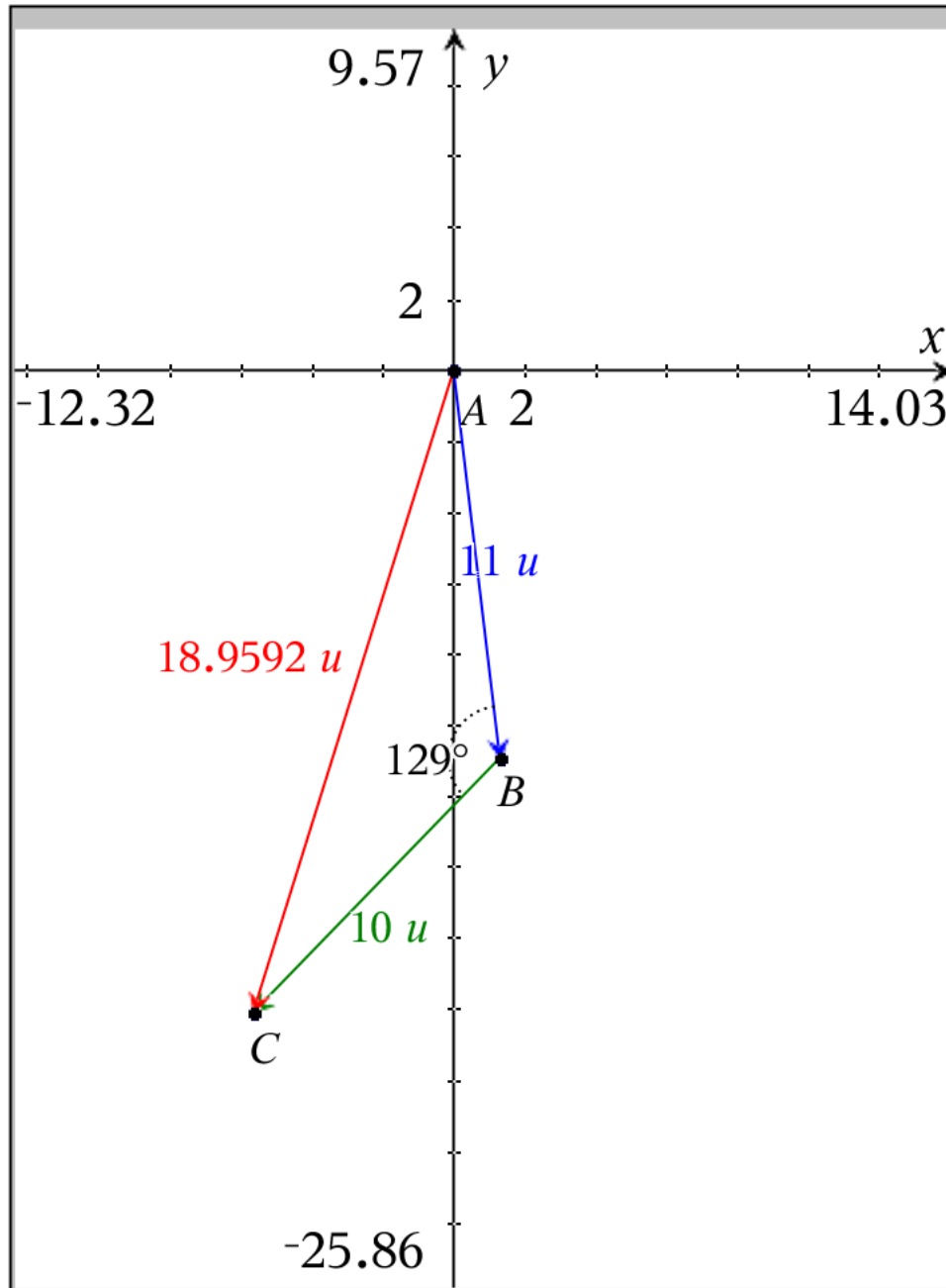


Problem 1



Your particle starts at the origin and moves in the direction of 97 degrees south of west for 11 cm. After reaching this point, your particle changes directions and takes a bearing of 224 degrees for 10 cm. Determine the distance from the initial point A when your particle reaches point C?

$$b^2 = a^2 + c^2 - 2a \cdot c \cdot \cos(B) =$$

$$= 10^2 + 11^2 - 2 \cdot 10 \cdot 11 \cdot \cos(129.)$$

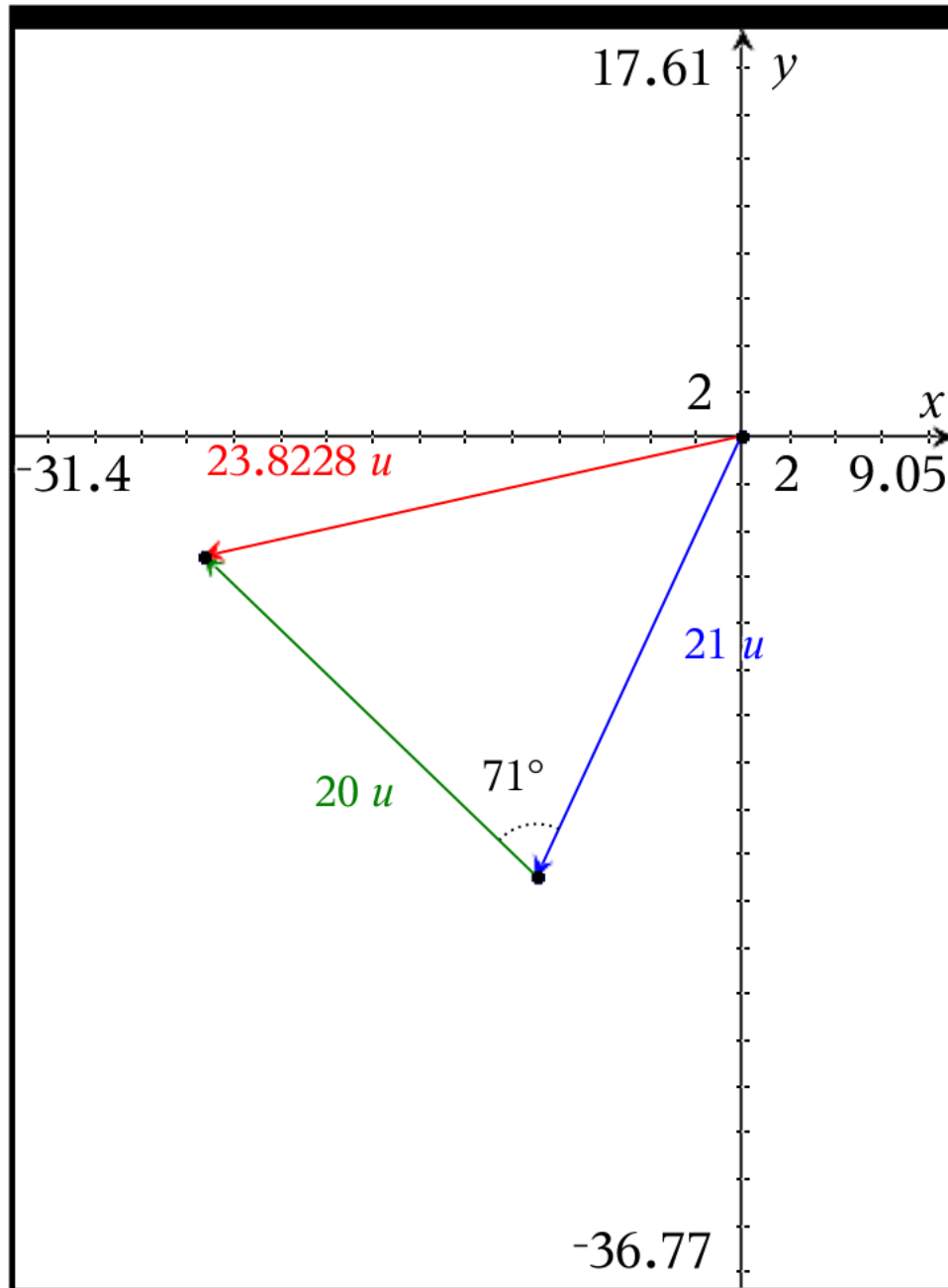
b =

$$\sqrt{10^2 + 11^2 - 2 \cdot 10 \cdot 11 \cdot \cos(129.)} \blacktriangleright 18.9592$$

