

solutions to #1 and #2

	A	B	C
=			
1	side_1		10
2	side_2		11
3	side_3		13
4			
5			
6			
7			
8			
9			
10			
11			

A1 side_1

Given information: SSS

$$\text{side}_1 = 10$$

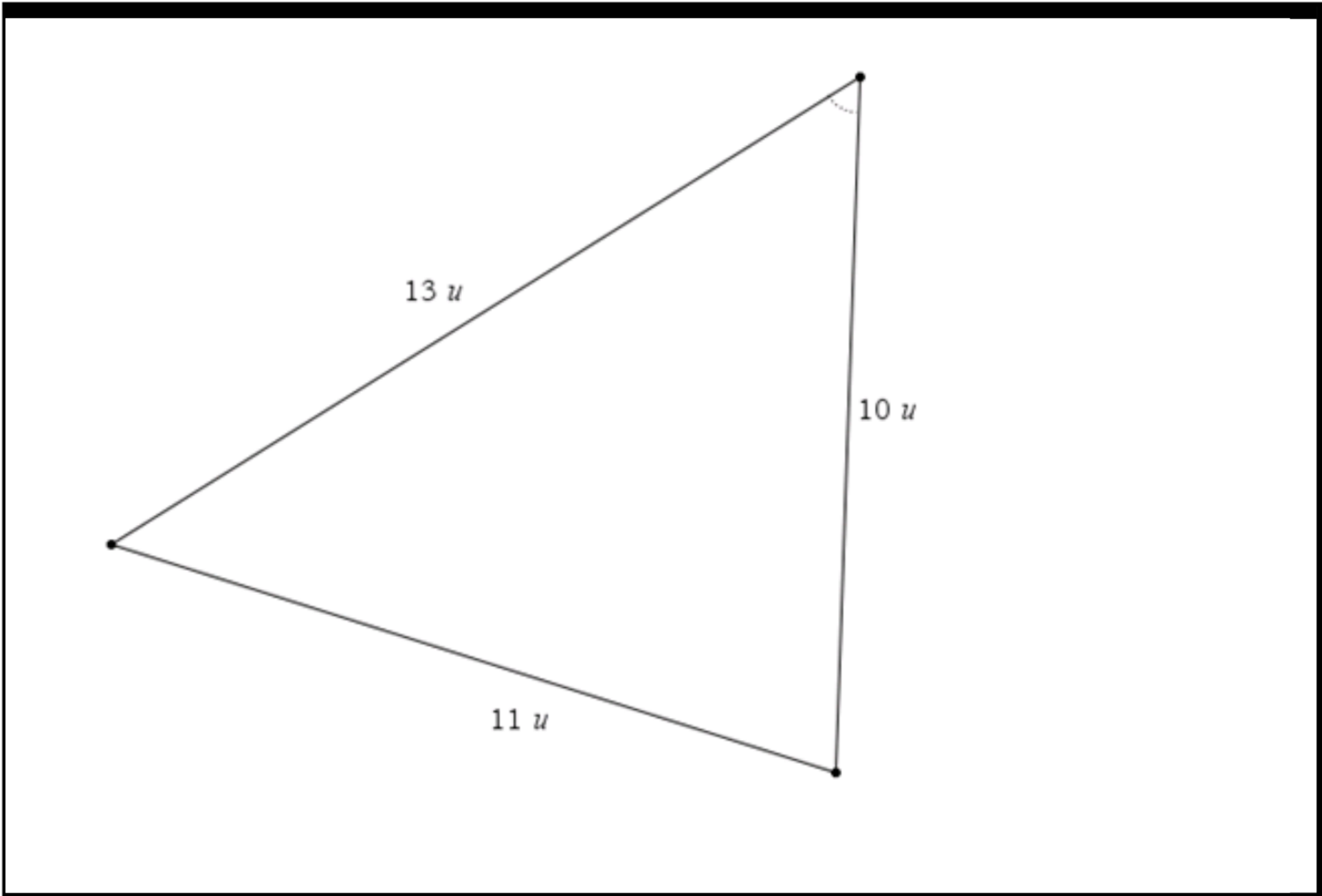
$$\text{side}_2 = 11$$

$$\text{side}_3 = 13$$

$$\text{semiperimeter} = 17$$

$$\begin{aligned} A &= \sqrt{[(17.)(17. - 10)(17. - 11)(17. - 13)]} \\ &= \sqrt{[2856.]} \\ &\approx 53.4416 \end{aligned}$$

$$P = 10 + 11 + 13 \approx 34$$



	A	B
=		
1	side_1	10
2	side_2	16
3	angle_3	53
4		
5		
6		
7		
8		
9		
10	63.8908	
11		

