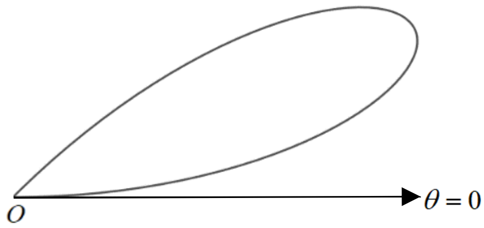
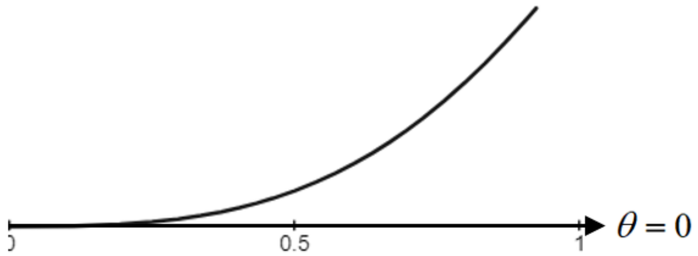
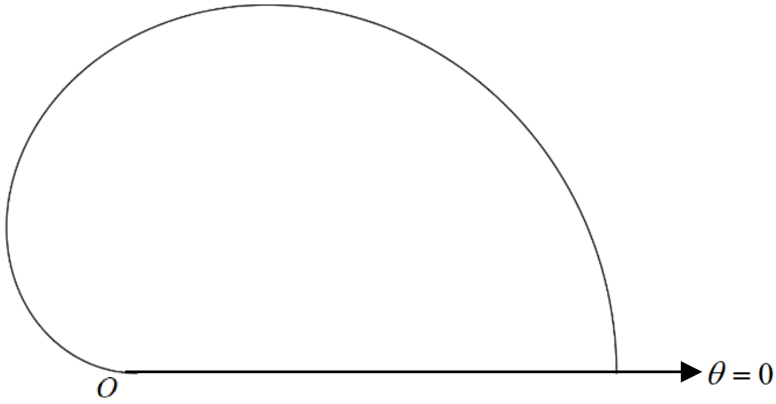
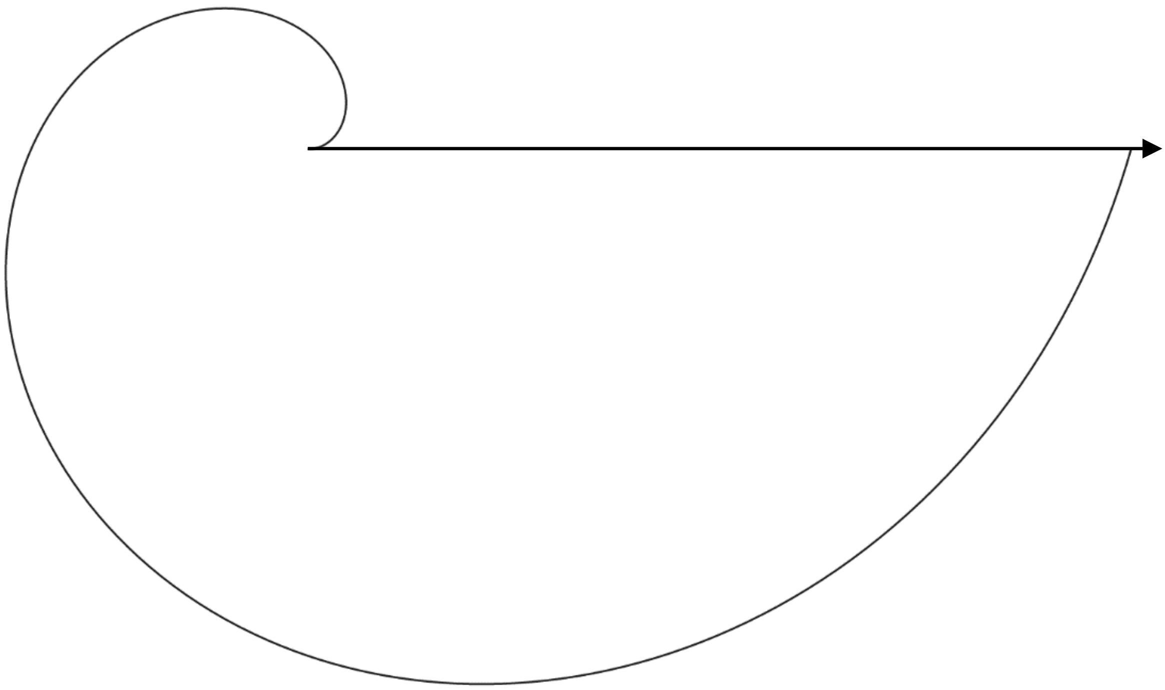
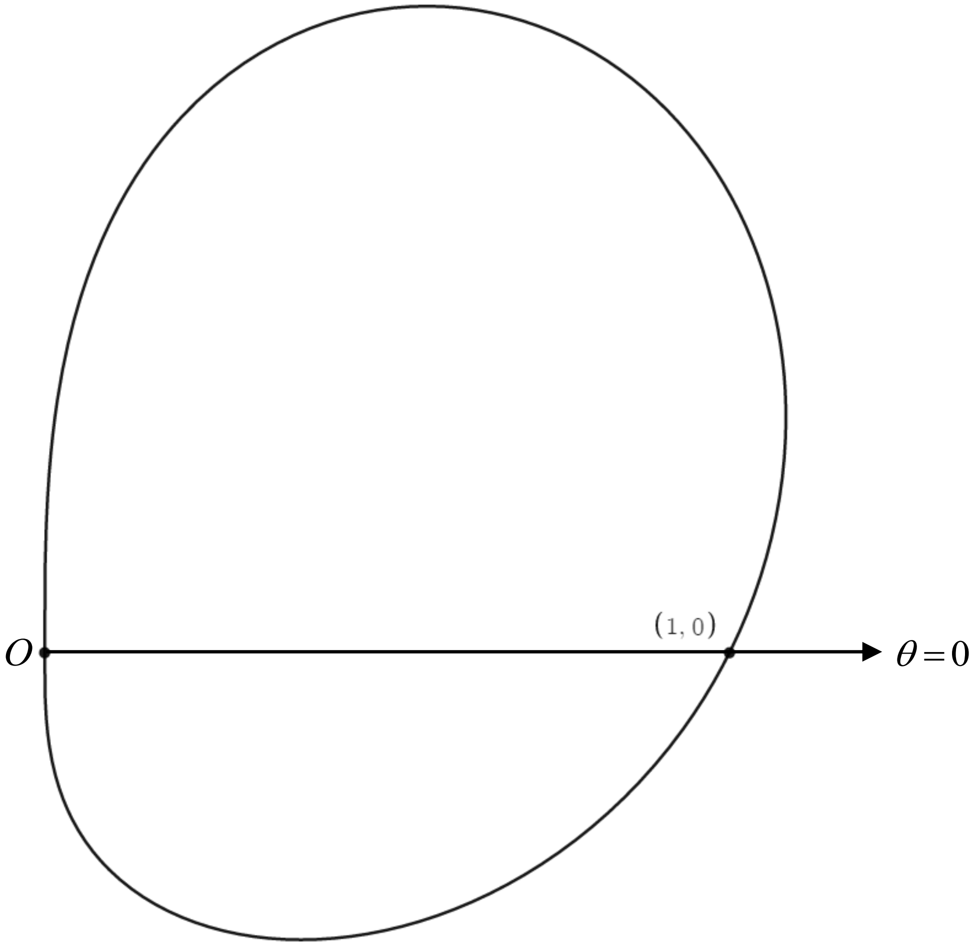
6(a)	
	$\theta = \frac{1}{6}\pi$.
6(b)	$\frac{1}{2}\int_0^{\frac{1}{3}\pi} \sin^2 3\theta \, d\theta$
	$= \frac{1}{4}\int_0^{\frac{1}{3}\pi} 1 - \cos 6\theta \, d\theta = \frac{1}{4}\left[\theta - \frac{1}{6}\sin 6\theta\right]_0^{\frac{1}{3}\pi}$
	$= \frac{1}{12}\pi$
6(c)	$y = 3\sin^2\theta - 4\sin^4\theta$
	$6\sin\theta\cos\theta - 16\sin^3\theta\cos\theta = 0$
	$\sin\theta\cos\theta \neq 0 \Rightarrow 6 - 16\sin^2\theta = 0$
	$\sin^2\theta = \frac{3}{8}$
	$y = \frac{9}{16}$.
6(d)	$r^4 = r\sin\theta\left(3r^2 - 4r^2\sin^2\theta\right)$ $r = \frac{3y}{r} - 4\frac{y^3}{r^3}$
	$\left(x^2 + y^2\right)^2 = y\left(3x^2 - y^2\right)$

