Unit 7 - Review

1. Find the area of the triangle if a = 5, b = 8, and C = 81°

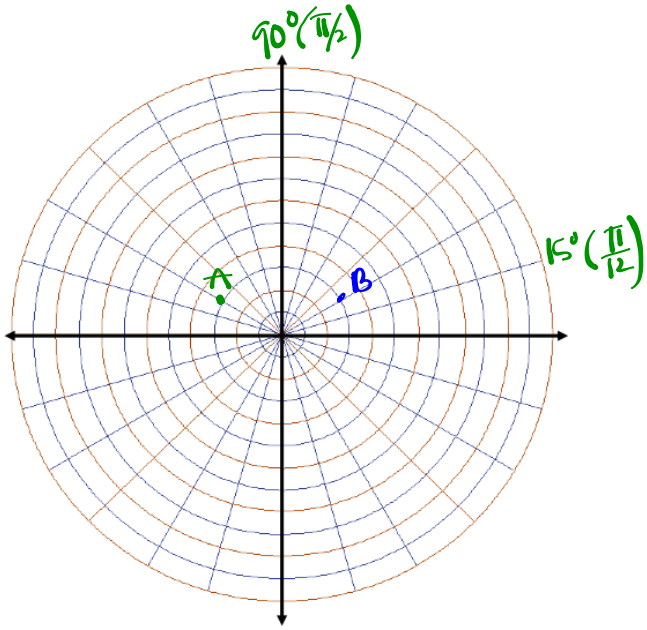
$A = \frac{1}{2}(5)(8)\sin 81^\circ$

$= 10.3007$

2. Plot the following points:

$A\left(3, \frac{5\pi}{6}\right)$

$B(-3, 210^\circ)$



3. Convert the polar coordinates to rectangular coordinates:

$(1, -45^\circ) \rightarrow \left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

$x = 1\cos(-45^\circ)$

$x = \frac{\sqrt{2}}{2}$

$y = 1\sin(-45^\circ)$

$y = -\frac{\sqrt{2}}{2}$

$(-2, 300^\circ) \rightarrow (-1, \sqrt{3})$

$x = -2\cos 300^\circ$

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

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

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

4. Convert the rectangular coordinates to polar coordinates:

(-2, 5) and (1, 3)

$(-2)^2 + 5^2 = r^2$

$4 + 25 = r^2$

$29 = r^2$

$r = \pm\sqrt{29}$

$\tan\theta = 5/-2$

$\theta = \tan^{-1}(5/-2)$

$\theta = -68.2^\circ$ or 291.8°

$\rightarrow 111.8^\circ$

$(\sqrt{29}, 111.8^\circ)(-\sqrt{29}, 291.8^\circ)$

$1^2 + 3^2 = r^2$

$10 = r^2$

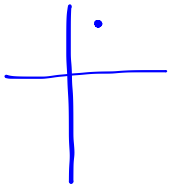
$r = \pm\sqrt{10}$

$\tan\theta = 3/1$

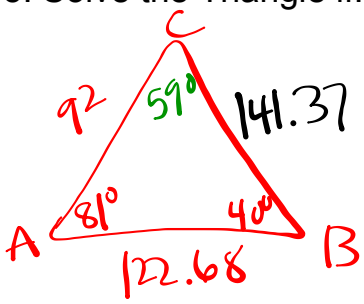
$\theta = \tan^{-1}(3)$

71.57° ; 251.57°

$(\sqrt{10}, 71.57^\circ)(-\sqrt{10}, 251.57^\circ)$



5. Solve the Triangle if: $A = 81^\circ$ $B = 40^\circ$ b = 92

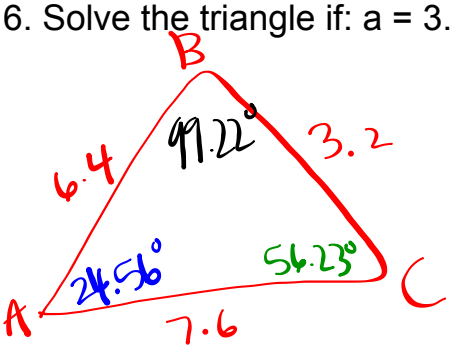


$\angle C = 180^\circ - 81^\circ - 40^\circ = 59^\circ$

$\frac{92}{\sin 40} = \frac{a}{\sin 81^\circ}$ $a = \frac{92 \sin 81}{\sin 40} \approx 141.37$