Note $10^2 + 11^2 \blacktriangleright 221$ Note $2 \cdot 10 \cdot 11 \blacktriangleright 220$

$$b = \sqrt{221 - 220 \cdot \cos(129.)} \blacktriangleright 18.9592$$

Problem 2



Your particle starts at the origin and moves in the direction of 25° west of south for 21 cm. After reaching this point, your particle changes directions and heads $N 46^\circ W$ for 20 cm. Determine the distance from the initial point A when your particle reaches point C?

$$b^2 = a^2 + c^2 - 2a \cdot c \cdot \cos(B) =$$

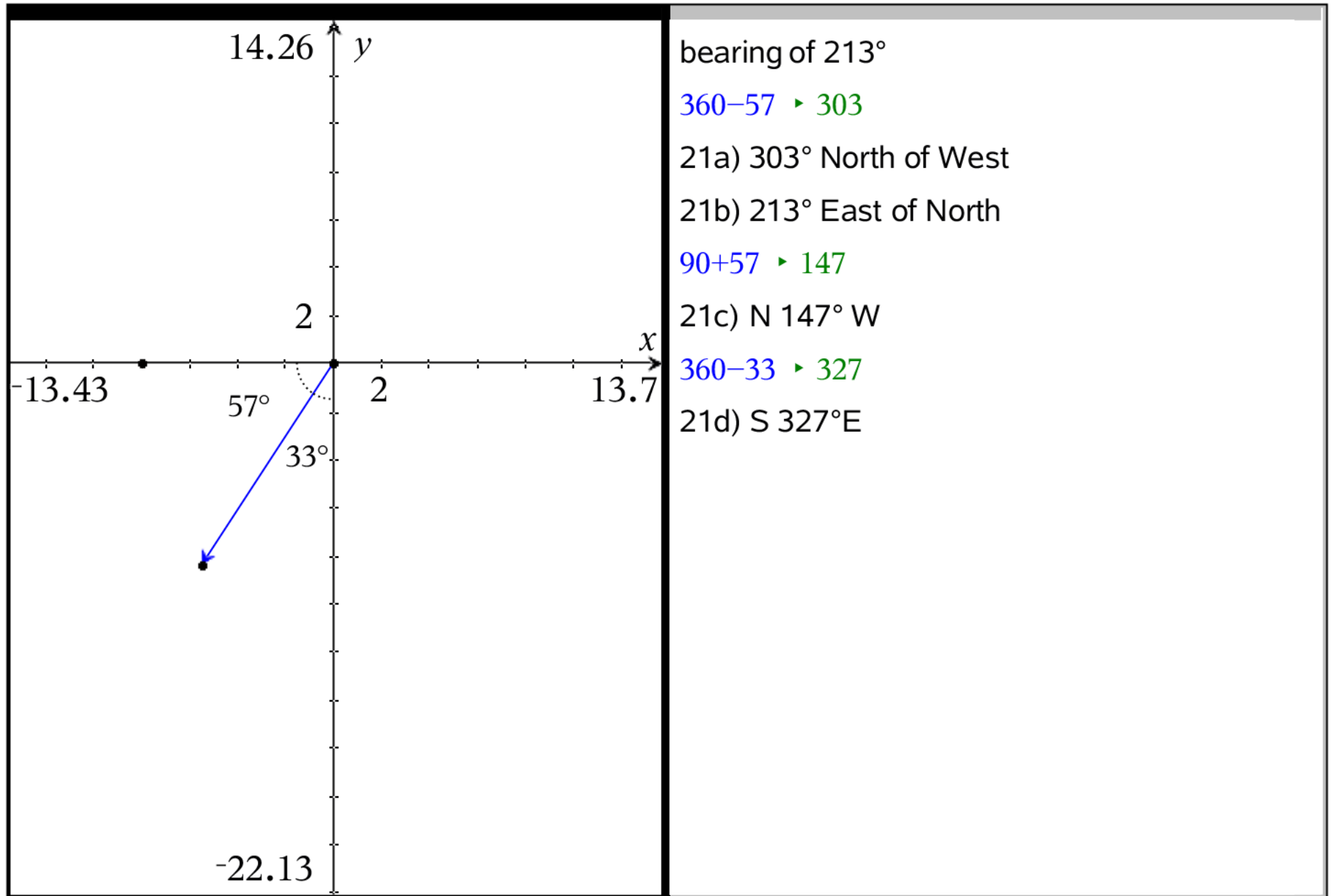
$$= 21^2 + 20^2 - 2 \cdot 21 \cdot 20 \cdot \cos(71.)$$

$$b = \sqrt{21^2 + 20^2 - 2 \cdot 21 \cdot 20 \cdot \cos(71.)} \triangleright 23.8227$$

Note $21^2 + 20^2 \triangleright 841$ Note $2 \cdot 20 \cdot 21 \triangleright 840$