Given information: SAS

side_1 = 10

side_2 = 16

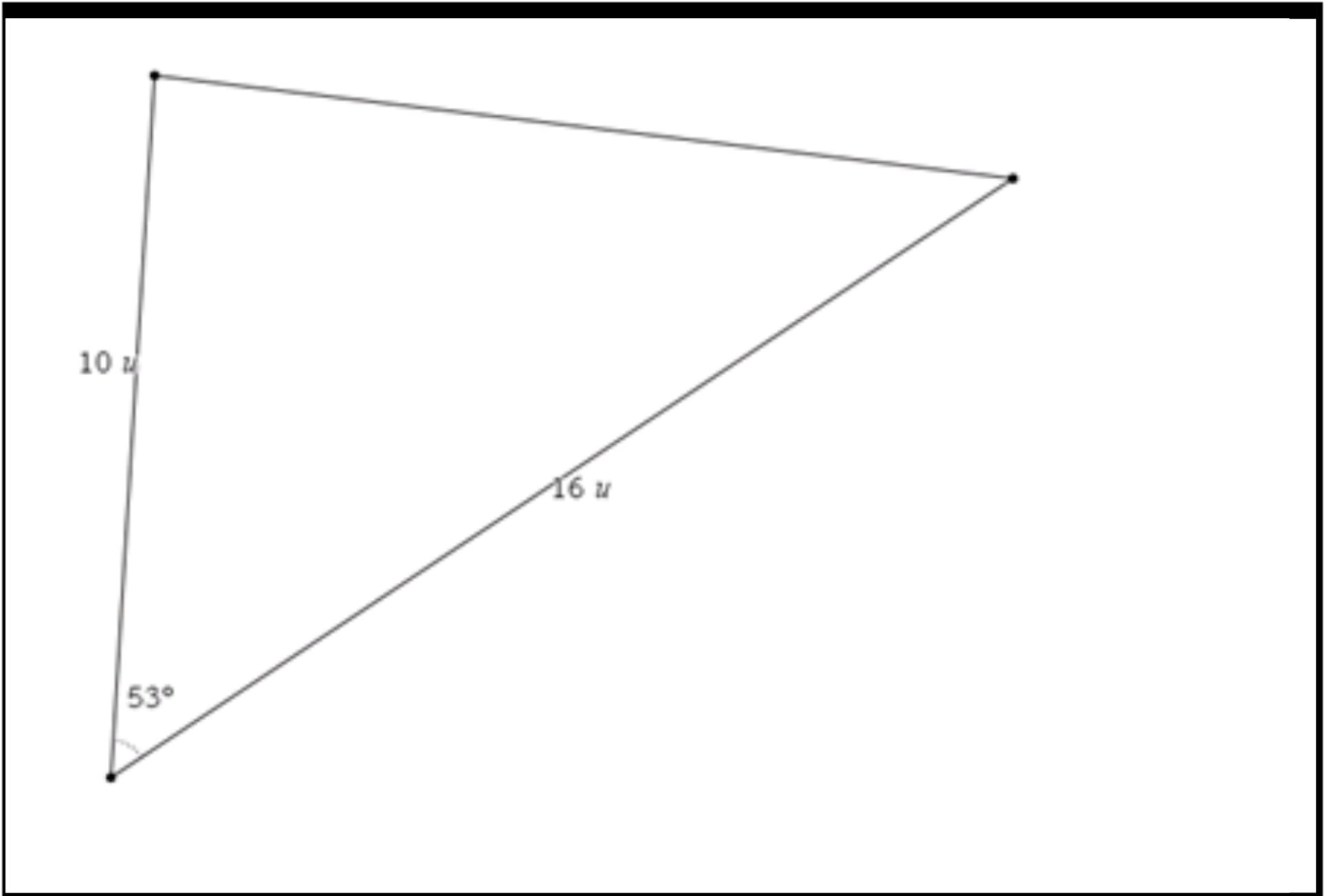
included angle = **53** missing side (see below)

