CHERCHER PREPARATORY SCHOOL

QUESTIONS ON "*COMPLEX NUMBERS*" FOR GRADE 11 STUDENTS, 2012/2020

1. Which one of the following is **NOT** true?

   a. $i^2 = -1$ b. $i^3 = -i$ c. $i^4 = 1$ d. $i^5 = -i$

2. If $Z = (2 + 3i)(3 - 2i)$, then Im (Z) =_____

   a. 12 b. 5 c. i d. 9

3. If $Z = (3 - 2i)^2$, then |Z| = _____

   a. 13 b. 12 c. 5 d. 10

4. If $Z = \frac{1+i}{1-i}$ then the conjugate of Z = _____

   a. $1 - 2i$ b. $1 + 2i$ c. $-2i$ d. $-i$

5. Let $Z = 1 + \sqrt{3}i$, then which one is true?

   a. Re (Z) = $\sqrt{3}$ b. Im (Z) = 1 c. Arg (Z) = $\frac{\pi}{3}$ d. |Z| = 4

6. If $Z = 0 + 0i$ is a complex number, then the arg (Z) = _____

   a. $\frac{\pi}{2}$ b. $\frac{\pi}{4}$ c. $\frac{\pi}{6}$ d. none

7. The simplified form of $(1 + 2i)i - \left(\frac{3 + 2i}{1 - i}\right) =$ _____

   a. $-\frac{1}{2} + \frac{5}{2}i$ b. $\frac{1}{2} + \frac{5}{2}i$ c. $\frac{1}{2} - \frac{5}{2}i$ d. $2 + 10i$

8. If $Z = 2 - i$, then Z^2 = _____

   a. $4 - 4i$ b. $3 + 4i$ c. $2 + i$ d. $3 - 4i$

9. If $Z^2 = -5 + 12i$, then the possible value of Z is

   a. $3 + 2i$ b. $3 - 2i$ c. $2 - 3i$ d. $-2 - 3i$

10. For what value of x is the equation $x^2 + i^5 + i^6 - x - xi^{11} = 0$ will be satisfied?

    a. i b. $-i$ c. 1 d. –1

11. Let $Z = \frac{-2 + i}{1 - i}$, then its conjugate $\overline{Z}$ = _____

    a. $-\frac{3}{2} - \frac{1}{2}i$ b. $\frac{3}{2} + \frac{1}{2}i$ c. $-\frac{3}{2} + \frac{1}{2}i$ d. $\frac{1}{2} - \frac{3}{2}i$

12. Which one is **NOT** true in complex number?

a. $\sqrt{-12} = 2\sqrt{3}i$ c. $\sqrt{-16} = 4i$

b. $\sqrt{-49} = 7i$ d. $\sqrt{-7} = -\sqrt{7}i$

13. If $Z = 1 + 2i$, then $Z^6 =$ _____

a. $117 + 44i$ c. $125 + 32i$

b. $119 + 64i$ d. $125 - 32i$

14. If $Z = 2 - 4i$, then its multiplicative inverse is

a. $-2 + 4i$ b. $\frac{1}{10} + \frac{1}{5}i$ c. $-\frac{1}{\sqrt{5}} + \frac{2i}{\sqrt{5}}$ d. $\frac{1}{\sqrt{5}} - \frac{2i}{\sqrt{5}}$

15. If $Z = (3 - 2i)^2$, then $|Z|$ = _____

a. $\sqrt{13}$ b. 13 c. 4 d. $\sqrt{5}$

16. Which one of the following is **NOT** true?

a. $i^2 + i^{12} + i^8 = 1$ c. $i + i^2 + i^3 + i^4 = 0$

b. $i + i^3 + i^5 = i$ d. $2i^5 + 7i^7 = 5i$

17. Which one of the following pairs of complex numbers are not conjugate each other?

a. $Z_1 = \frac{3-2i}{2-i}$, $\overline{Z}_1 = \frac{8}{5} + \frac{1}{5}i$

b. $Z_2 = (2 - i)^3$, $\overline{Z}_2 = 2 + 11i$

c. $Z_3 = 4i + 5i^8 + 6i^3 + 2i^4$, $\overline{Z}_3 = 7 + 2i$

d. $Z_4 = 3i + 2i^3$, $\overline{Z}_4 = i$

18. If $Z = \frac{1+i}{1-i}$, then $|Z|$ = _____

a. 0 b. 1 c. i d. –1

19. Let $Z = \frac{2i}{1+i}$, then which one is false about Z?

a. $|Z| = \sqrt{2}$ c. $Z - \overline{Z} = -2i$

b. $Z + \overline{Z} = 2$ d. Arg (Z) = $\frac{\pi}{4}$

20. If Z = 3 – 2i, then $|Z|^2 + \frac{1}{2}(Z - \overline{Z})^2$ = _____

a. 13 b. –8 c. 5 d. 21

21. Let $Z_1 = \frac{(7+2i)(1-i)}{-3+i}$ and $Z_2 = \frac{6-8i}{2i}$, If $Z = \overline{Z}_1 + |Z_2|$, then which one is the simplest form of Z?

