1.	C	$2x-3y=6$ $-3y=-2x+6$ $y=\frac{2}{3}x+6$ $\therefore \tan\theta=\frac{2}{3},\cot\theta=\frac{3}{2},\sin\theta=\frac{2}{\sqrt{13}},\csc\theta=\frac{\sqrt{13}}{2},\cos\theta=\frac{3}{\sqrt{13}},\sec\theta=\frac{\sqrt{13}}{3}$
2.	A	
3.	A	$\begin{vmatrix}\sin\frac{3\pi}{2} & \sin 2\pi & \cos 4\pi\\ \left(\sin\frac{\pi}{3}\right)^2 & \sec 0 & \cot\left(\frac{3\pi}{4}\right)\\ \cos\left(\frac{9\pi}{2}\right) & \tan\left(-\frac{5\pi}{4}\right) & \left(\csc\frac{\pi}{4}\right)^4\end{vmatrix}=\begin{vmatrix}-1 & 0 & 1\\ \left(\frac{\sqrt{3}}{2}\right)^2 & 1 & -1\\ 0 & -1 & \left(\sqrt{2}\right)^4\end{vmatrix}=\begin{vmatrix}-1 & 0 & 1\\ \frac{3}{4} & 1 & -1\\ 0 & -1 & 4\end{vmatrix}$ $=-1\begin{vmatrix}1 & -1\\ -1 & 4\end{vmatrix}-0+1\begin{vmatrix}\frac{3}{4} & 1\\ 0 & -1\end{vmatrix}=-1(4-1)+1\left(\frac{-3}{4}-0\right)=-3-\frac{3}{4}=\frac{-15}{4}$
4.	D	Using the Pythagorean theorem the missing side would be *x*. Therefore the answer is D.
5.	A	$A=\frac{1}{2}(4)(2)\sin 150^\circ=\frac{1}{2}(4)(2)\left(\frac{1}{2}\right)=2$
6.	C	A. Is neither even or odd B. Is even C. Is odd D. Is even
7.	B	$\cos\left(75^\circ\right)=\sqrt{\frac{1+\cos 150^\circ}{2}}=\sqrt{\frac{1+\frac{-\sqrt{3}}{2}}{2}}=\frac{\sqrt{2-\sqrt{3}}}{2}$
8.	B	$\cos^{-1}\left(\cos 225^\circ\right)=\cos^{-1}\left(-\sqrt{2}\right)=135^\circ$
9.	D	$period:\frac{2\pi}{3\pi}=\frac{2}{3}$ $frequeny:\frac{3}{2}$ $amplitude:3$ $\therefore \frac{2}{3}+\frac{3}{2}+3=\frac{31}{6}$

10.	B	$2012\sin^2 x - 2012 = 0$ $2012(\sin x - 1)(\sin x + 1) = 0$ $\sin x = 1 \qquad \sin x = -1$ $x = \frac{\pi}{2} \qquad x = \frac{3\pi}{2}$
11.	C	$\frac{\csc\theta}{\sin^2\theta + \sec\theta + \cos^2\theta - 1}$ $\frac{\csc\theta}{\sin^2\theta + \sec\theta - \sin^2\theta}$ $\frac{\frac{1}{\sin\theta}}{\frac{1}{\cos\theta}}$ $\frac{\cos\theta}{\sin\theta}$ $\cot\theta$
12.	A	$\sin\left(\frac{\pi}{4} + x\right) + \sin\left(\frac{\pi}{4} - x\right)$ $\sin\frac{\pi}{4}\cos x + \cos\frac{\pi}{4}\sin x + \sin\frac{\pi}{4}\cos x - \cos\frac{\pi}{4}\sin x$ $2\sin\frac{\pi}{4}\cos x$ $2\left(\frac{\sqrt{2}}{2}\right)\cos x$ $\sqrt{2}\cos x$
13.	B	$2\cos x\csc x - 4\cos x - \csc x = -2$ when $x \in [0, 2\pi)$ $2\cos x\csc x - 4\cos x - \csc x + 2 = 0$ $2\cos x(\csc x - 2) - (\csc x - 2) = 0$ $(\csc x - 2)(2\cos x - 1) = 0$ $\csc x = 2 \qquad \cos x = \frac{1}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6} \qquad x = \frac{\pi}{3}, \frac{5\pi}{3}$
14.	C	

15.	B	$\cot 2\phi = \frac{0-0}{1}$ $\cot 2\phi = 0$ $2\phi = \frac{\pi}{2}$ $\phi = \frac{\pi}{4}$ $x' = x\cos\frac{\pi}{4} + y\sin\frac{\pi}{4}$ $x' = \frac{\sqrt{2}}{2}x + \frac{\sqrt{2}}{2}y$
16.	C	$d = \sqrt{5^2 + 2^2 - 2(2)(5)\cos(315^\circ - 45^\circ)}$ $d = \sqrt{25 + 4 - 20\cos(270^\circ)}$ $d = \sqrt{29 - 0}$ $d = \sqrt{29}$
17.	B	$2 + \sin x = 3 - \sin x$ $2\sin x = 1$ $\sin x = \frac{1}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}$
18.	D	
19.	A	
20.	B	$\cos^2 x - \sin^2 x$ $\left(\frac{-4}{7}\right)^2 - \left(\frac{-\sqrt{33}}{7}\right)^2$ $\frac{16}{49} - \frac{33}{49}$ $-\frac{17}{49}$
21.	D	I, II, and III

22.	C	$\cos x - \cos 2x = 2\cos x$ $\cos x - (2\cos^2 x - 1) = 2\cos x$ $\cos x - 2\cos^2 x + 1 = 2\cos x$ $0 = 2\cos^2 x + \cos x - 1$ $0 = (2\cos x - 1)(\cos x + 1)$ $\cos x = \frac{1}{2} \quad \cos x = -1$ $x = \frac{\pi}{3}, \frac{5\pi}{3} \qquad x = \pi$ $\therefore \frac{\pi}{3}, \pi$
23.	D	$\left(6e^{i\left(\frac{4\pi}{3}\right)}\right)^2$ $(-3 - 3i\sqrt{3})^2$ $9 + 18i\sqrt{3} + 27i^2$ $9 + 18i\sqrt{3} + 27(-1)$ $9 + 18i\sqrt{3} - 27$ $-18 + 18i\sqrt{3}$
24.	C	2(8)=16
25.	A	<5,2> and <-1,4> $\cos\theta = \frac{-5+8}{\sqrt{29} \bullet \sqrt{17}}$ $\cos\theta = \frac{3}{\sqrt{493}}$ $\cos\theta = \frac{3\sqrt{493}}{493}$
26.	C	Inner loop limacon
27.	D	$\langle -12, 12 \rangle$ $12\sqrt{2}cis\frac{3\pi}{4}$
28.	D	$\left(81e^{i\frac{\pi}{3}}\right)^{1/4}$ $roots: 3cis\frac{\pi}{12},\ 3cis\frac{7\pi}{12},\ 3cis\frac{13\pi}{12}$

29.	B	$x = \frac{\pi}{2}$ shifted $\frac{\pi}{3}$ to the right results in $x = \frac{5\pi}{6} + \pi n$
30.	C	$\lim_{x \to 0} \frac{\sin 2x}{\sin x}$ $\lim_{x \to 0} \frac{2 \sin x \cos x}{\sin x}$ $\lim_{x \to 0} 2 \cos x$ $2 \cos(0)$ $2(1)$ 2