$$A = \frac{1}{2} (10)(16)\sin(53) \quad \approx 63.8908$$

$$P = 10 + 16 + 12.7836 \quad \approx 38.7836$$

$$side\ 3 = \sqrt{(10)^2 + (16)^2 - 2(10)(16)\cos(53)}$$

$$\sqrt{356 - 320\cos(53)}$$



Solutions to #5

5) bearing of 309

5a) 321° South of West

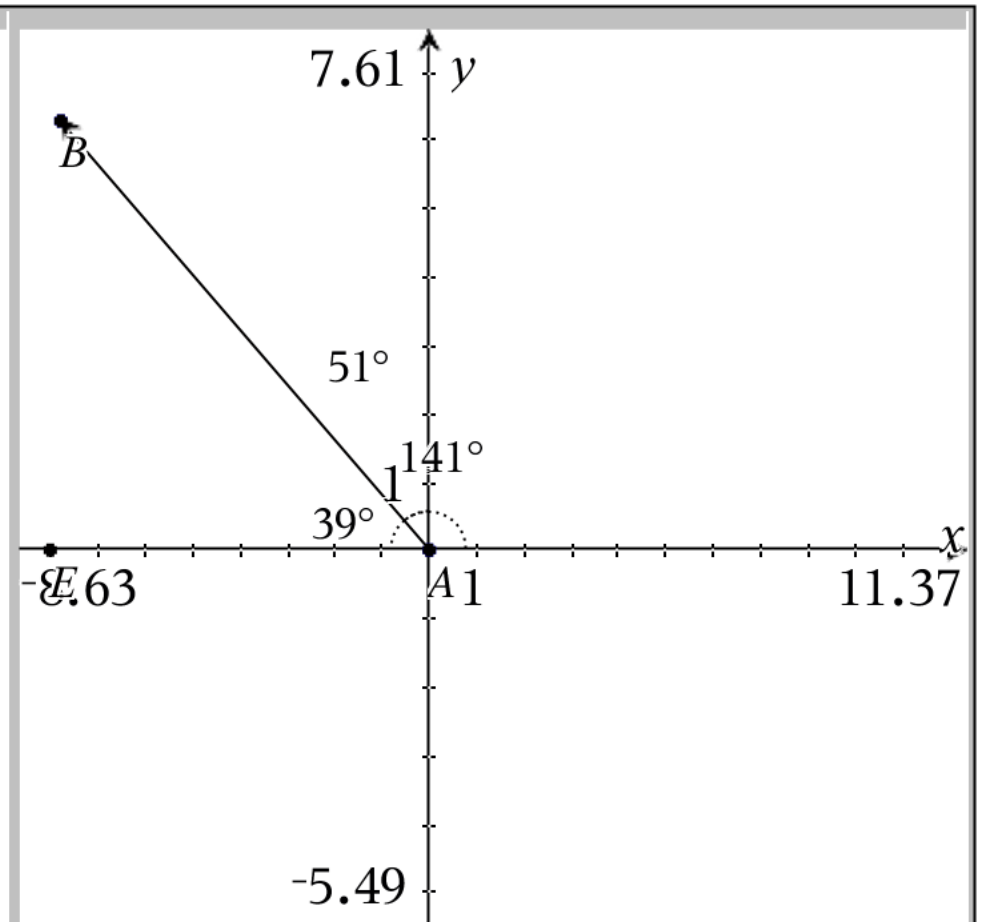
$$360 - 39$$

5b) 39° North of West

$$309 - 270$$

5c) S 129° W

$$90 + 39$$



	A	B	C	D
=				
1 bearing		309		
A1 bearing				

Solutions to #5

7) 127° East of South

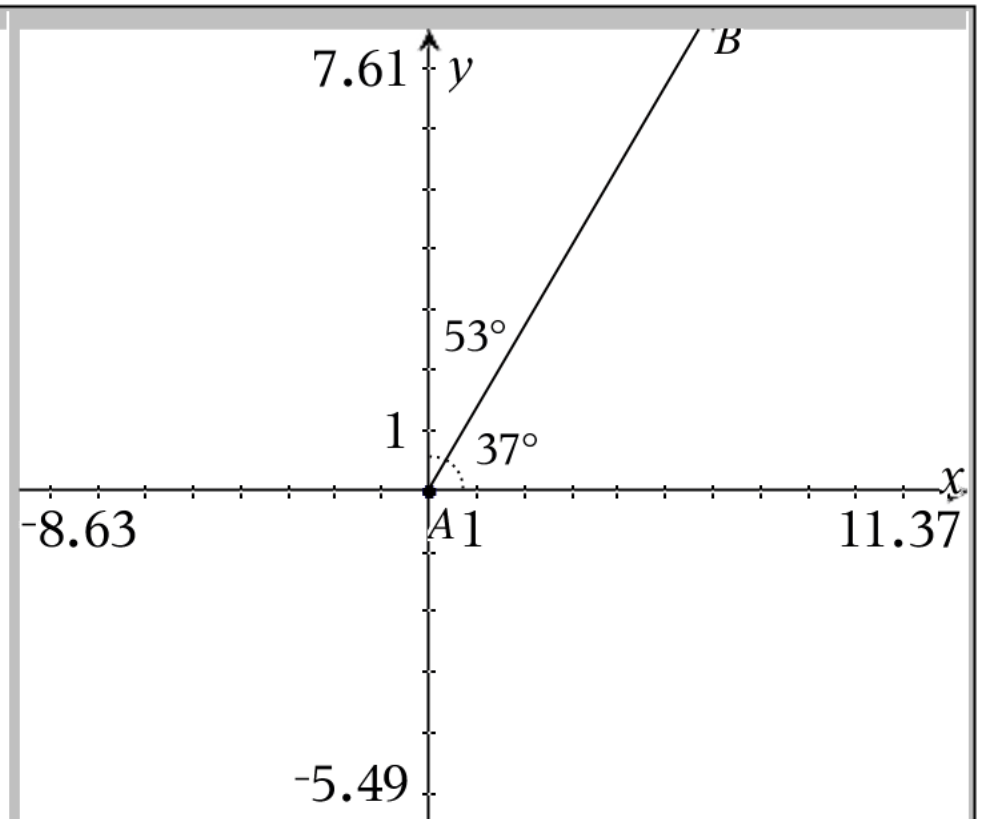
7a) bearing of $^\circ$

53°