$$b = \sqrt{841 - 840 \cdot \cos(71.)} \triangleright 23.8227$$

Problem 3



Problem 4

	A	B
=		
1	side_1	4
2	side_2	9
3	angle_3	85
4		
5		
6		
7		
8		
9		
10		
11		

Given information: SAS

$$\text{side}_1 = 4$$

$$\text{side}_2 = 9$$

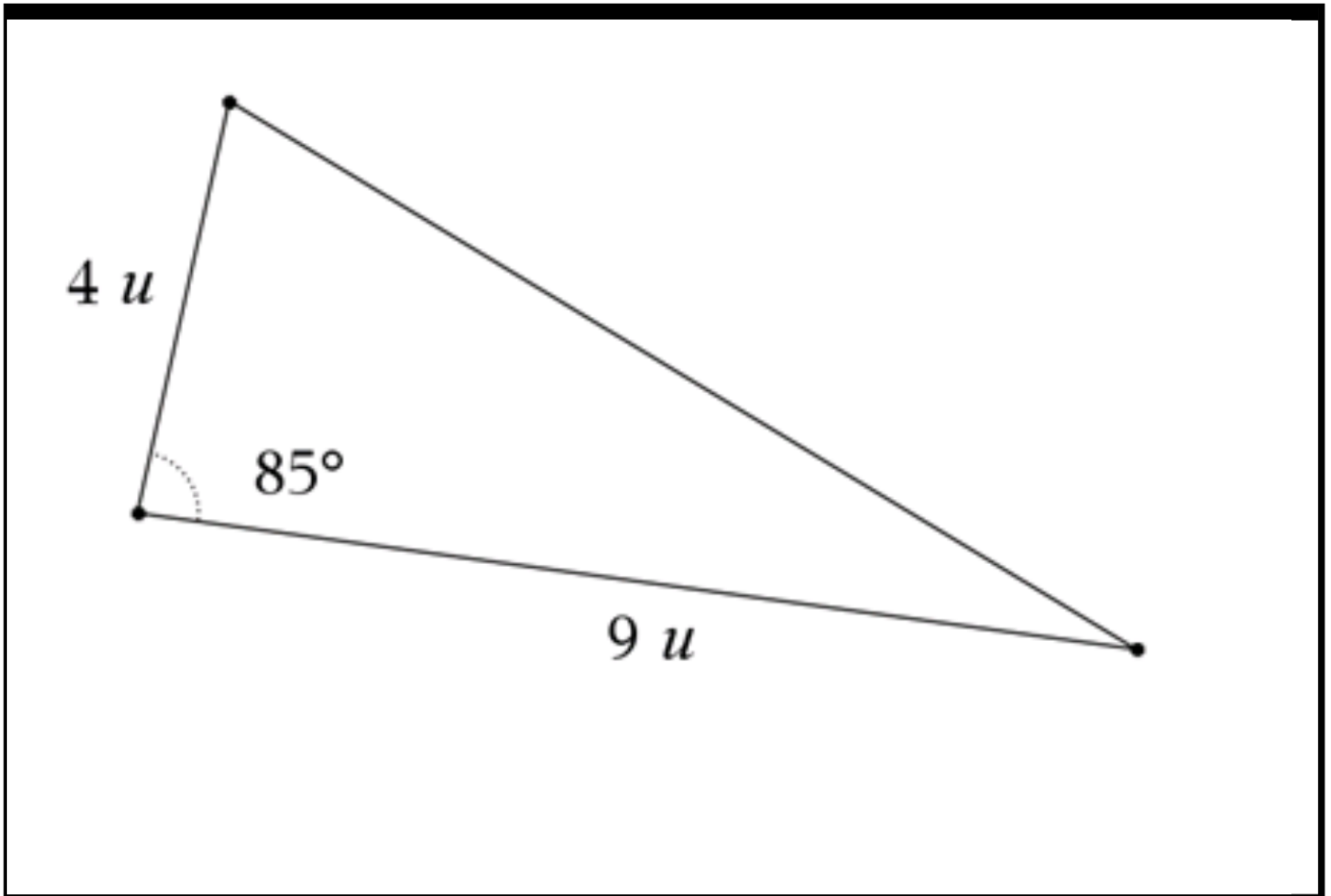
included angle = 85 missing side (see below)

$$A = \frac{1}{2} (4)(9)\sin(85) \approx 17.9315$$

$$P = 4 + 9 + 9.52496 \approx 22.525$$

$$\text{side } 3 = \sqrt{(4)^2 + (9)^2 - 2(4)(9)\cos(85)}$$

$$\sqrt{97 - 72\cos(85)}$$



Problem 5

	A	B	C
=			
1	side_1		5
2	side_2		9
3	side_3		12
4			
5			
6			
7			
8			
9			
10			
11			

