

(MWF, 60 pts.)

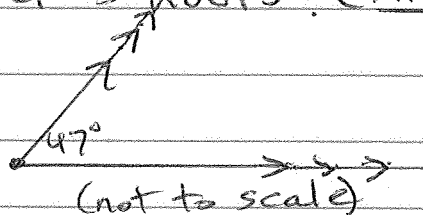
MAC 1114

EXAM IV MR. NADEL SPRING 2017

(10) ① Find the missing parts of $\triangle ABC$ if $B = 32^\circ$, $b = 100$, $c = 150$ and C is acute ($C < 90^\circ$).
Give answers to the nearest tenth.

(10) ② If $a = 15$, $b = 10$, $c = 13$, find angles A , B , and C in triangle ABC , to the nearest tenth. Do not use Law of Sines.

(10) ③ Two hikers, Marie and Sam, leave the same point at the same time. Marie walks due east at the rate of 3 miles per hour. Sam walks at the rate of 4.3 miles per hour. The angle between their paths is 47° . How far apart are they after 3 hours? (Hint: distance = rate \times time.)



(15) ④ a) Convert $(-2, 300^\circ)$ to rectangular form.
Give exact values.

b) Convert $(-3.7, 2.1)$ to polar form
with $r > 0$ and $0^\circ \leq \theta \leq 360^\circ$. Show work.

c) Convert $x^2 = 5y$ to polar form.

(15) ⑤ Sketch

a) $r = -4 \sin \theta$

b) $r = 3 - 2 \cos \theta$

c) $r^2 = 36 \sin 2\theta$

(Show all key values and angles.)

MAC 1114 EXAM IV KEY (SP '17)

$$\textcircled{1} \frac{\sin C}{150} = \frac{\sin 32^\circ}{100}$$

$$\Rightarrow C = 52.6^\circ$$

$$A = 180^\circ - 32^\circ - 52.6^\circ = 95.4^\circ$$

$$\frac{a}{\sin 95.4^\circ} = \frac{100}{\sin 32^\circ}$$

$$\Rightarrow a \approx 187.9$$

$$\textcircled{2} \cos A = \frac{10^2 + 13^2 - 15^2}{2(10)(13)} \Rightarrow A = 80.3^\circ$$

Similarly, using LOC,

$$B = 41.1^\circ, C = 58.7^\circ$$

(Due to rounding, the sum isn't exactly 180°).

$$\textcircled{3} 3(3) = 9 \text{ miles}$$

$$4.3(3) = 12.9 \text{ miles}$$

$$c^2 = 9^2 + 12.9^2 - 2(9)(12.9)\cos 47^\circ$$

$$c^2 = 89.04998079$$

$$c \approx 9.44$$

$$\textcircled{4} \text{a) } x = -2 \cos 300^\circ$$

$$= -2 \left(\frac{1}{2}\right) = -1$$

$$y = -2 \sin 300^\circ$$

$$= -2 \left(-\frac{\sqrt{3}}{2}\right) = \sqrt{3}$$

$$(x, y) = (-1, \sqrt{3})$$

$$\textcircled{4} \text{b) } r = \sqrt{3.7^2 + 2.1^2} \approx 4.25$$

$$\tan \alpha = \frac{2.1}{3.7}$$

$$\alpha = 29.6^\circ$$

$$\theta = 180^\circ - 29.6^\circ = 150.4^\circ \text{ (QII)}$$

$$(r, \theta) = (4.25, 150.4^\circ)$$

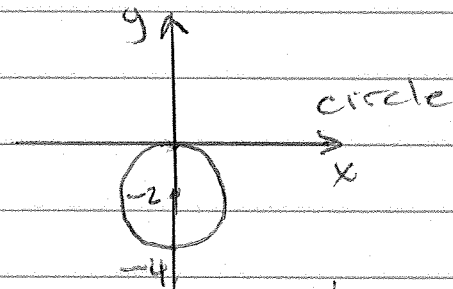
$$\text{c) } (r \cos \theta)^2 = 5r \sin \theta$$

This is fine, but it

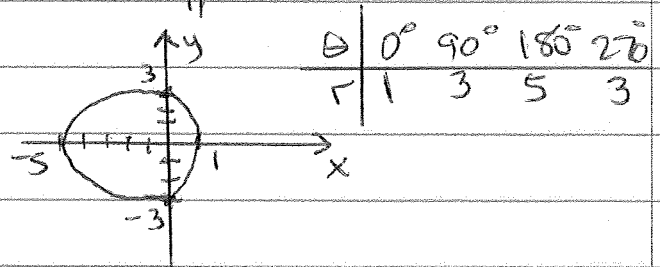
simplifies to

$$r = \frac{5 \sin \theta}{\cos^2 \theta}$$

$\textcircled{5} \text{a)}$



b)



c)