7b) $^\circ$ East of North

53°

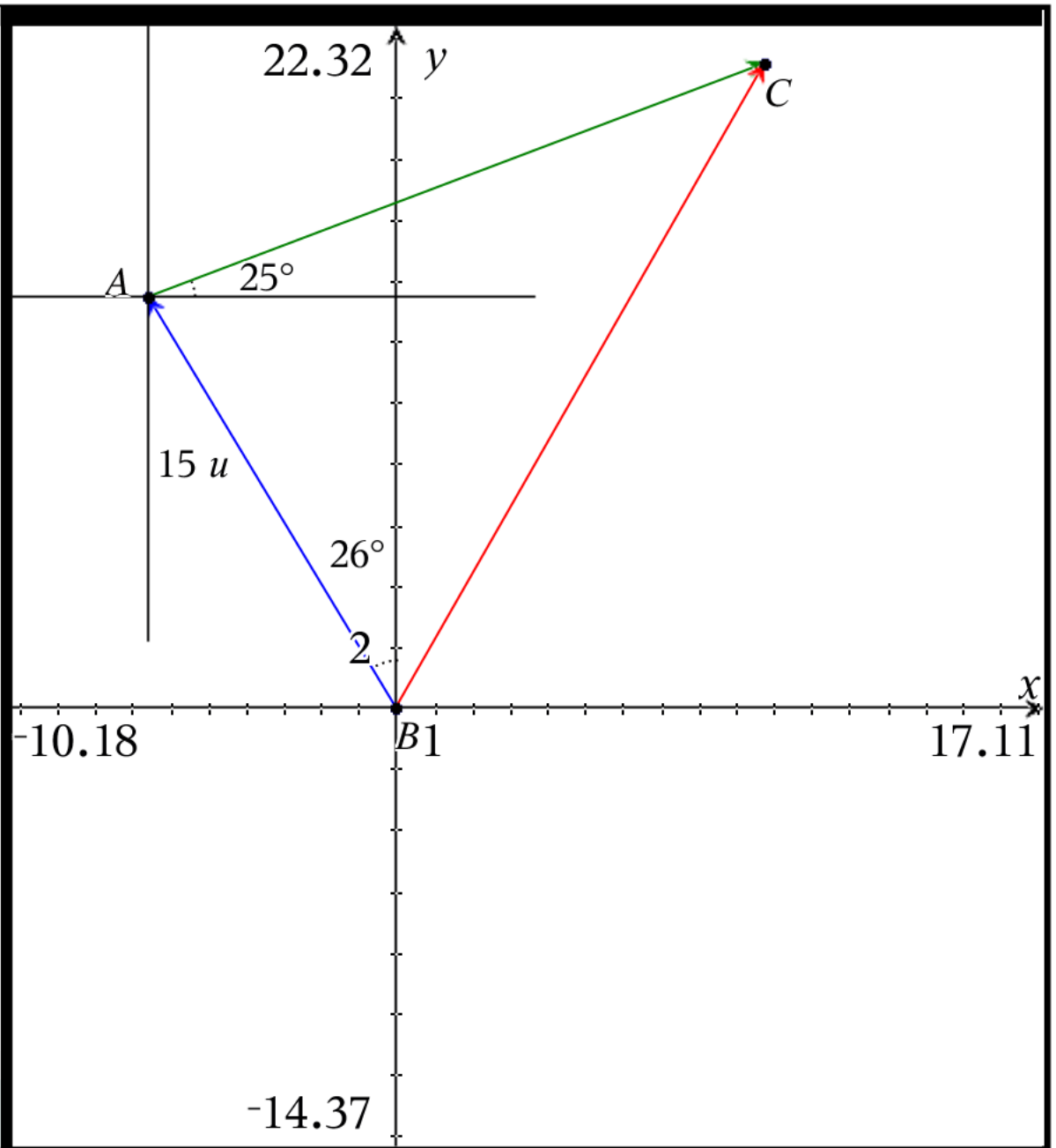
7c) N 307° W

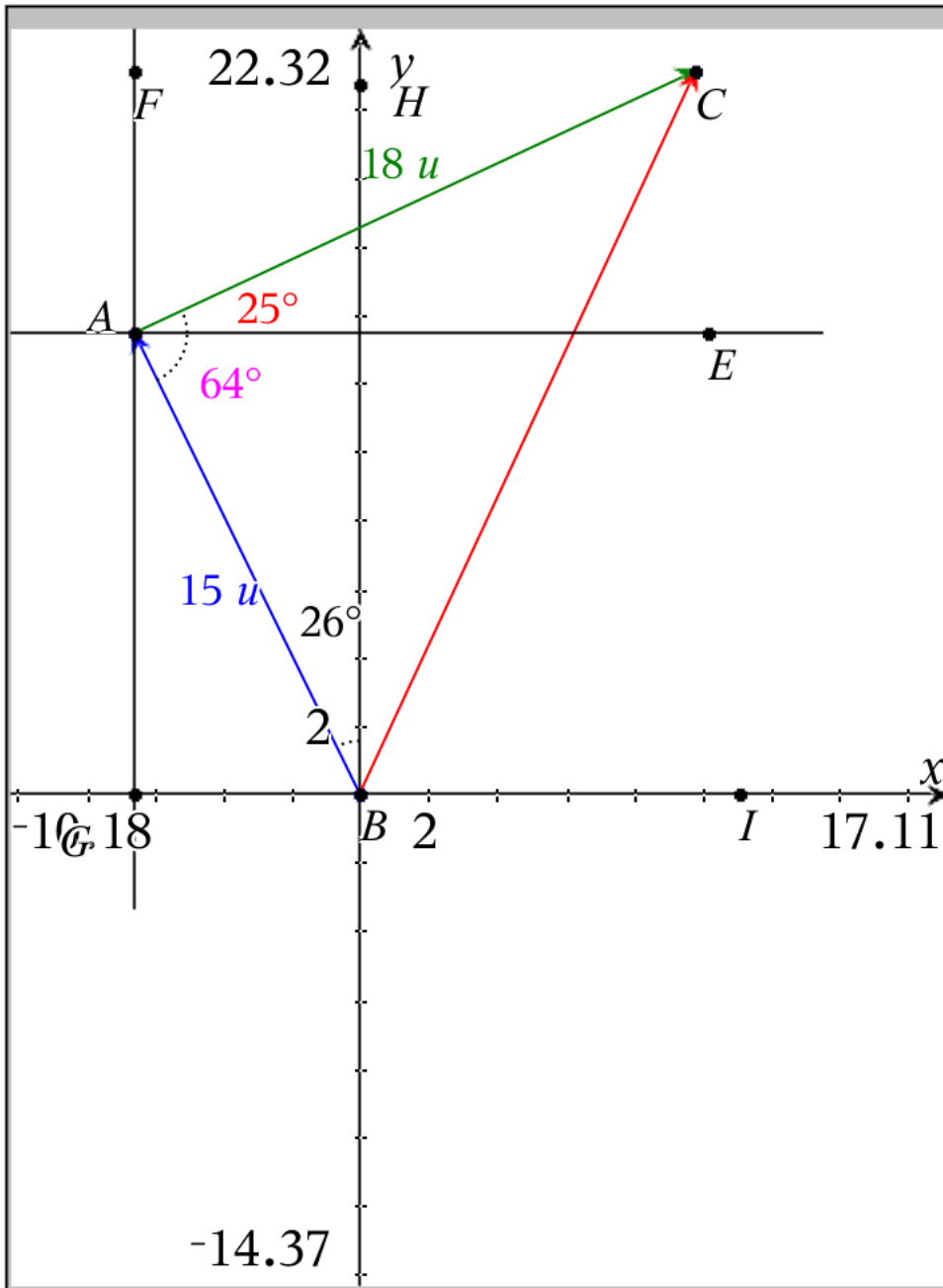


	A	B	C	D
=				
1	given_a...	127		
2				
A1	given_angle			

Solutions to #14, #15, #16

	A	B	C
=			
1	angle_1		26
2	magn_1		15
3	angle_2		115
4	magn_2		18
5			
6			
7			
8			
9			
10			
11			
<input type="text" value="A1 angle_1"/>			





Note $m\angle GAC = 115^\circ$ from given

We can find that $m\angle EAC = 25^\circ$

$$115 - 90$$

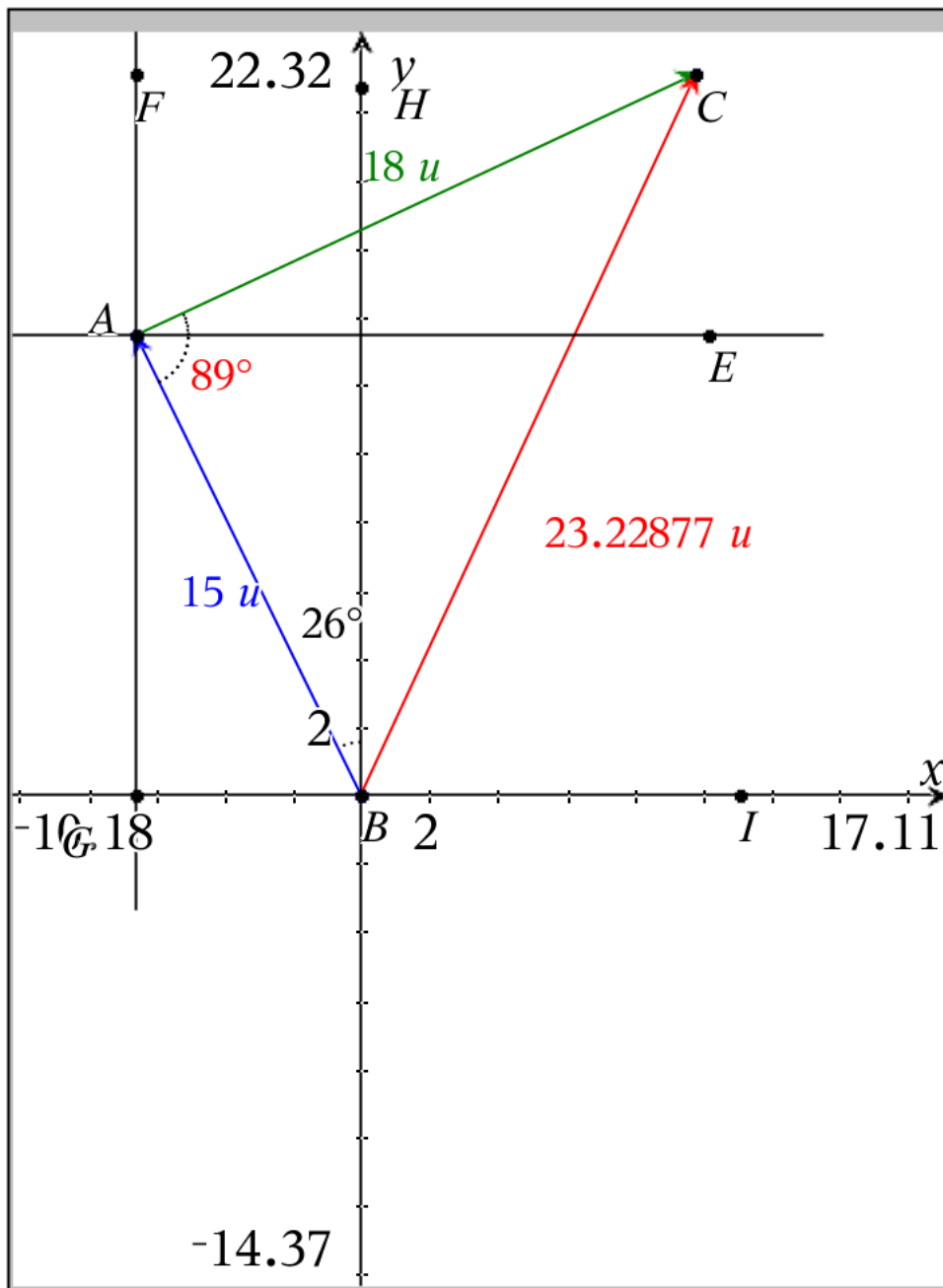
Note: $m\angle HBA = 26^\circ$ from given