$c = \frac{92 \sin 59}{\sin 40} \approx 122.68$

6. Solve the triangle if: a = 3.2, b = 7.6, and c = 6.4



$A = \cos^{-1}\left(\frac{6.4^2 + 7.6^2 - 3.2^2}{2(6.4)(7.6)}\right) \approx 24.56^\circ$

$C = \cos^{-1}\left(\frac{3.2^2 + 7.6^2 - 6.4^2}{2(3.2)(7.6)}\right) \approx 56.23^\circ$

$\angle B = 180^\circ - 56.23^\circ - 24.56 \approx 99.22^\circ$

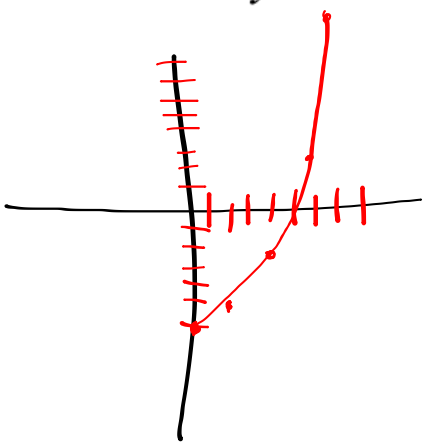
7. Solve the Triangle if A= 32, a = 17, and b = 11

8. Graph the following parametric equation over $0 \le t \le 4$

$$x = 2t$$

$$y = t^2 - 6$$

t	0	1	2	3	4
x	0	2	4	6	8
y	-6	-5	-2	3	10



9. Kirby hits a ball when it is 4 ft above the ground with an initial velocity of 120 ft/sec. The ball leaves the bat at 30° angle with the horizontal. How far will it travel?

$x(t) = 120(\cos 30°)t$

$x(t) = 396.52\text{ft}$

$y(t) = -16t^2 + 120(\sin 30)t + 4$

$0 = -16t^2 + 120\sin 30t + 4$

$t = 3.8155258$

$X = \dfrac{-120\sin 30 \pm \sqrt{(120\sin 30)^2 - 4(-16)(4)}}{2(-16)}$

10. A baseball is hit straight up from a height of 5 ft with an initial velocity of 80 ft/sec. Its position is modeled by the parametric equations $x = t$ and. $y = -16t^2 + 80t + 5$ How long will the ball be in the air? At what time will the ball be 60 ft in the air?

$0 = -16t^2 + 80t + 5$

$t = \dfrac{-80 \pm \sqrt{80^2 - 4(-16)(5)}}{2(-16)}$

$t \approx 5.062\text{seconds}$

$60 = -16t^2 + 80t + 5$

$-60 \quad -60$

$0 = 16t^2 + 80t - 55$

$t = \dfrac{-80 \pm \sqrt{80^2 - 4(-16)(-55)}}{2(-16)}$

$t \approx 4.2 \quad .638$

11. Find the polar equation for the following rectangular equation:

$$(x+3)^2+(y+3)^2=18$$

$x^2+6x+9+y^2+6y+9=18$

$x^2+y^2+6x+6y=0$

$r^2+6(r\cos\theta)+6(r\sin\theta)=0$

$\frac{r^2}{r}=\frac{-6r\cos\theta-6r\sin\theta}{r}$

$r=-6\cos\theta-6\sin\theta$

12. Analyze the graph of $r=3-4\sin\theta$
State the domain, range, symmetry, and type of limacon.

$\frac{3}{4}<1$ looped

D: $(-\infty,\infty)$

R: $[3-4, 3+4]=[-1,7]$

SY: y-axis

12. Analyze the graph of $r = 3\sin 2\theta$
State the domain, range, symmetry, # of petals and length of petals