5(a)	
	Maximum distance of C from the pole is 1.
5(b)	$\frac{1}{2}\int_0^{\frac{1}{8}\pi} \tan 2\theta \, d\theta$
	$= \frac{1}{2}\int_0^{\frac{1}{8}\pi} \frac{\sin 2\theta}{\cos 2\theta} d\theta = -\frac{1}{4}\left[\ln \cos 2\theta\right]_0^{\frac{1}{8}\pi}$
	$= -\frac{1}{4}\ln \frac{\sqrt{2}}{2} = \frac{1}{8}\ln 2$
5(c)	$r^2 = \frac{2\tan\theta}{1-\tan^2\theta}$
	$x^2 + y^2 = \frac{2\left(\frac{y}{x}\right)}{1-\frac{y^2}{x^2}} = \frac{2xy}{x^2-y^2}$
	$\left(x^2+y^2\right)\left(x^2-y^2\right) = 2xy$ $x^4 - y^4 = 2xy$ $x^4 - 2xy - y^4 = 0.$
5(d)	$\frac{1}{2}\left(\cos\frac{1}{8}\pi\right)\left(\sin\frac{1}{8}\pi\right) - \frac{1}{8}\ln 2$
	$\frac{1}{8}\sqrt{2} - \frac{1}{8}\ln 2$