We can find $m\angle BAE = 64^\circ$

$$90 - 26$$

We can now find $m\angle BAC = 89^\circ$

$$25 + 64$$

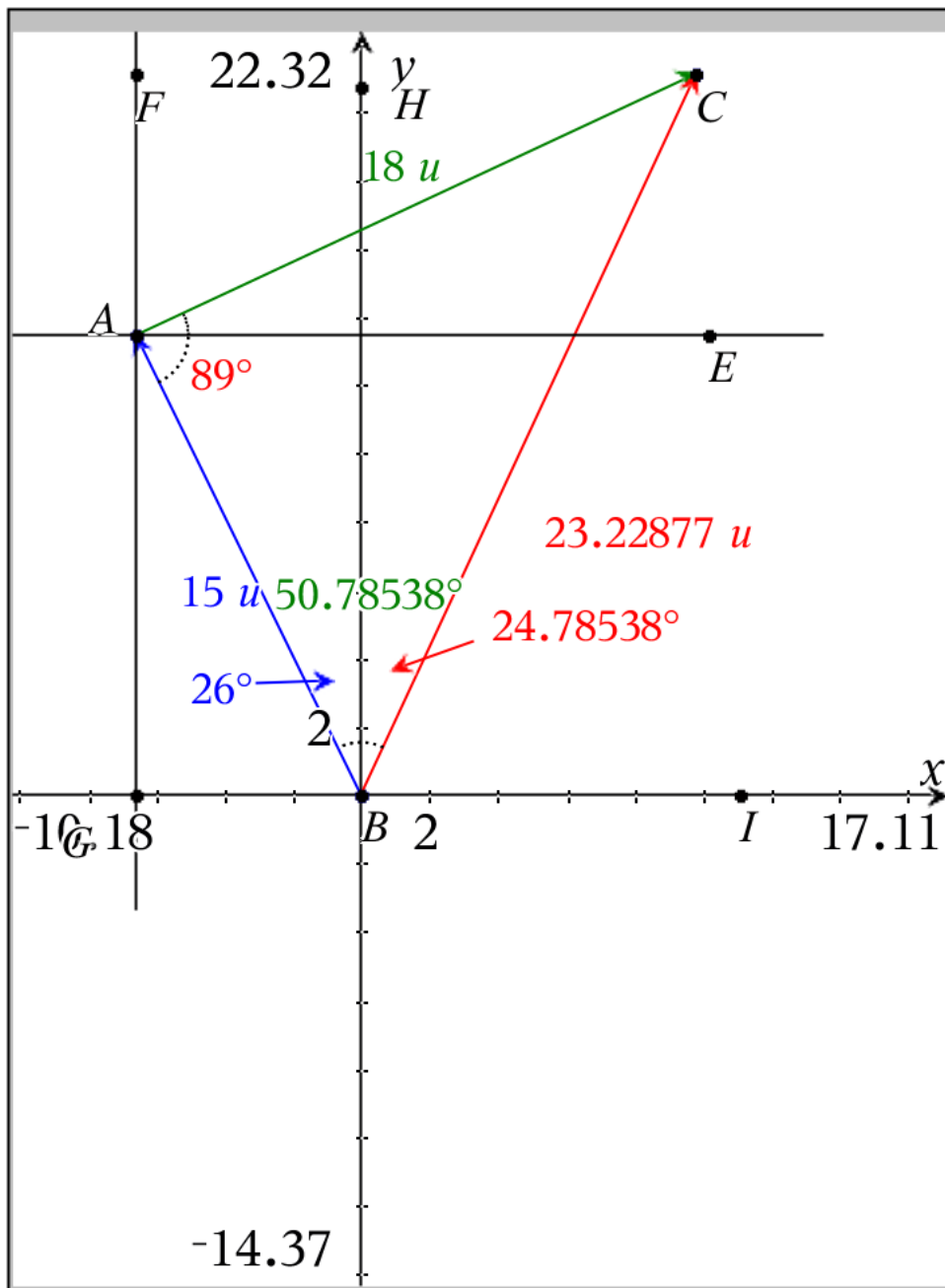


now that we know the angle opposite of the BC we can find its distance using law of cosines

$$BC = \sqrt{[15^2 + 18^2 - 2(15)(18)\cos(89)]}$$

$$BC = \sqrt{[549 - 540)\cos(89)]}$$

$$BC = 23.2288$$



Now have enough information to find $m\angle ABC$ which leads us to direction from Bob's House to Cindy's House

