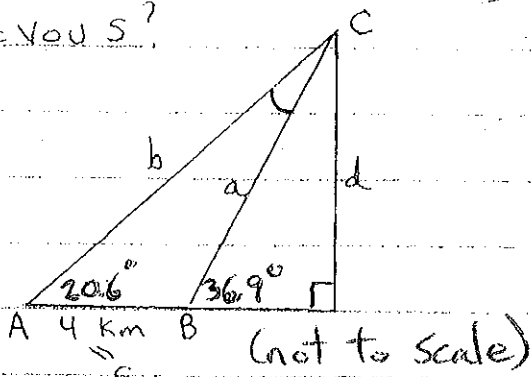


(10) ① If $b=4$, $c=5$, and $A=62^\circ$, find a and B .

(10) ② Two ships leave from 2 ports which are 4 km apart on the same shoreline. Ship A is traveling at a bearing of 20.6° and ship B at a bearing of 36.9° . How many km will they be from the shore when they rendezvous?



Hint: First find BC.

(10) ③ If $B=108^\circ$, $b=15$, $a=11$, solve for the missing parts of $\triangle ABC$.

(10) ④ Los Angeles and Las Vegas are approximately 200 miles apart. A pilot 70 miles from Los Angeles finds that she is 7.4° off course relative to her start in Los Angeles. How far is she from Las Vegas at this time?

(10) ⑤ a) Convert $(-2, 300^\circ)$ to rectangular form. (Give exact values. Show work)

b) Convert $(3.17, -2.43)$ to polar form with $r > 0$ and $0^\circ < \theta < 360^\circ$. Show work.

(10) ⑥ a) Change the equation $r = -2 \sin \theta$ to rectangular form. Show work.

b) Change $x^2 + (y-1)^2 = 1$ to polar form. Show work.
Hint: First, multiply out.

(MWF)
MAC 1114 (F'11) EX. IV KEY (60 pts.)

$$\textcircled{1} a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 4^2 + 5^2 - 2(4)(5) \cos 62^\circ$$

$$a \approx 4.713$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac} \Rightarrow B = 48.53^\circ$$

$$\textcircled{2} \frac{a}{\sin 20.6^\circ} = \frac{4}{\sin 16.3^\circ}$$

$$\Rightarrow a = BC \approx 5.014369$$

$$\sin 36.9^\circ = \frac{d}{a} \Rightarrow d \approx 3.01$$

$$\textcircled{3} \frac{\sin A}{11} = \frac{\sin 108^\circ}{15}$$

$$\sin A = \frac{11 \sin 108^\circ}{15}$$

$$A \approx 44.2^\circ$$

$$C = 180^\circ - 108^\circ - 44.2^\circ = 27.8^\circ$$

$$\frac{c}{\sin 27.8^\circ} = \frac{15}{\sin 108^\circ}$$

$$c \approx 7.36$$

$$\textcircled{4} c^2 = 70^2 + 200^2 - 2(70)(200) \cos 7.4^\circ$$



$$c \approx 130.9$$

(not to scale)

$$\textcircled{5} a) x = -2 \cos 300^\circ = -2 \left(\frac{1}{2}\right) = -1$$

$$y = -2 \sin 300^\circ = -2 \left(-\frac{\sqrt{3}}{2}\right) = \sqrt{3}$$

$$b) r^2 = (3.17)^2 + (2.43)^2 = 15.9538$$

$$r \approx 3.99$$

$$\tan \theta = -\frac{2.43}{3.17} \quad \alpha = 37.47^\circ$$

$$\theta = 322.53^\circ$$

$$\textcircled{6} a) r = -2 \sin \theta$$

$$r^2 = -2r \sin \theta \Rightarrow x^2 + y^2 = -2y$$

$$b) x^2 + y^2 - 2y + 1 = 1$$

$$x^2 + y^2 - 2y = 0$$

$$r^2 - 2r \sin \theta = 0 \quad \text{or}$$

$$r = 2 \sin \theta$$