LarTrig9 4.1.011. (2469139) (Add) -- view

Write the complex number in standard form. a+bi

$6 + \sqrt{-16}$ = 6 + 4i

$6 + 4i$

LarTrig9 4.1.013.MI.SA. (2936587) (Add) -- view 7m

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Write the complex number in standard form.

$7 - \sqrt{-48}$

$= 7 - 4i\sqrt{3}$ $= 7 + (-4\sqrt{3})\,i$

48 = 2 · 24, 24 = 2 · 12, 12 = 2 · 6, 6 = 2 · 3

$2 \cdot 2\sqrt{3}$

$= 4\sqrt{3}$

Step 1

Write the square root as the product of two square roots.

$7 - \sqrt{48}$ $\sqrt{}\cdot\sqrt{}$

Step 2

Use the definition, $i = \sqrt{-1}$, to simplify.

$7 - \sqrt{48}$

LarTrig9 4.1.019. (2456881) (Add) -- view

Write the complex number in standard form.

$-11i + i^2$

$-1 - 11i$

Need Help? Read It

$i^2 = -1$

$-11i - 1 = -1 + (-11)i$

$-1 - 11i$

$\sqrt{8} = 2\sqrt{2}$ (2 | 8, 2 | 4, 2)

$\sqrt{50} = 5\sqrt{2}$ (2 | 50, 5 | 25, 5)

LarTrig9 4.1.027. (2860243) (Add) -- view

Perform the operation and write the result in standard form.

$\left(-2 + \sqrt{-8}\right) + \left(7 - \sqrt{-50}\right) =$

$5 - 3i\sqrt{2}$

$-2 + 2i\sqrt{2} \quad +7 - 5i\sqrt{2}$

$= 9 - 3i\sqrt{2} = 9 + (-3\sqrt{2})i$

LarTrig9 4.1.031. (2859690) (Add) -- view

Perform the operation and write the result in standard form.

$-\left(\frac{3}{2} + \frac{5}{2}i\right) + \left(\frac{5}{3} + \frac{10}{3}i\right)$

$\frac{1}{6} + \frac{5i}{6}$

$-\frac{3}{2} - \frac{5}{2}i + \frac{5}{3} + \frac{10}{3}i = \left(-\frac{3}{2} + \frac{5}{3}\right) + \left(-\frac{5}{2} + \frac{10}{3}\right)i$

$\frac{-3(3) + 5(2)}{6} + \left(\frac{-5(3) + 10(2)}{6}\right)i$

$= \frac{-9 + 10}{6} + \left(\frac{-15 + 20}{6}\right)i$

$= \frac{1}{6} + \frac{5}{6}i$

LarTrig9 4.1.035. (2859684) (Add) -- view

Perform the operation and write the result in standard form.

$13i(1 - 8i)$

$104 + 13i$

$13i(1) + (13i)(-8i)$

$= 13i - 104i^2$

$= 13i + 104$

$= 104 + 13i$

LarTrig9 4.1.037. (2859716) (Add) -- view

Perform the operation and write the result in standard form.

$(\sqrt{15} + \sqrt{14}i)(\sqrt{15} - \sqrt{14}i)$ $= (\sqrt{15})^2 - (\sqrt{14}\,i)^2 = 15 - 14i^2 = 15 + 14 = 29$

$29 + 0i$

LarTrig9 4.1.039. (2859765) (Add) -- view

Perform the operation and write the result in standard form.

$(4 + 8i)^2$ $(a+b)^2 = a^2 + 2ab + b^2$

$4^2 + 2(4)(8i) + (8i)^2 = 16 + 64i + 64i^2$

$= 16 + 64i - 64$

$= -48 + 64i$

$-48 + 64i$

LarTrig9 4.1.043. (2483708) (Add) -- view

Write the complex conjugate of the complex number.

$3 + 4i = z \Rightarrow \bar{z} = 3 - 4i$

$3 - 4i$

LarTrig9 4.1.045. (2483688) (Add) -- view

Write the complex conjugate of the complex number.

$-2 - \sqrt{6}i = z \Rightarrow \bar{z} = -2 + \sqrt{6}\,i = -2 + i\sqrt{6}$

$-2 + i\sqrt{6}$

Multiply the number by its complex conjugate. (Simplify your answer completely.)

$(-2 - \sqrt{6}\,i)(-2 + \sqrt{6}\,i) = (-2)^2 + \sqrt{6}^2 = 4 + 6 = 10$

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LarTrig9 4.1.051. (2859856) (Remove) -- view

Write the quotient in standard form.

$\frac{7}{i} \cdot \frac{-i}{-i} = \frac{-7i}{-i^2} = -7i$

$0 - 7i$

LarTrig9 4.1.055. (2859485) (Add) -- view

Write the quotient in standard form.

$\frac{8+i}{8-i}$

$\frac{63}{65}+\frac{16i}{65}$

Use conjugate of the denominator.

$= \left(\frac{8+i}{8-i}\right)\left(\frac{8+i}{8+i}\right) = \frac{8^2+2\cdot 8i+i^2}{8^2+1^2} = \frac{64+16i-1}{65} = \frac{63}{65}+\frac{16}{65}i$

LarTrig9 4.1.057. (2859476) (Add) -- view

Write the quotient in standard form.