Given information: SSS

side_1 = 5

side_2 = 9

side_3 = 12

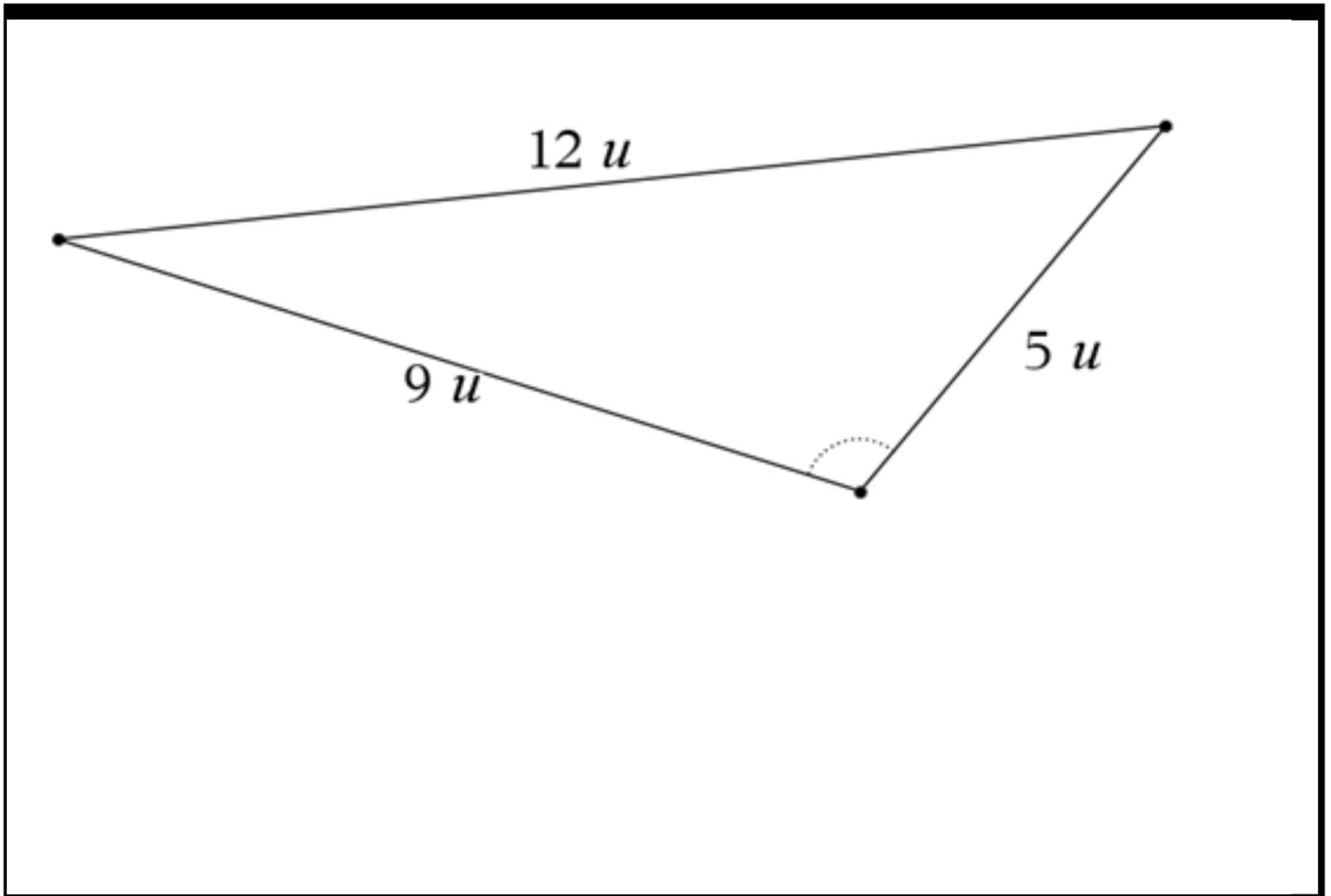
semiperimeter = 13

$$A = \sqrt{[13(13-5)(13-9)(13-12)]}$$

$$= \sqrt{[416.]}$$

$$\approx 20.3961$$

$P = 5 + 9 + 12 \approx 26$

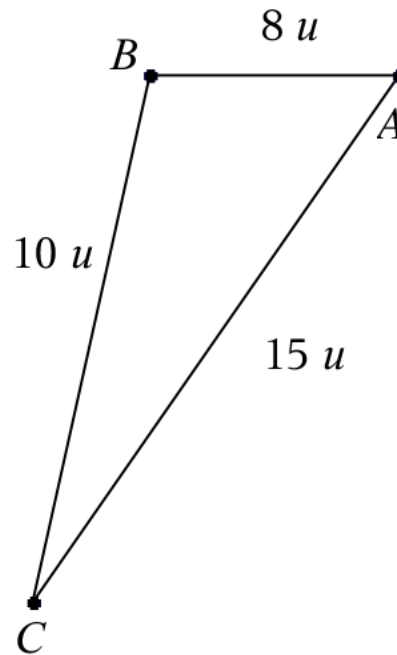


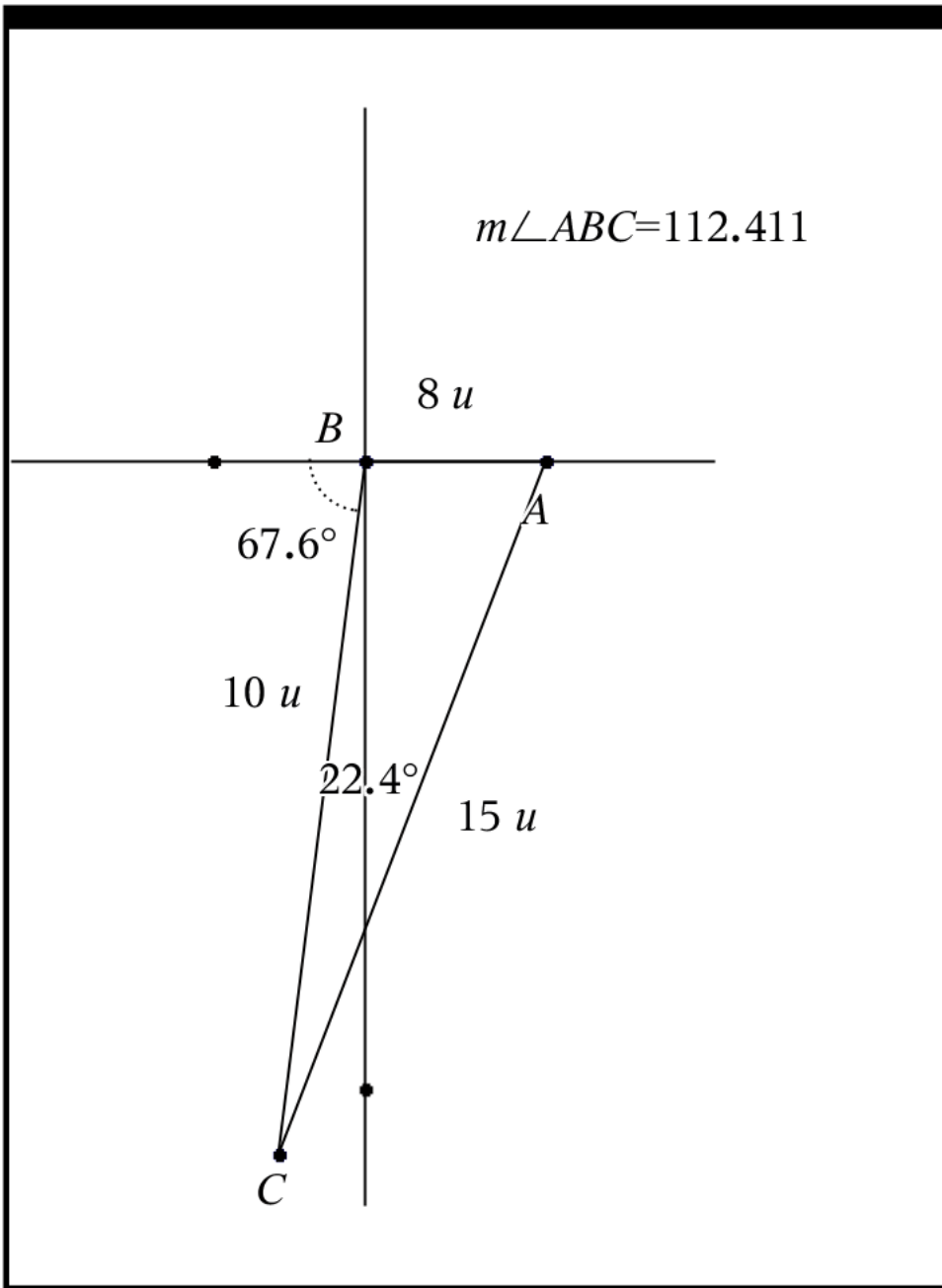
Problem 6

	A	B
=		
1	side_1	8
2	side_2	10
3	side_3	15
4		
5		
6		
7		
8		
9		
10		
11		
B2		10

Given information: SSS

$\text{side}_1 = 8$ $\text{side}_2 = 10$ $\text{side}_3 = 15$





$$m\angle ABC = \cos^{-1}\left(\frac{8^2 + 10^2 - 15^2}{2 \cdot 10 \cdot 8}\right) \triangleright 112.411$$