$\cos \angle ABC =$

$$\frac{(15^2 + 23.2288^2 - 18^2)}{2(15)(23.2288)}$$

$$= 0.632227$$

$$m\angle ABC = 50.7854$$

This can be used to find

$$m\angle HBC = 50.7854 - 26 = 24.7854^\circ$$

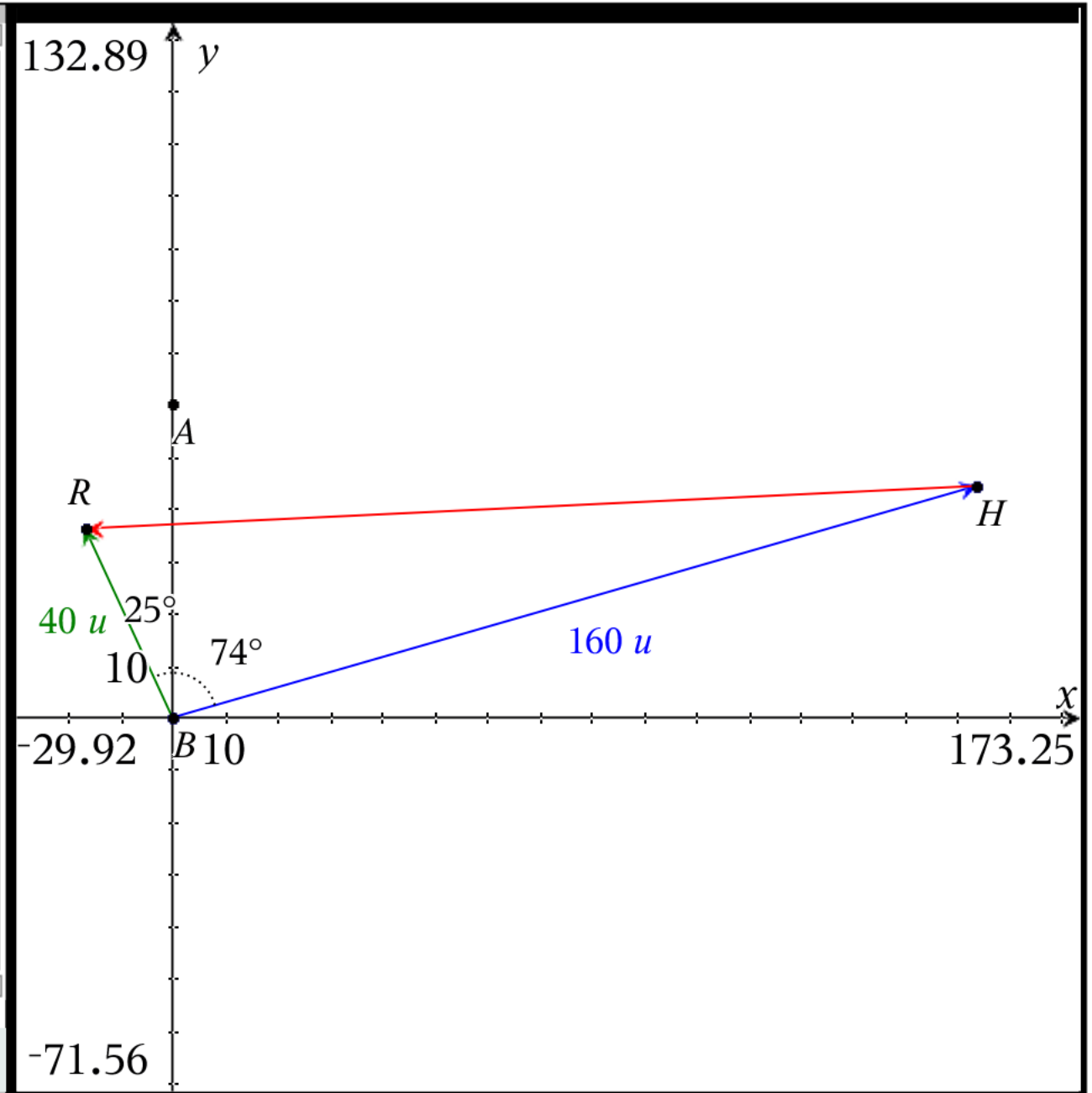
This is BEARING which leads to many other forms of direction or heading

