

10) ① Solve for the missing parts of this triangle:

$$B = 105^\circ, C = 34^\circ, b = 61.$$

o) ② To measure the length BC of a lake, a baseline AB is established and measured to be 130 meters. Angles A and B are measured to be 39° and 117.2° , respectively. How long is the lake?

o) ③ Suppose $B = 85^\circ, a = 18, c = 14$. Find side b, and A

o) ④ Two points A and B are on opposite sides of a building. A third point C is selected to place a transit. Point C is 46 feet from point A and 75 feet from point B. The angle ACB is 59° . How far apart are points A and B?

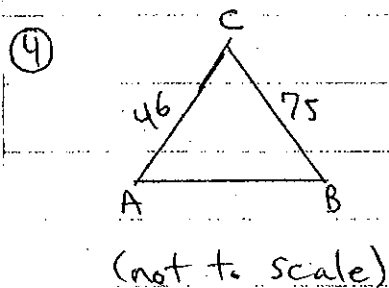
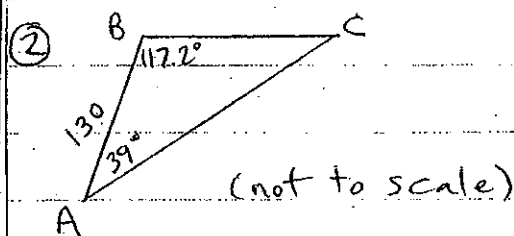
o) ⑤ a) Convert $(-\sqrt{3}, -1)$ to polar form with $r \geq 0$ and $0^\circ \leq \theta \leq 360^\circ$. Show work.

b) Convert $(-4, 330^\circ)$ to rectangular form. Give exact values. Show work.

o) ⑥ a) Transform the equation $r = -5 \cos \theta$ to rectangular form.

⑥ b) Change $x^2 + 16y^2 = 16$ to polar form.

Pictures:



MAC 1114 EXAM IV (F'09)

$$\textcircled{1} A = 180^\circ - 105^\circ - 34^\circ = 41^\circ$$

$$\frac{a}{\sin 41^\circ} = \frac{61}{\sin 105^\circ} \Rightarrow a = 41.4$$

$$\frac{c}{\sin 34^\circ} = \frac{61}{\sin 105^\circ} \Rightarrow c = 35.3$$

$\textcircled{2}$ BC = length of the lake

$$C = 180^\circ - 39^\circ - 117.2^\circ = 23.8^\circ$$

$$\frac{x}{\sin 39^\circ} = \frac{130}{\sin 23.8^\circ}$$

$$x \approx 202.7$$

$$\textcircled{3} b^2 = a^2 + c^2 - 2ac \cos B$$

$$= 18^2 + 14^2 - 2(18)(14) \cos 85^\circ$$

$$b^2 \approx 476.07 \Rightarrow b \approx 21.8$$

$$\frac{\sin A}{18} = \frac{\sin 85^\circ}{21.8}$$

$$A \approx 55.3^\circ$$

or use Law of Cosines to get A.

$$\textcircled{4} x^2 = 46^2 + 75^2 - 2(46)(75) \cos 59^\circ$$

$$x \approx 64.71$$

$$\textcircled{5} a) (-\sqrt{3}, -1) \text{ Q III}$$

$$\tan \theta = \frac{-1}{-\sqrt{3}} = \frac{1}{\sqrt{3}}$$

$$\theta = 30^\circ + 180^\circ = 210^\circ$$

$$r = \sqrt{3+1} = \sqrt{4} = 2$$

$$b) x = -4 \cos 330^\circ = -4\left(\frac{\sqrt{3}}{2}\right) = -2\sqrt{3}$$

$$y = -4 \sin 330^\circ = -4\left(-\frac{1}{2}\right) = 2$$

$$(-2\sqrt{3}, 2)$$

$$\textcircled{6} a) r^2 = -5r \cos \theta$$

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

$$\textcircled{6} b) x^2 + 16y^2 = 16$$

$$(r \cos \theta)^2 + 16(r \sin \theta)^2 = 16$$

$$\text{or } r^2 \cos^2 \theta + 16r^2 \sin^2 \theta = 16$$