$$90 + 112.411 \triangleright 202.411$$

bearing 202.411

$$360 - 202.411 \triangleright 157.589$$

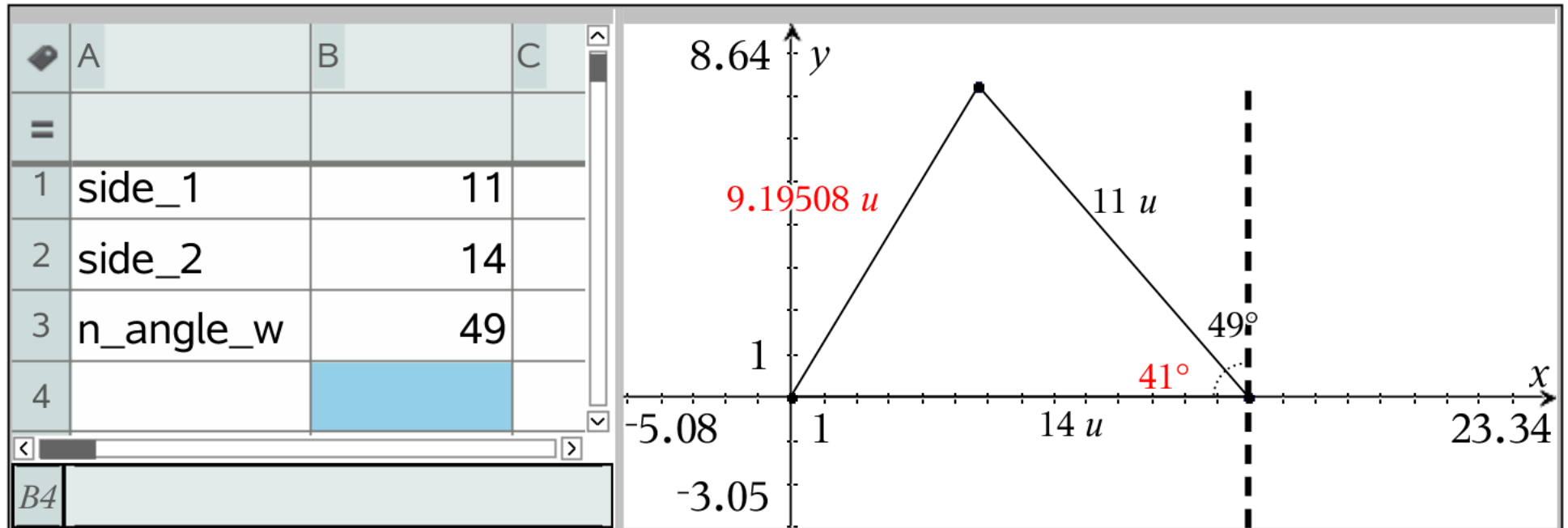
N 157.589 W

$$112.411 - 90 \triangleright 22.411$$

S 22.411 °W

67.6° South of West

Problem 7



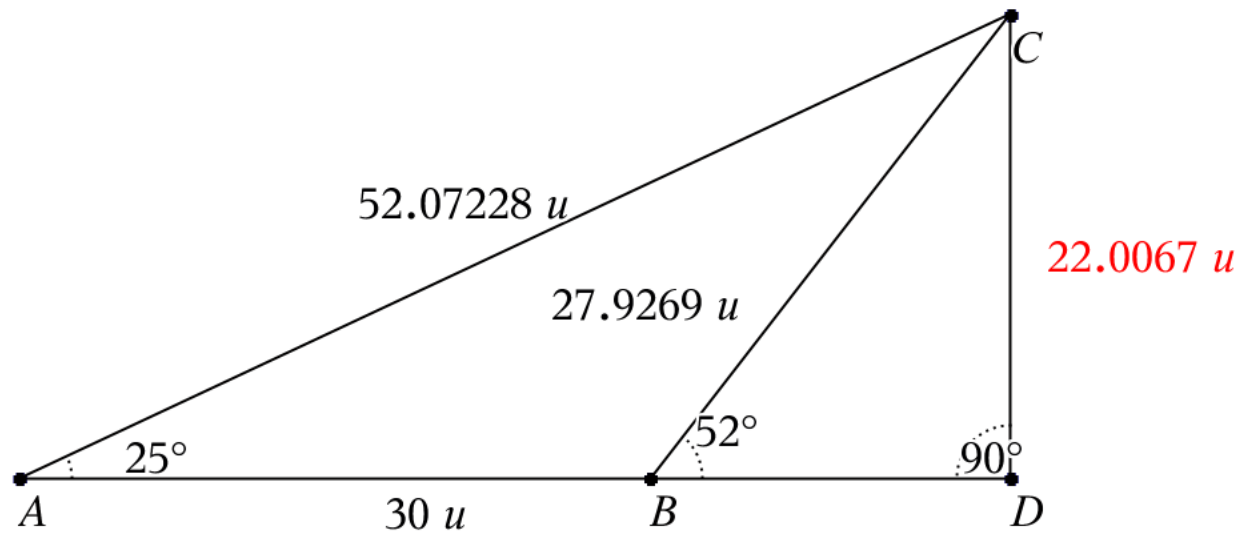
SAS angle = $90 - 49 = 41$

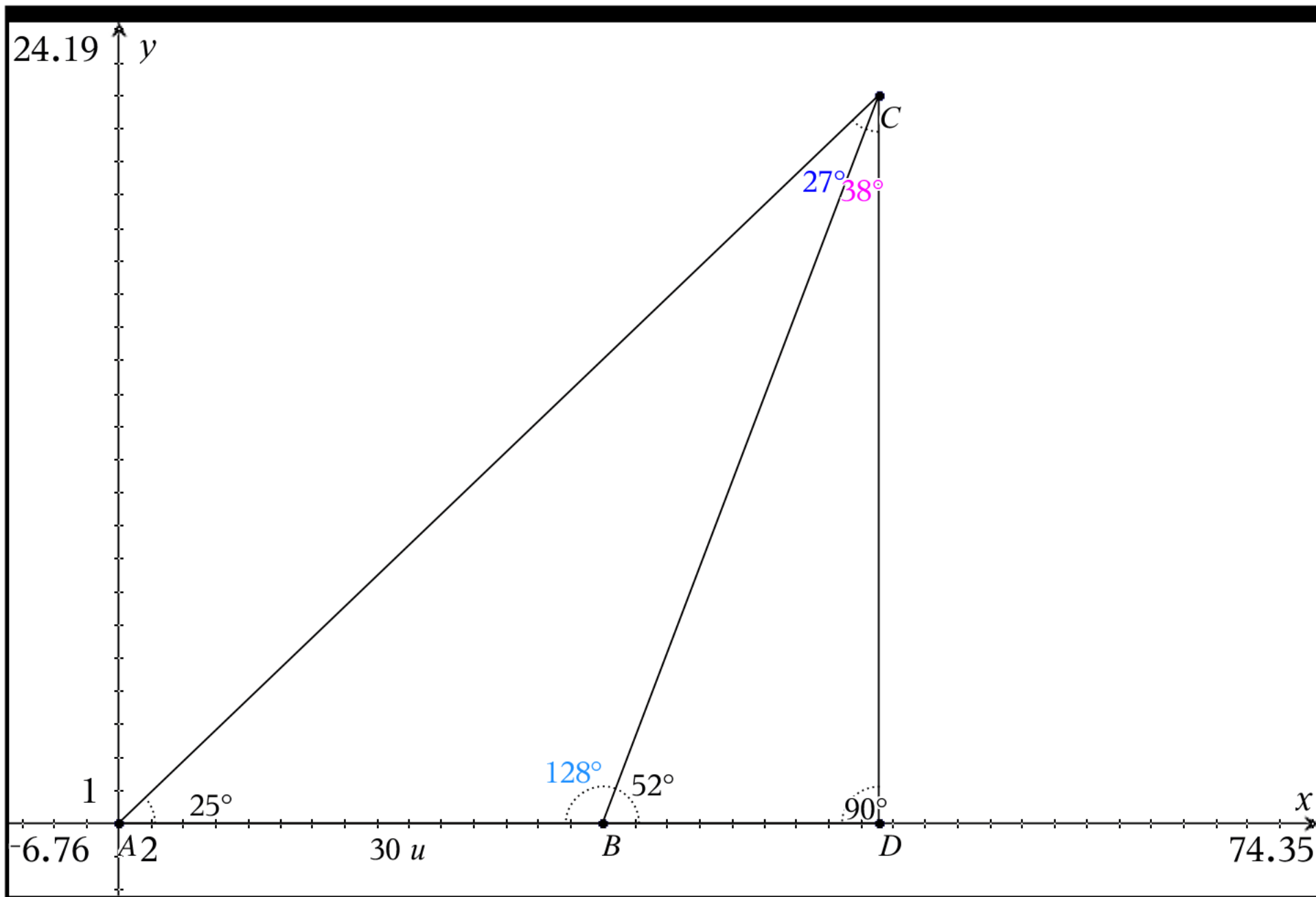
$$\begin{aligned} \text{missing side}^2 &= (11)^2 + (14)^2 - 2(11)(14)\cos(41) \\ &= 317 - 308 \cos(41) \end{aligned}$$

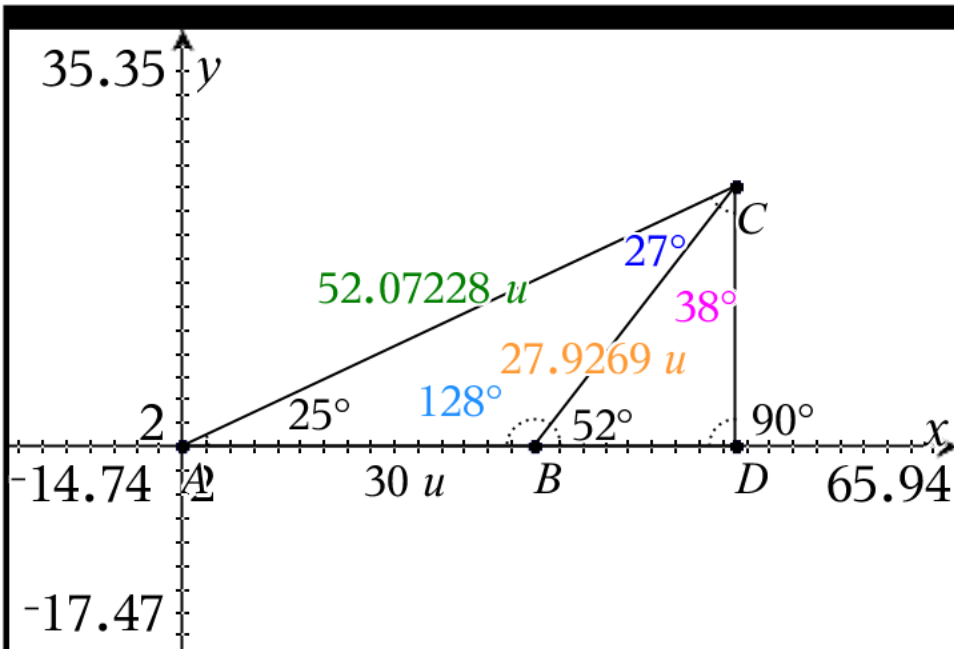
$$\begin{aligned} \text{missing side} &= \sqrt{[(11)^2 + (14)^2 - 2(11)(14)\cos(41)]} \\ &= \sqrt{[317 - 308 \cos(41)]} \\ &\approx 9.19508 \end{aligned}$$