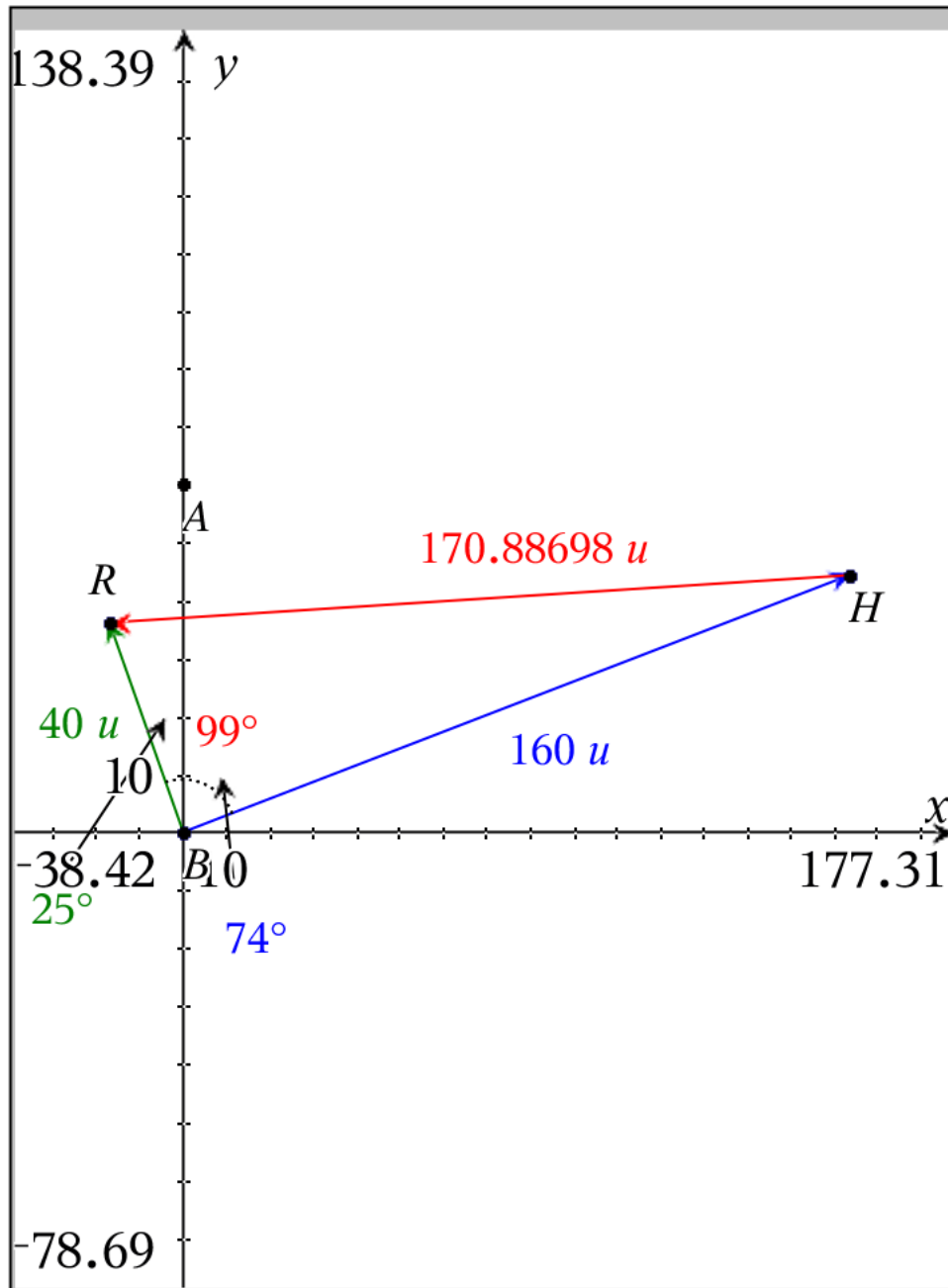
$$65.2146^\circ \text{ North of East}$$

Problem 6

	A	B	C
=			
1	bearing		74
2	rate_1		32
3	angle_1		25
4	rate_2		8
5	time		5
6			
7			
8			
9			
10			
11			

A1 bearing





Why is BH 160 ?

$$BH = 32(5) = 160$$

Why is BR 40 ?

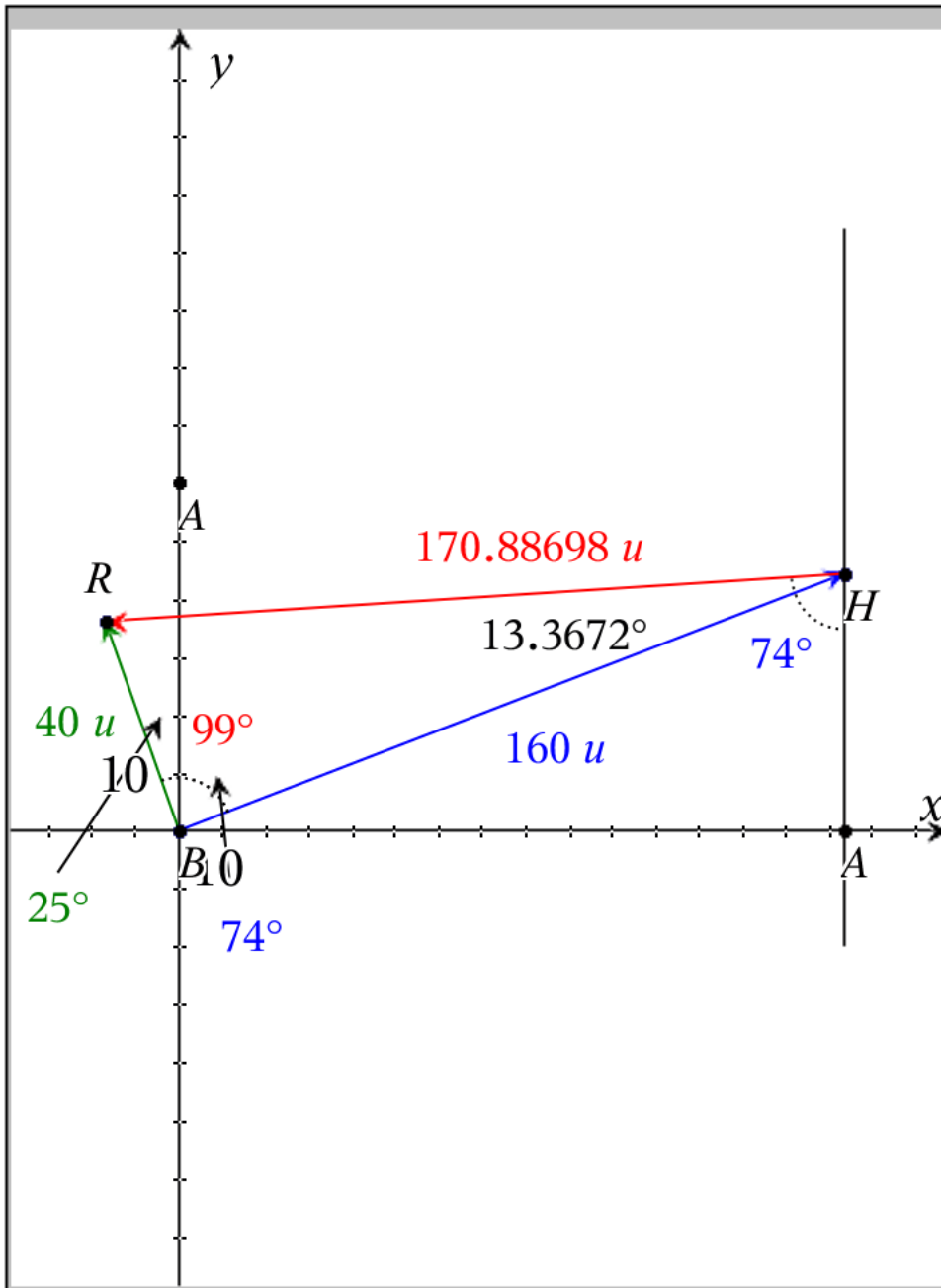
$$BR = 8(5) = 40$$

Since we were given the angles that actually form angle RBH it is a relatively easy task to find RH

$$RH = \sqrt{[160^2 + 40^2 - 2(160)(40)\cos(99)]}$$

$$RH = \sqrt{[27200 - 12800\cos(99)]}$$

$$RH = 170.887$$



To describe the direction of of vector HR we need $m\angle RHB$, since we now know all three sides, I would use law of cosines

