Unit 7 - Review

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

$\frac{1}{2}ab\sin C$

$\frac{1}{2}bc\sin A$

$\frac{1}{2}ac\sin B$

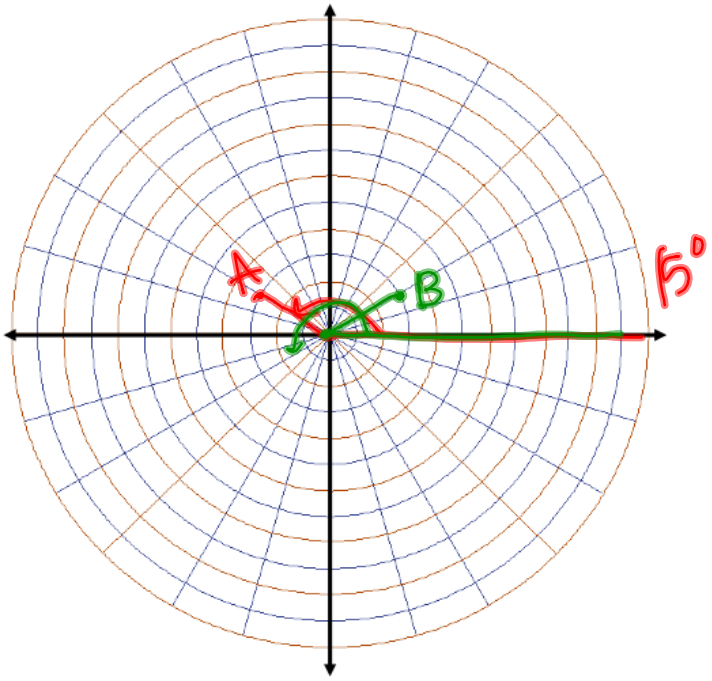
$\frac{1}{2}(5)(8)\sin 81^\circ$

≈ 19.75

2. Plot the following points:

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

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



3. Convert the polar coordinates to rectangular coordinates:

$(1, -45^\circ)$

$x = r\cos\theta$

$y = r\sin\theta$

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

$x = \sqrt{2}/2$

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

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

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

$(-2, 300^\circ)$

$(-1, \sqrt{3})$

4. Convert the rectangular coordinates to polar coordinates:

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

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

$= 4 + 25$

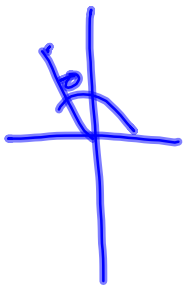
$r^2 = 29$

$r = \pm\sqrt{29}$

$\tan\theta = 5/-2$

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

$5.03, 1.95$



$(\sqrt{29}, 1.95)$

$(-\sqrt{29}, 5.03)$

$r^2 = x^2 + y^2$

$= 1^2 + 3^2$

$= 1 + 9$

$r^2 = 10$

$r = \pm\sqrt{10}$

$\tan\theta = y/x$

$\tan\theta = 3/1$

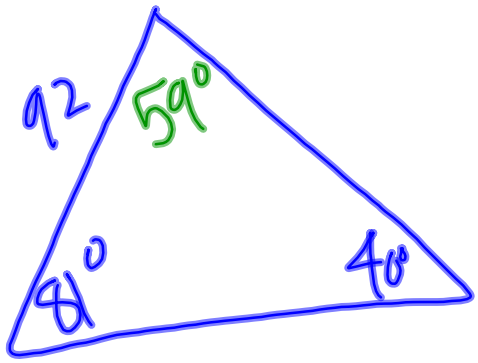
$\theta = \tan^{-1}(3)$

$1.25, 4.39$

$(\sqrt{10}, 1.25)$

$(-\sqrt{10}, 4.39)$

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



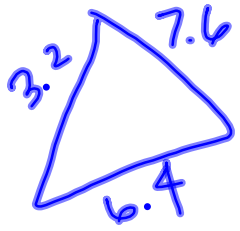
$\angle C = 180 - 81 - 40 = 59^\circ$

$$\frac{92}{\sin 40} = \frac{a}{\sin 81}$$

$$\frac{92 \sin 81}{\sin 40} = a \approx 141.365$$

$$\frac{92 \sin 59}{\sin 40} = c \approx 122.683$$

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



$\angle A = \cos^{-1}\left(\frac{7.6^2 + 6.4^2 - 3.2^2}{2(7.6)(6.4)}\right) \approx 24.558^\circ$

$\angle B = \cos^{-1}\left(\frac{3.2^2 + 6.4^2 - 7.6^2}{2(3.2)(6.4)}\right) \approx 99.226^\circ$

$180 - 24.558 - 99.226 =$

56.226°

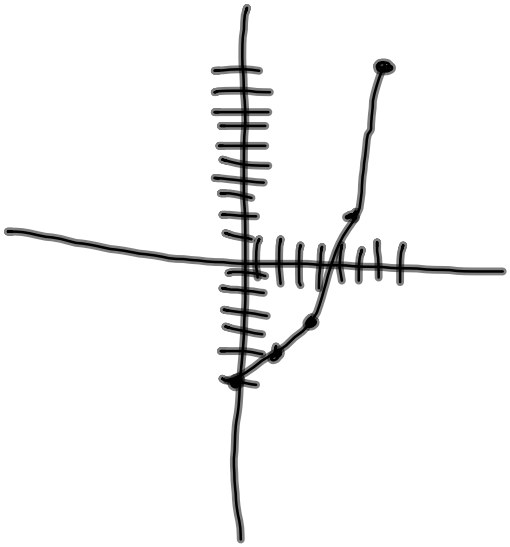
7. Solve the Triangle if A= 32, a = 17, and b = 11

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

$$x = 2t$$

$$y = t^2 - 6$$

	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?

How Far

$X = V_0 \cos\theta t$

$X = 120\cos 30° t$

$X = 120\cos 30°(3.8\text{S})$

$X = \boxed{396.5\text{ft}}$

How high

$y = -16t^2 + V_0 \sin\theta t + h_0$

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

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

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

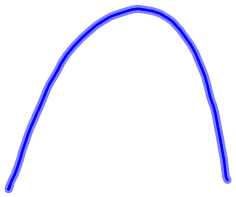
$t = 3.815 \text{ seconds}$

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?

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

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

$t = 5.068$ sec.



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

$-60 \quad -60$

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

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

$t = 4.178$ sec

or .63248

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

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

$r^2=x^2+y^2$

$x=r\cos\theta$

$y=r\sin\theta$

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

$-18 \quad -18$

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

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

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

$r+6\cos\theta+6\sin\theta=0$

$-6\cos\theta \quad -6\sin\theta \quad -6\cos\theta-6\sin\theta$

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

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

D: $\mathbb{R}$ R: $[-1, 7]$ S: y-axis

Looped Limaçon

$\frac{3}{4}$

$\frac{a}{b} < 1$ Looped

$\frac{a}{b} = 1$ Cardioid

$1 < \frac{a}{b} < 2$ dimpled

$\frac{a}{b} \geq 2$ convex

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