Problem 8

	B
=	
1	25
2	52
3	30
4	
5	
6	
7	
8	
9	
10	
11	
B4	







Step 1: Find the missing angles using supplements, complements, and right triangles

Step 2: Determine one of the two hypotenuse of the right triangles using law of sines

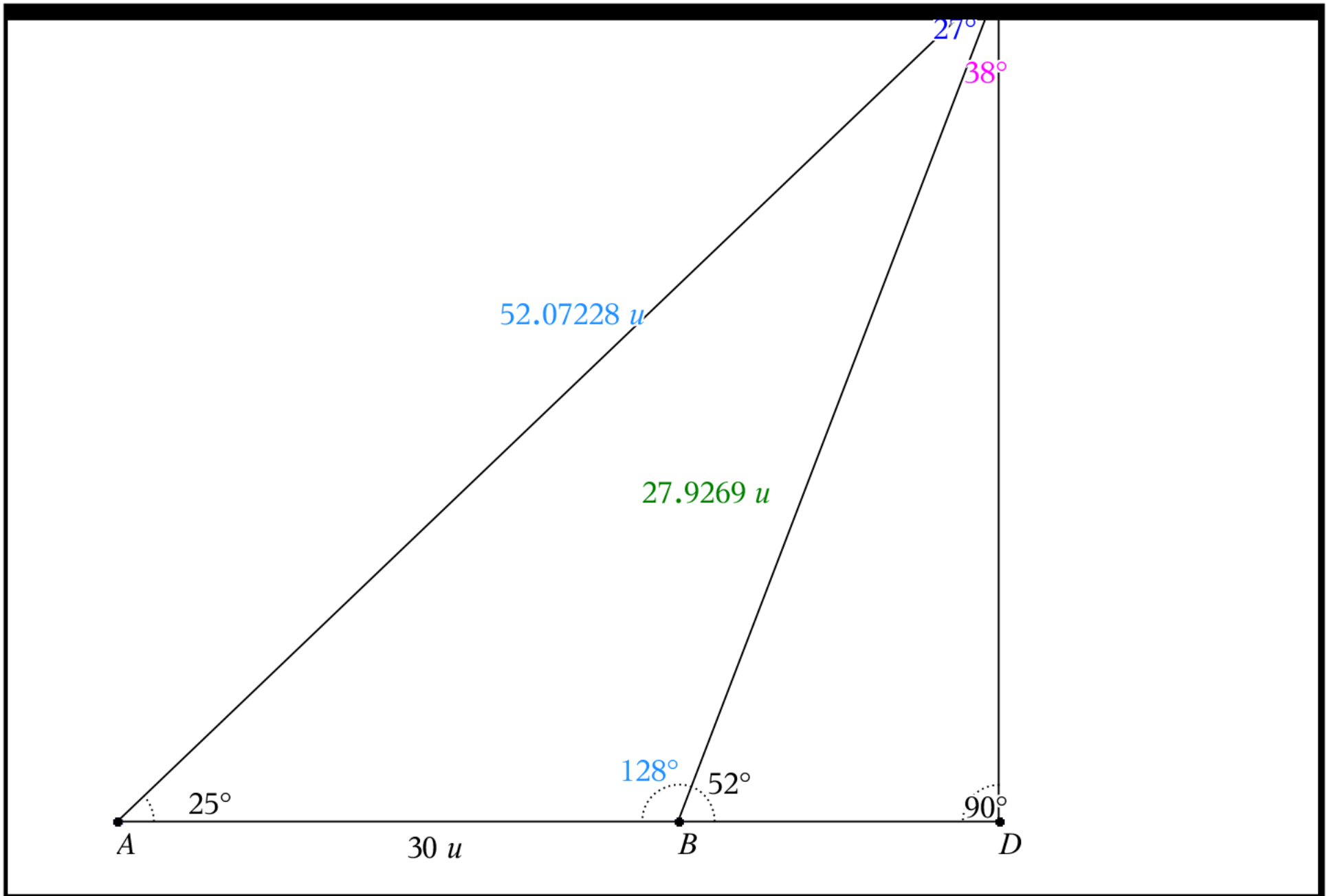
Step 3: Use sine ratio to solve for CD

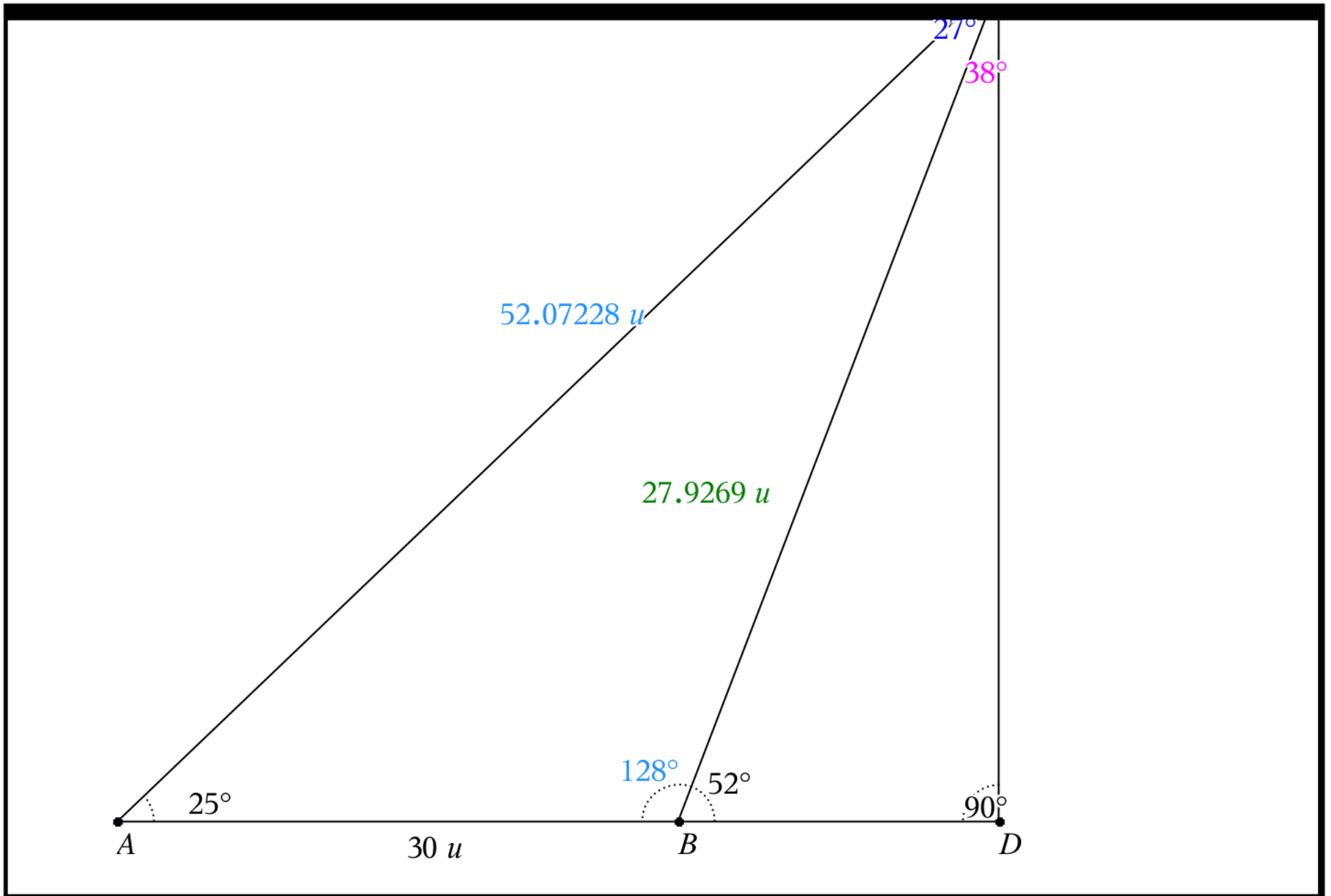
$$\frac{30}{\sin(27^\circ)} = \frac{AC}{\sin(128^\circ)}$$

