

Problem Set 20

Calculate:

1. $i^{57} =$
2. $\frac{2+i}{(2-i)^2} =$
3. $\frac{1+i}{1-i} + \frac{2-i}{2+i} =$
4. Find $\tan x$ if $\sin 2x = -\frac{24}{25}$ and x is in the fourth quadrant.
5. An object is traveling on a circular path. It completes a cycle in 3.5 seconds. How long does it take for the object to travel 1 radian?
6. Graph at least two periods of the function $y = 4\cos(2\pi x)$.

Prove each of the following identities.

7. $\frac{\tan a - 1}{\tan a + 1} = \frac{1 - \cot a}{1 + \cot a}$
8. $(\tan B \sin B)^2 = \tan^2 B - \sin^2 B$
9. $\left(\cos \frac{x}{2} + \sin \frac{x}{2}\right)^2 = 1 + \sin x$

Solve each of the following equation. List all solutions in the interval indicated.

10. $2 \tan \left(3x - \frac{\pi}{4}\right) = 2$, where $-\frac{\pi}{2} < x < \frac{\pi}{2}$
11. $2 \sin^2 x + \sin x - 1 = 0$, where $0 \leq x < 2\pi$
12. $\sin x \cos x = \frac{\sqrt{3}}{4}$, where $0 \leq x < 2\pi$
13. $\cos 2x - 2 \cos^2 x = \cos x$, where $0 \leq x < 2\pi$

Find the polar coordinates.

14. $\left(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$