

Math 2412 Review 4

1. Expand $(x+2)^5$, using the Binomial Theorem, or using Pascal's Triangle.
2. Expand $(x-1)^6$, using the Binomial Theorem, or using Pascal's Triangle.
3. Find the coefficient of x^3 in the expansion of $(x+3)^{10}$.
4. Find the coefficient of x^0 in the expansion of $(x-\frac{1}{x^2})^9$.

Give the exact value of the following.

5. $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
6. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
7. $\sec^{-1}(2)$
8. $\cos(\cos^{-1}(0))$
9. $\csc^{-1}\left(\csc\left(\frac{3\pi}{4}\right)\right)$
10. $\sin\left(\cos^{-1}\left(-\frac{2}{3}\right)\right)$
11. $\sin\left(2\cos^{-1}\left(\frac{4}{5}\right)\right)$ {Hint: $\sin 2A = 2\sin A \cos A$.}
12. $\sin\left[\sin^{-1}\left(-\frac{1}{4}\right) - \sin^{-1}\left(\frac{2}{3}\right)\right]$ {Hint: $\sin(A-B) = \sin A \cos B - \cos A \sin B$.}
13. $\tan\left(\frac{1}{2}\sin^{-1}\left(-\frac{1}{3}\right)\right)$ {Hint: $\tan \frac{A}{2} = \frac{\sin A}{1 + \cos A} = \frac{1 - \cos A}{\sin A}$.}

Exactly solve the following trigonometric equations on the interval $[0, 2\pi)$.

14. $\cos^2 x = 1$
15. $3\sin^2 x + 2\sin x - 1 = 0$
16. $\csc^4(2x) = 4$
17. $\sec\left(\frac{x}{3}\right) = \cos\left(\frac{x}{3}\right)$
18. $\sin x = \sin 2x$ {Hint: $\sin 2A = 2\sin A \cos A$.}
19. $\cos 2x - \cos x = 0$ {Hint: $\cos 2A = 2\cos^2 A - 1$.}
20. $\sin 2x = 2\cos^2 x$ {Hint: $\sin 2A = 2\sin A \cos A$.}
21. $\sqrt{2}\sin 3x - 1 = 0$
22. $\cos \frac{x}{2} = 1$
23. $\sqrt{3}\sin x + \cos x = 1$
24. Sketch the graph of the polar coordinate equation $r = \cos 2\theta$.
25. Sketch the graph of the polar coordinate equation $r = 1 + 2\sin \theta$.
26. Find the points of intersection of the solution curves of the polar coordinate equations $r = 1 + \sin \theta$ and $r = 3\sin \theta$.
27. Find the points of intersection of the solution curves of the polar coordinate equations $r = 2\sin 2\theta$ and $r = 1$.
28. Find zw and $\frac{z}{w}$ for $z = 4\left(\cos \frac{3\pi}{8} + i\sin \frac{3\pi}{8}\right)$ and $w = 2\left(\cos \frac{9\pi}{16} + i\sin \frac{9\pi}{16}\right)$. Leave your answers in polar form.
29. Write the equivalent standard form of $\left[\sqrt{3}\left(\cos \frac{5\pi}{18} + i\sin \frac{5\pi}{18}\right)\right]^6$.
30. Write the equivalent standard form of $(\sqrt{3} + i)^9$.