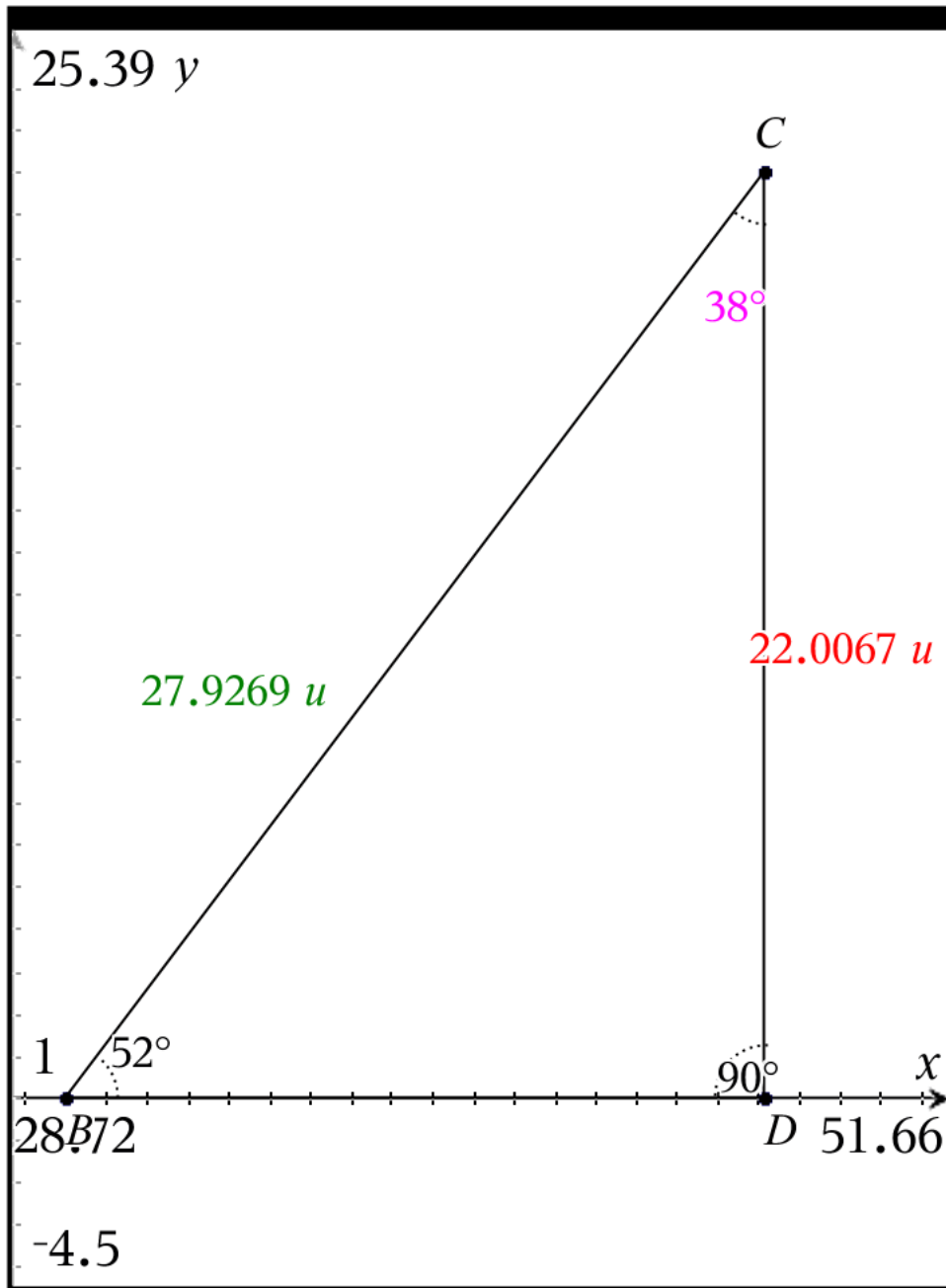
$$AC = \frac{30 \sin(128^\circ)}{\sin(27^\circ)} \approx 52.07228$$