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

$-3-8i$

LarTrig9 4.1.061. (2859801) (Remove) -- view

Perform the operation and write the result in standard form.

$\frac{6}{1+i}-\frac{7}{1-i}$

$-\frac{1}{2}-\frac{13i}{2}$

LCD $= (1+i)(1-i) = i^2+i^2 = 1+1 = 2$

$= \left(\frac{6}{1+i}\right)\left(\frac{1-i}{1-i}\right)-\left(\frac{7}{1-i}\right)\left(\frac{1+i}{1+i}\right) = \frac{6-6i-(7+7i)}{2}$

$= \frac{6-6i-7-7i}{2} = \frac{-1-13i}{2}$

$= -\frac{1}{2}-\frac{13}{2}i$

LarTrig9 4.1.065. (2859925) (Remove) -- view

Comment: not randomized

Write the complex number in standard form.

$\sqrt{-6}\cdot\sqrt{-2}$

$-2\sqrt{3}+0i$

$(\sqrt{6}\,i)(\sqrt{2}\,i) = \sqrt{6}\sqrt{2}\,i^2 = -\sqrt{12}$

$= -\sqrt{4\cdot 3} = -\sqrt{4}\sqrt{3} = \boxed{-2\sqrt{3}}$

LarTrig9 4.1.069.MI. (2550714) (Remove) -- view

Write the complex number in standard form. (Simplify your answer completely.)

$(4+\sqrt{-7})(6-\sqrt{-14})$

$24+7\sqrt{2}+i\left(6\sqrt{7}-4\sqrt{14}\right)$

$= 24-4i\sqrt{14}+6\sqrt{7}\,i-(\sqrt{7}\,i)(\sqrt{14}\,i)$

$= 24+(-4\sqrt{14}+6\sqrt{7})i+7\sqrt{2}$

$= 24+7\sqrt{2}+(6\sqrt{7}-4\sqrt{14})\,i$

$\sqrt{(-6)(-2)} = \sqrt{12} = 2\sqrt{3}$ Nuup!

Careful with $\sqrt{ab} = \sqrt{a}\sqrt{b}$, when $a, b < 0$ (negative).

$\sqrt{7}\sqrt{14} = \sqrt{7\cdot 7\cdot 2} = 7\sqrt{2}$

LarTrig9 4.1.071. (2860287) (Add) -- view
Comment: not randomized

3m

Use the Quadratic Formula to solve the quadratic equation. (Enter your answers as a comma-separated list.)

$x^2 - 2x + 2 = 0$

$x =$ $1 - i, 1 + i$

$a=1, b=-2, c=2$

$b^2-4ac = (-2)^2 - 4(1)(2)$

$= 4-8$

$= -4$

$\Rightarrow \sqrt{-4} = 2i$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{2 \pm \sqrt{-4}}{2} = \frac{2 \pm 2i}{2} = 1 \pm i$

$x^2 - 2x + 2$

$= x^2 - 2x + i^2 - 1 + 2$

$= (x-1)^2 + 1 \overset{\text{SET}}{=} 0$

$(x-1)^2 = -1$

$x - 1 = \pm\sqrt{-1} = \pm i$

$x = 1 \pm i$

LarTrig9 4.1.077. (2859609) (Remove) -- view
Comment: not randomized

Use the Quadratic Formula to solve the quadratic equation. (Enter your answers as a comma-separated list.)

$\frac{3}{2}x^2 - 6x + 9 = 0$

$x =$ $2 - i\sqrt{2}, 2 + i\sqrt{2}$

$\frac{3}{2}x^2 - 6x + 9 = 0$

$\frac{3}{2}(x^2 - 4x \quad) + 9 = 0$

$\frac{6}{\frac{3}{2}} = 6 \cdot \frac{2}{3} = 4$

$\frac{3}{2}(x^2 - 4x + 2^2) - \frac{3}{2}(4) + 9 = 0$

$\frac{4}{2} = 2 \rightsquigarrow 2^2 = 4$

$\frac{3}{2}(x-2)^2 + 3 = 0$

$\frac{3}{2}(x-2)^2 = -3$

$(x-2)^2 = -2$

$\sqrt{(x-2)^2} = \sqrt{-2}$

$|x-2| = \sqrt{-2}$

$x - 2 = \pm\sqrt{-2} = \pm i\sqrt{2}$

$x = 2 \pm \sqrt{2}\, i$

$\Rightarrow 3x^2 - 12x + 18 = 0$

$x^2 - 4x + 6 = 0$

$a = 1, \; b = -4, \; c = 6$

$b^2 - 4ac = (-4)^2 - 4(1)(6) = 16 - 24 = -8$

$\sqrt{-8} = i \cdot 2\sqrt{2} = 2i\sqrt{2}$

$(-\frac{3}{2})(4) + 9 = -6 + 9 = 3$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{4 \pm 2i\sqrt{2}}{2(1)} = \frac{2(2 \pm i\sqrt{2})}{2}$

$= 2 \pm i\sqrt{2}$