6(a)	
6(b)	$\frac{1}{2}\int_0^{\pi} \cos^2 \frac{1}{2}\theta \, d\theta$
	$= \frac{1}{4}\int_0^{\pi} \cos\theta + 1 \, d\theta = \frac{1}{4}\left[\sin\theta + \theta\right]_0^{\pi}$
	$= \frac{1}{4}\pi$
6(c)	$y = \cos\frac{1}{2}\theta \sin\theta$
	$\cos\frac{1}{2}\theta\cos\theta - \frac{1}{2}\sin\theta\sin\frac{1}{2}\theta = 0$
	$\cos\frac{1}{2}\theta\left(2\cos^2\frac{1}{2}\theta - 1\right) - \sin^2\frac{1}{2}\theta\cos\frac{1}{2}\theta = 0$ $\cos\frac{1}{2}\theta \neq 0 \Rightarrow 2\cos^2\frac{1}{2}\theta - 1 - \sin^2\frac{1}{2}\theta = 0$ $2\cos^2\frac{1}{2}\theta - 1 - \left(1 - \cos^2\frac{1}{2}\theta\right) = 0 \Rightarrow 3\cos^2\frac{1}{2}\theta - 2 = 0$
	$\cos^2\frac{1}{2}\theta = \dfrac{2}{3}$
	$y = 2\cos^2\frac{1}{2}\theta\sin\frac{1}{2}\theta = 2\left(\frac{2}{3}\right)\sqrt{1 - \frac{2}{3}} = \frac{4}{3}\sqrt{\frac{1}{3}}$

5(a)	
5(b)	$\frac{1}{2}\int_0^{2\pi}\theta^2 e^{\frac{1}{4}\theta}\,d\theta$
	$=\frac{1}{2}\left[4\theta^2 e^{\frac{1}{4}\theta}\right]_0^{2\pi}-\frac{1}{2}\int_0^{2\pi}8\theta e^{\frac{1}{4}\theta}d\theta$
	$=\frac{1}{2}\left[4\theta^2 e^{\frac{1}{4}\theta}\right]_0^{2\pi}-4\left[4\theta e^{\frac{1}{4}\theta}\right]_0^{2\pi}+16\int_0^{2\pi}e^{\frac{1}{4}\theta}d\theta=\left[2\theta^2 e^{\frac{1}{4}\theta}-16\theta e^{\frac{1}{4}\theta}+64e^{\frac{1}{4}\theta}\right]_0^{2\pi}$
	$=\left(8\pi^2-32\pi+64\right)e^{\frac{1}{2}\pi}-64$
5(c)	$y=\theta e^{\frac{1}{8}\theta}\sin\theta$
	$\frac{dy}{d\theta}=\theta e^{\frac{1}{8}\theta}\cos\theta+\sin\theta\left(\frac{1}{8}\theta e^{\frac{1}{8}\theta}+e^{\frac{1}{8}\theta}\right)$
	$e^{\frac{1}{8}\theta}\neq 0\Rightarrow\theta\cos\theta+\left(\frac{1}{8}\theta+1\right)\sin\theta=0$
	$5\cos 5+\left(\frac{5}{8}+1\right)\sin 5=-0.1399$ and $5.05\cos 5.05+\left(\frac{5.05}{8}+1\right)\sin 5.05=0.1336$

7(a)	$-e^{\sin\theta}\sin\theta + e^{\sin\theta}\cos^2\theta = 0$
	$\cos^2\theta - \sin\theta = 0$
	$1 - \sin^2\theta - \sin\theta = 0$
	$\sin\theta = \frac{1}{2}\left(-1+\sqrt{5}\right)$
	$(1.208,\ 0.666)$
7(b)	$x = e^{\frac{1}{2}\sin\theta}\cos^{\frac{3}{2}}\theta$ $\frac{dx}{d\theta} = -\frac{3}{2}e^{\frac{1}{2}\sin\theta}\cos^{\frac{1}{2}}\theta\sin\theta + \frac{1}{2}\cos^{\frac{5}{2}}\theta e^{\frac{1}{2}\sin\theta} = 0$
	$-3\sin\theta + \cos^2\theta = 0$
	$-3\sin\theta + 1 - \sin^2\theta = 0$
	$\sin\theta = \frac{1}{2}\left(-3+\sqrt{13}\right)$
	$(1.136,\ 0.308)$

7(c)	

7(d)	$\frac{1}{2}\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} e^{\sin\theta}\cos\theta \, d\theta$
	$= \frac{1}{2}\left[e^{\sin\theta}\right]_{-\frac{\pi}{2}}^{\frac{\pi}{2}}$
	$= \frac{1}{2}\left(e - e^{-1}\right)$