$$\frac{30}{\sin(27^\circ)} = \frac{CB}{\sin(25^\circ)}$$

$$CB = \frac{30 \sin(25^\circ)}{\sin(27^\circ)} \approx 27.9269$$



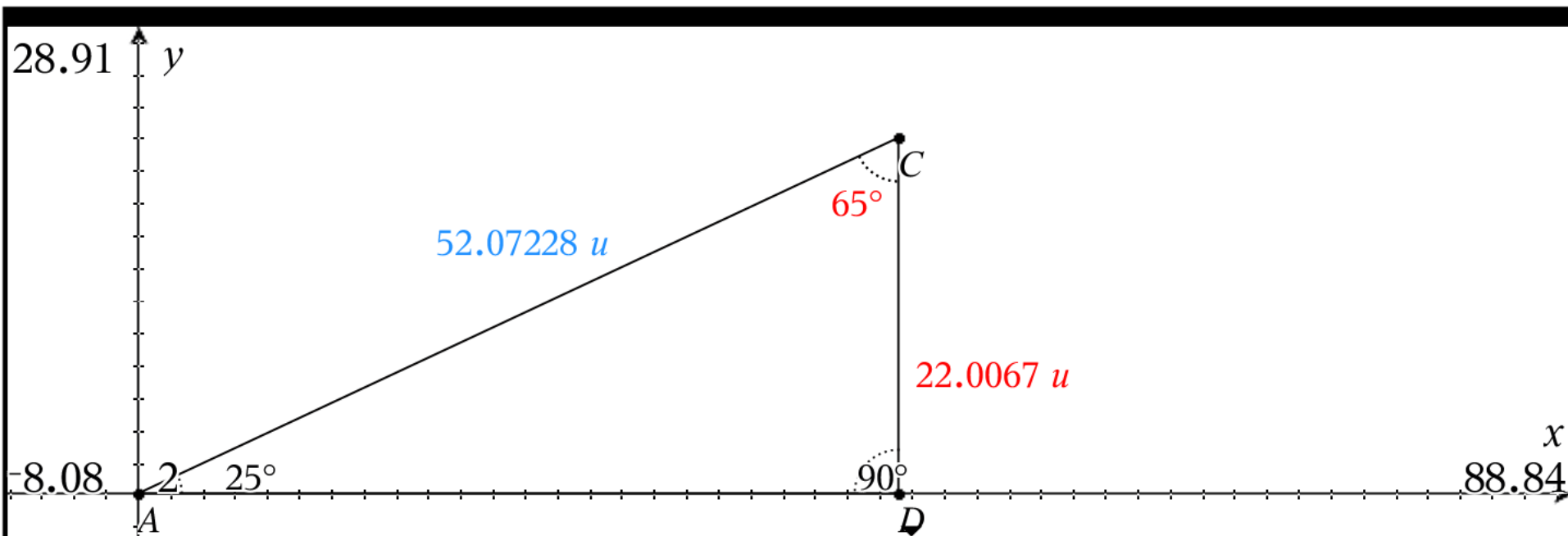




$$\sin(52^\circ) = \frac{CD}{27.9269}$$

$$CD = 27.9269 \sin(52^\circ)$$

$$CD \approx 22.0067$$

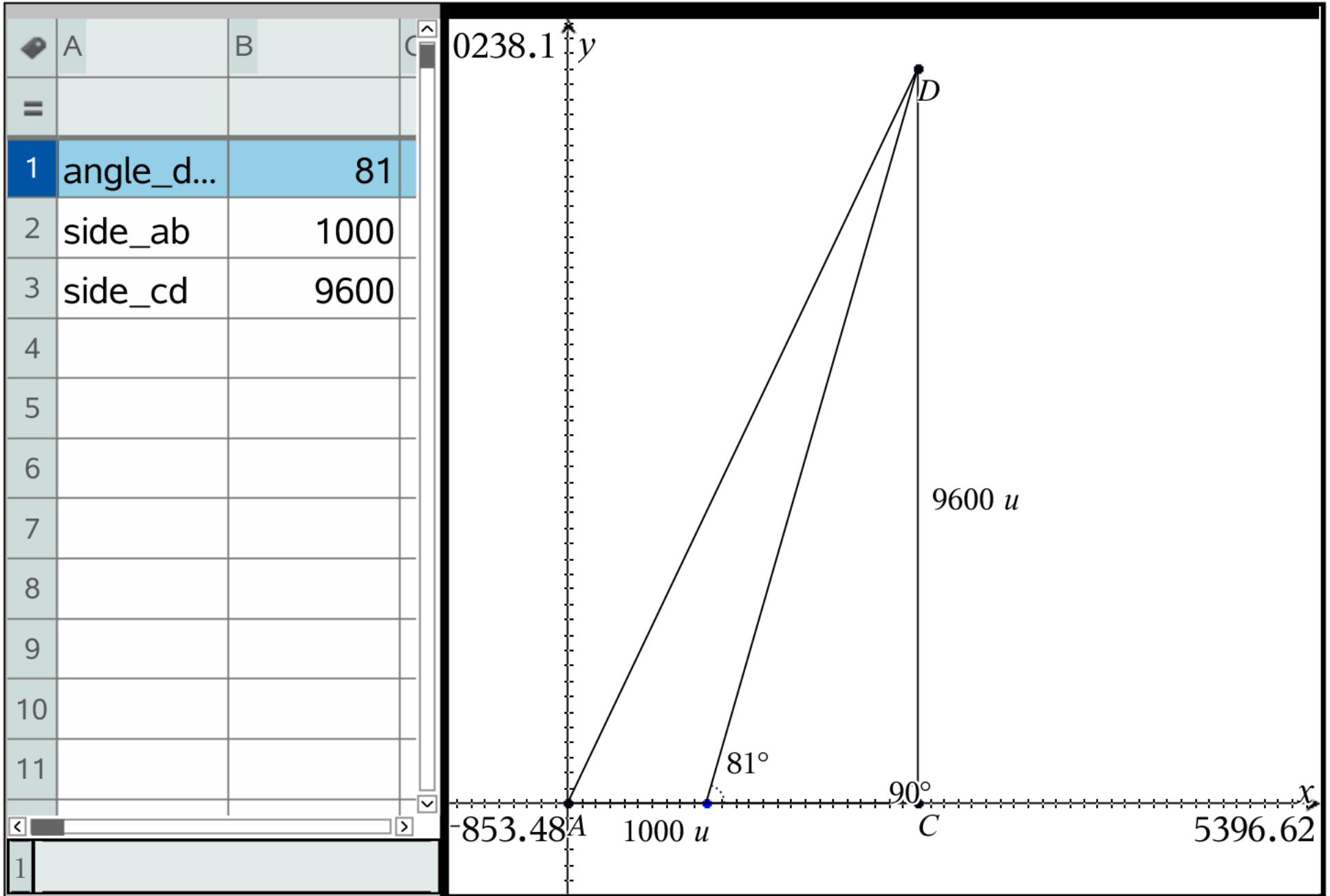


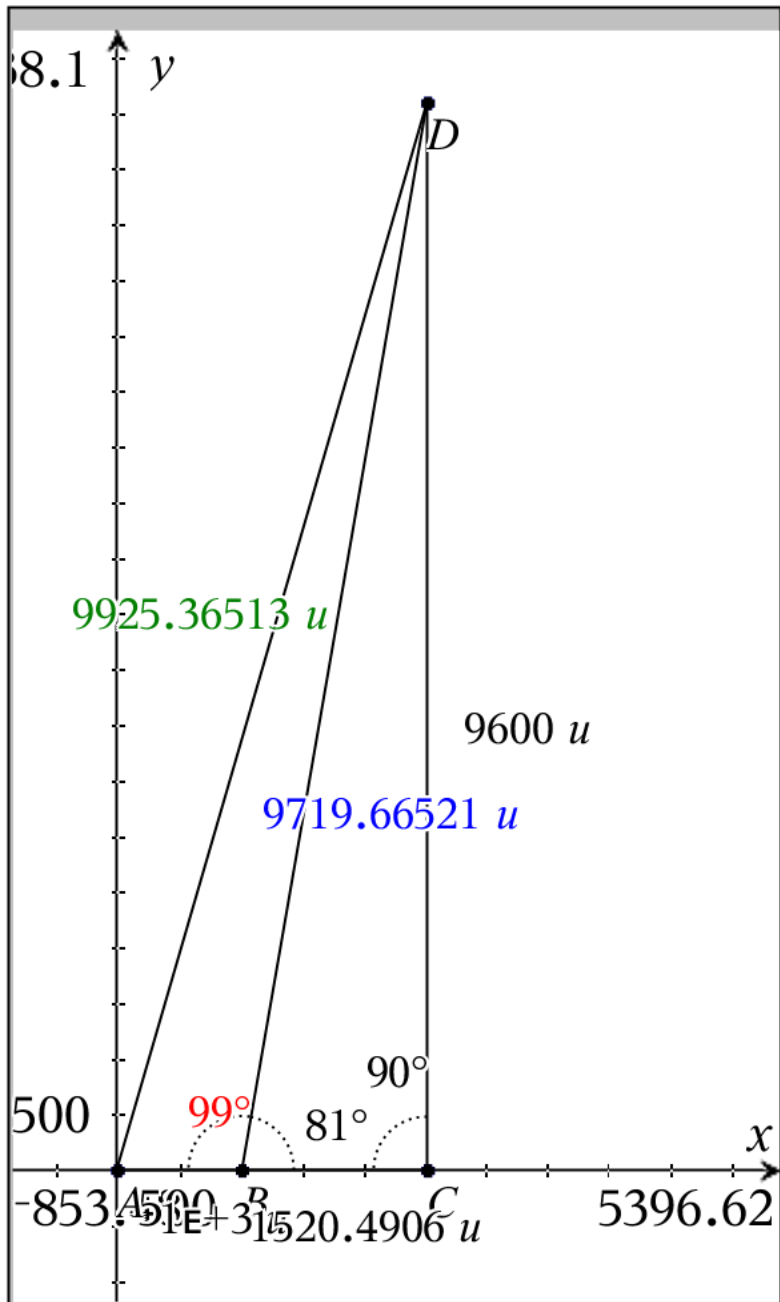
$$\sin(25^\circ) = \frac{CD}{52.07228}$$

$$CD = 52.07228 \sin(25^\circ)$$

$$CD \approx 22.0067$$

Problem 9





Step 1) Find $m\angle ABD = 180 - 81 \rightarrow 99$

Step 2) Find BD using sine ratio

$$\sin(81) = \frac{9600}{BD}$$

$$BD = \frac{9600}{\sin(81)} \rightarrow 9719.67$$

We have SAS now

Step 3) Use law of cosines to find AD

AD =

$$\sqrt{(9719.6652)^2 + 1000^2 - 2 \cdot 9719.6652 \cdot 1000 \cdot \cos(99)} \rightarrow 9925.37$$

Problem 10