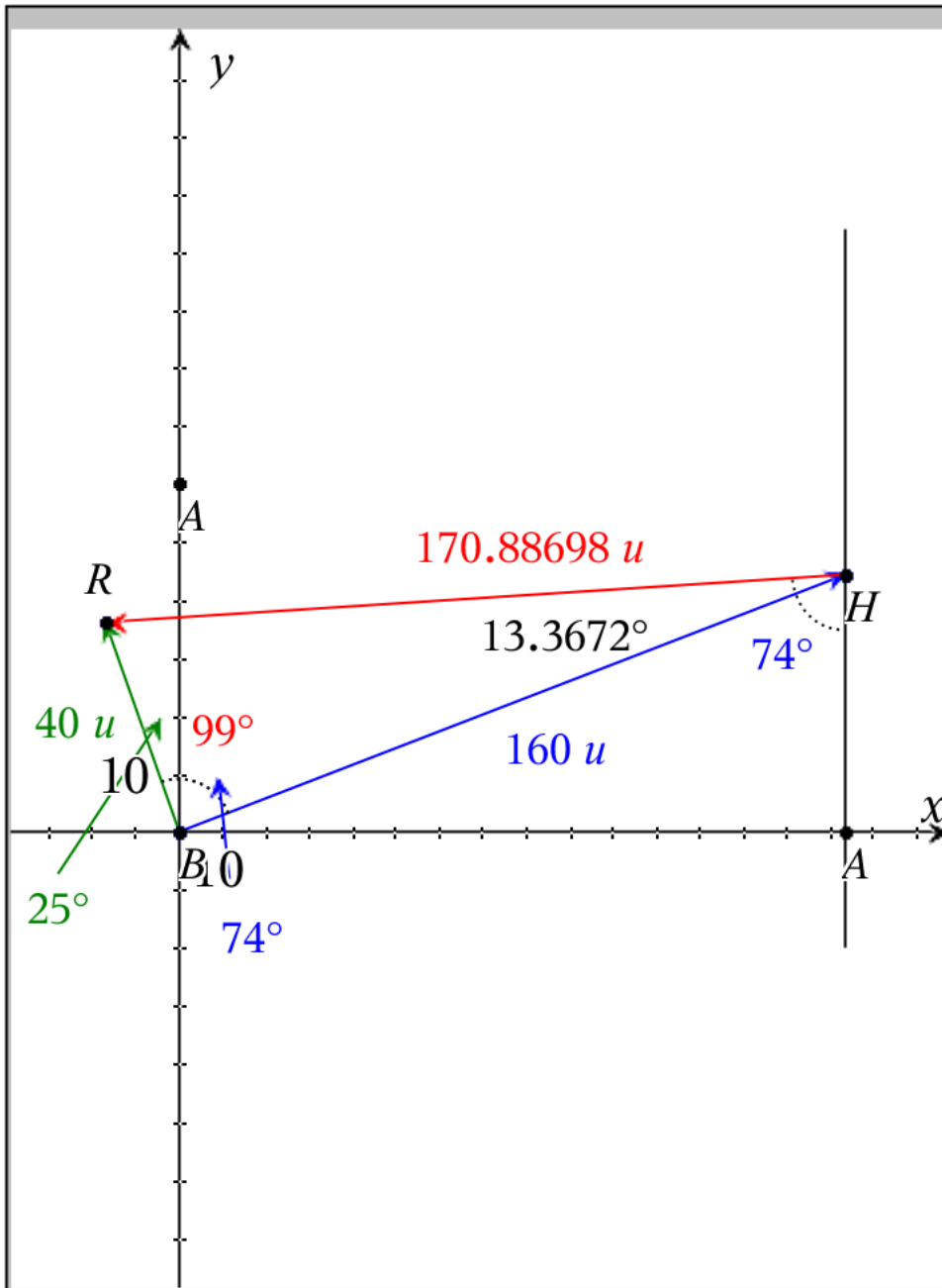
to find $m\angle RHB$

$\cos RHB =$

$$\frac{(160^2 + 170.887^2 - 40^2)}{[2(160)(170.887)]}$$

$$= 0.972908$$

$$m\angle RHB = 13.3672$$



Now that we know $m\angle RHB$ we can find

$$\begin{aligned} m\angle RHA &= m\angle AHB + m\angle RHB \\ &= 74 + 13.3672 \\ &= 87.3672^\circ \end{aligned}$$

This is the direction $S 87.3672^\circ W$

Which means the bearing is 267.367°

You can also state the direction is $N 92.6328^\circ W$

You can also state the direction is 2.6328° South of West

You can also state the direction is 177.367° South of East

$$-2 \cdot 32 \cdot x \cdot 8 \cdot x \quad \blacktriangleright \quad -512 \cdot x^2$$

$$CB = \sqrt{1088x^2 - 512x^2 \cdot \cos(99)}$$

$$300^2 = 1088 \cdot x^2 - 512 \cdot x^2 \cdot \cos(99)$$

$$90000 = 1088 \cdot x^2 - 512 \cdot x^2 \cdot \cos(99)$$

$$\frac{90000}{1088 - 512 \cdot \cos(99)} = \frac{x^2(1088 - 512 \cdot \cos(99))}{(1088 - 512 \cdot \cos(99))}$$

$$x^2 = \frac{90000}{1088 - 512 \cdot \cos(99)}$$

$$x = \sqrt{\frac{90000}{1088 - 512 \cdot \cos(99)}} \quad \blacktriangleright \quad 8.77773$$

$$CB =$$

$$\sqrt{\left(32 \cdot \sqrt{\frac{90000}{1088 - 512 \cdot \cos(99)}}\right)^2 + \left(8 \cdot \sqrt{\frac{90000}{1088 - 512 \cdot \cos(99)}}\right)^2 - 2 \cdot 32 \cdot \sqrt{\frac{90000}{1088 - 512 \cdot \cos(99)}} \cdot 8 \cdot \sqrt{\frac{90000}{1088 - 512 \cdot \cos(99)}}}$$

$\blacktriangleright 300.$

$$CB = \sqrt{(32 \cdot 8.778)^2 + (8 \cdot 8.778)^2 - 2 \cdot 32 \cdot 8.778 \cdot 8 \cdot 8.778 \cdot \cos(99)} \quad \blacktriangleright \quad 300.009$$

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