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EXERCISE 5.1 - Question No. 1

Express of the complex number in the form $a + ib$. $(5i) \left(-\frac{3}{5}i \right)$

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EXERCISE 5.1 - Question No. 2

Express of the complex number in the form $a + ib$. $i + i$

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EXERCISE 5.1 - Question No. 3

Express of the complex number in the form $a + ib . i^{-}$

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EXERCISE 5.1 - Question No. 4

Express of the complex number in the form $a + ib .$

$$3(7 + i7) + i(7 + i7)$$

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EXERCISE 5.1 - Question No. 5

Express of the complex number in the form $a + ib .$

$$(1 - i) - (-1 + i6)$$

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EXERCISE 5.1 - Question No. 6

Express of the complex number in the form $a + ib$.

$$\left(\frac{1}{5} + i\frac{2}{5}\right) - \left(4 + i\frac{5}{2}\right)$$

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EXERCISE 5.1 - Question No. 7

Express of the complex number in the form $a + ib$. $[(1/3+i7/3)+(4+i1/3)]-(-4/3+i)$

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EXERCISE 5.1 - Question No. 8

Express of the complex number in the form $a + ib$. $(1 - i)^4$

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EXERCISE 5.1 - Question No. 9

Express of the complex number in the form $a + ib$. $\left(\frac{1}{3} + 3i\right)^3$

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EXERCISE 5.1 - Question No. 10

Express of the complex number in the form $a + ib$.

$$\left(-2 - \frac{1}{3}i\right)^3$$

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EXERCISE 5.1 - Question No. 11

Find the multiplicative inverse of the complex number $4 - 3i$

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EXERCISE 5.1 - Question No. 12

Find the multiplicative inverse of the complex number $\sqrt{5} + 3i$

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EXERCISE 5.1 - Question No. 13

Find the multiplicative inverse of the complex number i

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EXERCISE 5.1 - Question No. 14

Express the following expression in the form of $a + ib$

$$\frac{(3 + i\sqrt{5})(3 - i\sqrt{5})}{(\sqrt{3} + \sqrt{2}i) - (\sqrt{3} - i\sqrt{2})}$$

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EXERCISE 5.2 - Question No. 1

Find the modulus and the arguments of the complex number

$$z = -1 - i\sqrt{3}$$

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EXERCISE 5.2 - Question No. 2

Find the modulus and the arguments of the complex number

$$z = -\sqrt{3} + i$$

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EXERCISE 5.2 - Question No. 3

Convert of the complex number in the polar form: $1 - i$

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EXERCISE 5.2 - Question No. 4

Convert of the complex number in the polar form: $-1 + i$

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EXERCISE 5.2 - Question No. 5

Convert of the complex number in the polar form: $-1 - i$

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EXERCISE 5.2 - Question No. 6

Convert of the complex number in the polar form: (i) -3

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EXERCISE 5.2 - Question No. 7

Convert of the complex number in the polar form: $\sqrt{3} + i$

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EXERCISE 5.2 - Question No. 8

Convert of the complex number in the polar form: i

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EXERCISE 5.3 - Question No. 1

Solve the equation: $x^2 + 3 = 0$

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EXERCISE 5.3 - Question No. 2

Solve the equation: $2x^2 + x + 1 = 0$

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EXERCISE 5.3 - Question No. 3

Solve the equation: $x^2 + 3x + 9 = 0$

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EXERCISE 5.3 - Question No. 4

Solve the equation $-x^2 + x - 2 = 0$

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EXERCISE 5.3 - Question No. 5

Solve the equation: $x^2 + 3x + 5 = 0$

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EXERCISE 5.3 - Question No. 6

Solve the equation: $x^2 - x + 2 = 0$

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EXERCISE 5.3 - Question No. 7

Solve the equation: $\sqrt{2}x^2 + x + \sqrt{2} = 0$

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EXERCISE 5.3 - Question No. 8

Solve the equation: $\sqrt{3}x^2 - \sqrt{2}x + 3\sqrt{3} = 0$

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EXERCISE 5.3 - Question No. 9

Solve the equation: $x^2 + x + \frac{1}{\sqrt{2}} = 0$

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EXERCISE 5.3 - Question No. 10

Solve the equation: $x^2 + \frac{x}{\sqrt{2}} + 1 = 0$

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EXERCISE 5.4 - Question No. 1

Find the square roots of the following: $15 - 8i$

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EXERCISE 5.4 - Question No. 2

Find the square roots of the following: $8 - 6i$

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EXERCISE 5.4 - Question No. 3

Find the square roots of the following: $1 - i$

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EXERCISE 5.4 - Question No. 4

Find the square roots of the following: $-i$

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EXERCISE 5.4 - Question No. 5

Find the square roots of the following: i

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EXERCISE 5.4 - Question No. 6

Find the square roots of the following: $1 + i$

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MISCELLANEOUS EXERCISE - Question No. 1

Evaluate : $\left[i^{18} + \left(\frac{1}{i} \right)^{25} \right]^3$

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MISCELLANEOUS EXERCISE - Question No. 2

For any two complex numbers z_1 and z_2 , prove that

$$\operatorname{Re}(z_1 z_2) = \operatorname{Re} z_1 \operatorname{Re} z_2 - |m z_1| m z_2 .$$

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MISCELLANEOUS EXERCISE - Question No. 3

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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MISCELLANEOUS EXERCISE - Question No. 4

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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MISCELLANEOUS EXERCISE - Question No. 5

Convert the following in the polar form : (i) $\frac{1 + 7i}{(2 - i)^2}$ (ii) $\frac{1 + 3i}{1 - 2i}$

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MISCELLANEOUS EXERCISE - Question No. 6

