



MATHS

BOOKS - JEEVITH PUBLICATIONS

MATHS (KANNADA ENGLISH)

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

One Marks Questions With Answers

1. Express $\frac{2 + i}{1 - 3i}$ in the form $x+iy$



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2. Find the conjugate of $\frac{2 + 3i}{1 + 2i}$.



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3. Find the multiplicative inverse of $\frac{1 + i}{2 + 3i}$.



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4. Find the least positive integer 'n' such that

$$\left(\frac{1+i}{1-i} \right)^n = 1.$$



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5. Find the modulus of $\frac{2-i}{5i}$.



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6. Find the amplitude of $-\frac{1}{2} + I, \frac{\sqrt{3}}{2}$



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7. Write $2 - 2i$ in polar form.



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8. Express $\frac{2 + i}{1 - 3i}$ in the form $x + iy$



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9. Find the conjugate of $\frac{2 + 3i}{1 + 2i}$.



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10. Find the multiplicative inverse of $\frac{1 + i}{2 + 3i}$.



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11. Find the least positive integer 'n' such that

$$\left(\frac{1 + i}{1 - i} \right)^n = 1.$$



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12. Find the modulus of $\frac{2 - i}{5i}$.



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13. Find the amplitude of $-\frac{1}{2} + I, \frac{\sqrt{3}}{2}$



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14. Write $-2 - 2i$ in polar form.



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Two Marks Questions With Answers

1. Evaluate $(1 + i)^6 + (1 - i)^3$



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2. If $(x + iy)^{1/3} = a + ib$, where

$a, b, x, y \in R$ show that

$$\frac{x}{a} - \frac{y}{b} = -2(a^2 + b^2).$$



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3. Find real value of θ for which $\frac{3 + 2i \sin \theta}{1 - 2i \sin \theta}$ is purely real.



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4. Convert the complex number $-\frac{16}{1 + i\sqrt{3}}$ into polar form.



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5. Find the conjugate of $\frac{(3 - 2i)(2 + 3i)}{(1 + 2i)(2 - i)}$.



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6. Evaluate $(1 + i)^6 + (1 - i)^3$



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7. If $(x + iy)^{1/3} = a + ib$, where

$a, b, x, y \in \mathbb{R}$ show that

$$\frac{x}{a} - \frac{y}{b} = -2(a^2 + b^2).$$



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8. Find real value of θ for which $\frac{3 + 2i \sin \theta}{1 - 2i \sin \theta}$ is purely real.



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9. Convert the complex number $-\frac{16}{1 + i\sqrt{3}}$ into polar form.



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10. Find the conjugate of $\frac{(3 - 2i)(2 + 3i)}{(1 + 2i)(2 - i)}$.



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Three Marks Questions With Answers

1. Find the square roots of the following:

(i) $-15 - 8i$



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2. Find the square roots of the following:

(i) $-15 - 8i$



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3. Find the square roots of the following:

(i) $-15 - 8i$



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4. Reduce $\left(\frac{1}{1-4i} - \frac{2}{1+i}\right)\left(\frac{3-4i}{5+i}\right)$ to the standard form.



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5. (i) If $x - iy = \sqrt{\frac{a - ib}{c - id}}$ prove that

$$(x^2 + y^2) = \frac{a^2 + b^2}{c^2 + d^2}$$



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6. (ii) If $x + iy = \frac{a + ib}{a - ib}$ prove that

$$x^2 + y^2 = 1$$



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7. (iii) Find the modulus and argument of the complex numbers.

(a) $\frac{1+i}{1-i}$, (b) $\frac{1}{1+i}$



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8. Convert the following in the polar form:

(i) $\frac{1+7i}{(2-i)^2}$

(ii) $\frac{1+3i}{1-2i}$



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9. If $a+ib = \frac{(x+i)^2}{2x^2+1}$, prove that

$$a^2 + b^2 = \frac{(x^2 + 1)^2}{(2x^2 + 1)^2}.$$



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10. Find real θ such that $\frac{3 + 2i \sin \theta}{1 - 2i \sin \theta}$ is purely real.



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11. Convert the complex number

$$z = \frac{i - 1}{\frac{\cos \pi}{3} + i \frac{\sin \pi}{3}} \text{ in the polar form.}$$



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12. If $\left(\frac{1+i}{1-i}\right)^{2m} = 1$, then find the least integral value of m .



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13. Solve each of the following equations.

1. Solve $x^2 + x + 1 = 0$



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14. $x^2 + x + \frac{1}{\sqrt{2}} = 0$



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15. Solve: $2x^2 + x + 1 = 0$



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16. Solve $x^2 + 3x + 5 = 0$



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17. Solve $x^2 - x + 2 = 0$



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18. $x^2 + x + \frac{1}{\sqrt{2}} = 0$



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19. Solve $\sqrt{5}x^2 + x + \sqrt{5} = 0$



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20. Find the square roots of the following:

(i) $-15 - 8i$



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21. Find the square roots of the following:

(i) $-8 - 6i$



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22. Find the square roots of the following:

(i) i



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23. Reduce $\left(\frac{1}{1-4i} - \frac{2}{1+i}\right)\left(\frac{3-4i}{5+i}\right)$ to the standard form.



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24. (i) If $x - iy = \sqrt{\frac{a - ib}{c - id}}$ prove that

$$(x^2 + y^2) = \frac{a^2 + b^2}{c^2 + d^2}$$


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25. (ii) If $x + iy = \frac{a + ib}{a - ib}$ prove that $x^2 + y^2 = 1$



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26. (iii) Find the modulus and argument of the complex numbers.

(a) $\frac{1 + i}{1 - i}$, (b) $\frac{1}{1 + i}$



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27. Convert the following in the polar form:

$$(i) \frac{1 + 7i}{(2 - i)^2}$$

$$(ii) \frac{1 + 3i}{1 - 2i}$$



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28. If $a+ib = \frac{(x+i)^2}{2x^2+1}$, prove that

$$a^2 + b^2 = \frac{(x^2 + 1)^2}{(2x^2 + 1)^2}.$$



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29. Find real θ such that $\frac{3 + 2i \sin \theta}{1 - 2i \sin \theta}$ is purely real.



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30. Convert the complex number

$$z = \frac{i - 1}{\frac{\cos \pi}{3} + i \frac{\sin \pi}{3}}$$
 in the polar form.



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31. If $\left(\frac{1+i}{1-i}\right)^{2m} = 1$, then find the least integral value of m .



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32. Solve each of the following equations.

1. Solve $x^2 + x + 1 = 0$



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33. Solve $\sqrt{2}x^2 + x + \sqrt{2} = 0$



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34. Solve: $2x^2 + x + 1 = 0$



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35. Solve $x^2 + 3x + 5 = 0$



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36. Solve $x^2 - x + 2 = 0$



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$$37. x^2 + x + \frac{1}{\sqrt{2}} = 0$$



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$$38. \text{Solve } \sqrt{5}x^2 + x + \sqrt{5} = 0$$



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