a. $\frac{-1}{5} + \frac{3}{5}i$ c. $\frac{9}{5} - \frac{3}{5}i$

b. $\frac{-16}{5} - \frac{3}{5}i$ d. $\frac{9}{5} + \frac{3}{5}i$

22. For any integer n, which one is **NOT** true?

a. $i^{4n} = 1$ c. $i^{4n+2} = -1$

b. $i^{4n+1} = i$ d. $i^{4n+3} = i$

23. If Z = –1 + $\sqrt{3}i$, then its polar form is

a. $2(\cos 60 + i \sin 60)$ c. $2(\cos(-60) + i \sin(-60))$

b. $2(\cos 120 + i \sin 120)$ d. $\sqrt{2}(\cos \frac{2\pi}{3} + i \sin \frac{2\pi}{3})$

24. The polar form of Z = 1 – i is

a. $\sqrt{2}(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4})$ c. $2(\cos 45 - i \sin 45)$

b. $\sqrt{3}(\cos 45 + i \sin 45)$ d. $\sqrt{2}(\cos 45 - i \sin 45)$

25. The polar form of Z = 5 is

a. $5(\cos 90 + i \sin 90)$ c. $5(\cos 0 + i \sin 0)$

b. $5(\cos 90 - i \sin 90)$ d. $\sqrt{5}(\cos 0 - i \sin 0)$

26. If Z = 1 – i , then Z^6 = _____

a. $8i$ b. $-8i$ c. $8 - 8i$ d. $4 + 4i$

27. If Z = 2 + $\sqrt{12}\,i$, then Z^5 = _____

a. $64 + 64\sqrt{3}\,i$ c. $256 + 256\sqrt{3}\,i$

b. $128 - 128\sqrt{3}\,i$ d. $256 - 256\sqrt{3}\,i$

28. The complex numbers given by $\sqrt{-10}$ x $\sqrt{-10}$ = _____

a. 10 b. –10 c. $10i$ d. ∄

29. If Z = 4 + 3i, then Z . $\overline{Z}$ = _____

a. 25 b. 5 c. $\sqrt{5}$ d. 7

30. If Z = 1 + i then Z^{12} = _____

a. $\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i$ c. –64 (1 + i)

b. $\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}i$ d. –64

31. Let Z = $\frac{2+2i}{4-2i}$ then $|Z|^2$ = _____

a. $\frac{1}{5}$ b. $\frac{2}{5}$ c. $\frac{4}{5}$ d. $\frac{1}{10}$

32. Let $Z_1 = \frac{1+i}{i}$, $Z_2 = \frac{5}{2-i}$, then $Z_1 + Z_2$ = _____

a. 1 + i b. 3 – 2i c. 3 + 2i d. 3

33. Let Z = $\frac{10-5}{-2+6i}$, then which one is **NOT** true?

a. $\overline{Z} = -\frac{5}{4} + \frac{5}{4}i$ c. $\frac{1}{Z} = -\frac{2}{5} + \frac{2}{5}i$

b. $|Z| = \frac{5\sqrt{2}}{4}$ d. $Z - \frac{1}{Z} = \frac{-17}{20} + \frac{33}{20}i$

34. If $x^3 - 2x^2 + 9x - 18 = 0$, then which one does **NOT** satisfy this equation?

a. 2 b. 3i c. –2 d. –3i

35. If $Z_1 = \frac{3+i}{3-i}$, $Z_2 = \frac{5}{1-i}$, then $2Z_1Z_2$ = _____

a. $\frac{1}{2} + 7i$ b. 1 + 14i c. $-\frac{1}{2} - 7i$ d. 1 – 14 i

36. Which one is **NOT** true?

a. $i^{40} = 1$ b. $i^{50} = 1$ c. $i^{25} = i$ d. $i^{67} = -i$

37. If $Z = \frac{2}{3-4i}$, then $\overline{Z}$ = _____

a. $\frac{6}{25} + \frac{8}{25}i$

b. $\frac{1}{25}(6 - 8i)$

c. $\frac{6}{5} - \frac{8}{5}i$

d. $\frac{6}{5} + \frac{8}{5}i$

38. If $x^2 - 6x + 12 = 0$, then the solution set is

a. $\{2 + \sqrt{2}, 2 - \sqrt{2}\}$

b. $\{2 + \sqrt{3}\,i, 2 - \sqrt{3}\,i\}$

c. $\{3 - \sqrt{3}\,i, 3 + \sqrt{3}\,i\}$

d. $\{2 + \sqrt{3}\,i, 1 - \sqrt{3}\,i\}$

39. Which one of the following pairs of complex numbers are **NOT** multiplicative inverse each other?

a. $Z_1 = -1 + 2i$, $Z_2 = \frac{-1}{5} - \frac{2}{5}i$

b. $Z_1 = 3 - 3i$, $Z_2 = \frac{1}{6} + \frac{1}{6}i$

c. $Z_1 = 2 - \frac{1}{2}i$, $Z_2 = \frac{8}{7} + \frac{1}{7}i$

d. $Z_1 = \frac{1}{2} - \frac{1}{4}i$, $Z_2 = \frac{8}{5} - \frac{4}{5}i$

40. If $Z = 9 + \pi i$, then its multiplicative inverse is

a. $\frac{9}{81+\pi^2} - \frac{\pi}{81+\pi^2}i$

b. $\frac{9}{81} - \frac{\pi}{81}i$

c. $\frac{9}{81} - \frac{\pi}{81}i$

d. $(81+\pi^2) - (81 - \pi^2)\,i$