Solve the equation : $3x^2 - 4x + \frac{20}{3} = 0$

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MISCELLANEOUS EXERCISE - Question No. 7

Solve the equation : $x^2 - 2x + \frac{3}{2} = 0$

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MISCELLANEOUS EXERCISE - Question No. 8

Solve the equation : $27x^2 - 10x + 1 = 0$

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MISCELLANEOUS EXERCISE - Question No. 9

Solve the equation : $21x^2 - 28x + 10 = 0$

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MISCELLANEOUS EXERCISE - Question No. 10

If $z_1 = 2 - i$, $z_2 = 1 + i$, find $\left| \frac{z_1 + z_2 + 1}{z_1 - z_2 + i} \right|$

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MISCELLANEOUS EXERCISE - Question No. 11

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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MISCELLANEOUS EXERCISE - Question No. 12

Let $z_1 = 2 - i$, $z_2 = -2 + i$. Find (i) $\operatorname{Re} \left(\frac{z_1 z_2}{\bar{z}_1} \right)$ (ii) $\operatorname{Im} \left(\frac{1}{z_1 \bar{z}_1} \right)$

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MISCELLANEOUS EXERCISE - Question No. 13

Find the modulus and argument of the complex number $\frac{1 + 2i}{1 - 3i}$.

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MISCELLANEOUS EXERCISE - Question No. 14

Find the real numbers x and y if $(x - iy)(3 + 5i)$ is the conjugate of $-6 - 24i$.

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MISCELLANEOUS EXERCISE - Question No. 15

Find the modulus of $\frac{1+i}{1-i} - \frac{1-i}{1+i}$.

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MISCELLANEOUS EXERCISE - Question No. 16

If $(x + iy)^3 = u + iv$, then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$.

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MISCELLANEOUS EXERCISE - Question No. 17

If α and β are different complex numbers with $|\beta| = 1$, then find

$$\left| \frac{\beta - \alpha}{1 - \bar{\alpha}\beta} \right|.$$

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MISCELLANEOUS EXERCISE - Question No. 18

Find the number of non-zero integral solutions of the equation

$$|1 - i|^x = 2^x.$$

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MISCELLANEOUS EXERCISE - Question No. 19

If $(a + ib)(c + id)(e + if)(g + ih) = A + iB$, then show

$$\text{that } (a^2 + b^2)(c^2 + d^2)(e^2 + f^2)(g^2 + h^2) = A^2 + B^2$$

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MISCELLANEOUS EXERCISE - Question No. 20

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

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SOLVED EXAMPLES - Question No. 1

If $4x + i(3x - y) = 3 + i(-6)$, where x and y are real numbers, then find the values of x and y .

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SOLVED EXAMPLES - Question No. 2

Express the following in the form of $a + bi$: (i) $(-5i)\left(\frac{1}{8}i\right)$ (ii)

$$(-i)(2i)\left(-\frac{1}{8}i\right)^3$$

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SOLVED EXAMPLES - Question No. 3

Express $(5 - 3i)^3$ in the form $a + ib$.

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SOLVED EXAMPLES - Question No. 4

Express $(-\sqrt{3} + \sqrt{-2})(2\sqrt{3} - i)$ in the form of $a + ib$

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SOLVED EXAMPLES - Question No. 5

Find the multiplicative inverse of $2 - 3i$.

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SOLVED EXAMPLES - Question No. 6

Express the following in the form $a + ib$ (i) $\frac{5 + \sqrt{2}i}{1 - \sqrt{2}i}$ (ii) i^{-35}

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SOLVED EXAMPLES - Question No. 7

Represent the complex number $z = 1 + i\sqrt{3}$ in the polar form.

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SOLVED EXAMPLES - Question No. 8

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

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SOLVED EXAMPLES - Question No. 9

Solve $x^2 + 2 = 0$.

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SOLVED EXAMPLES - Question No. 10

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

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SOLVED EXAMPLES - Question No. 11

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

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SOLVED EXAMPLES - Question No. 12

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

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SOLVED EXAMPLES - Question No. 13

Find the modulus and argument of the complex numbers : (i)

$$\frac{1+i}{1-i} \quad \text{(ii)} \quad \frac{1}{1+i}$$

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SOLVED EXAMPLES - Question No. 14

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

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SOLVED EXAMPLES - Question No. 15

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

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SOLVED EXAMPLES - Question No. 16

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

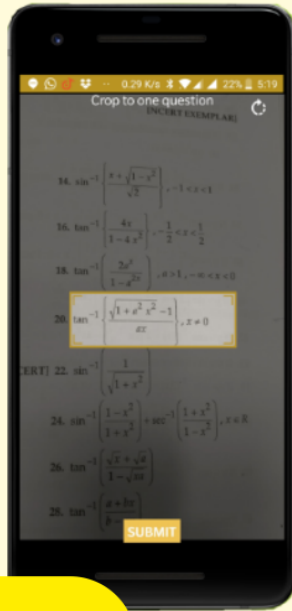
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SOLVED EXAMPLES - Question No. 17

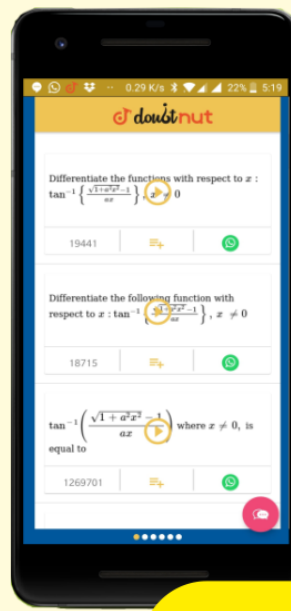
Find the square root of $-7 - 24i$

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