(1 point) Evaluate the expression $\frac{\sqrt{-1}}{\sqrt{-9}\sqrt{-9}}$ and write the result in the form $a + bi$.

The real number a equals 0

The real number b equals -1/9

(1 point) Evaluate the expression i^{92} and write the result in the form $a + bi$.

The real number a equals 1

The real number b equals 0

(1 point) Write each of the given numbers in the polar form $re^{i\theta}$, $-\pi < \theta \leq \pi$.

(a) $\frac{2-i}{8}$

$r =$ sqrt(5)/8 , $\theta =$ tan^-1(-1/2) ,

(b) $-6\pi(7 + i\sqrt{3})$

$r =$ 12sqrt(13)pi , $\theta =$ tan^-1(sqrt(3)/7)-pi ,

(c) $(1 + i)^4$

$r =$ 4 , $\theta =$ pi .

(1 point)
Rewrite the following expression into the form of a+bi:

$\frac{-4+8i}{4+3i} =$ 8/25+(44/25)i

(1 point) Complete the following equation. Your answers will be algebraic expressions.

$\frac{1}{a+bi} =$ a/(a^2+b^2) $+$ (-b)/(a^2+b^2) i

Entered	Answer Preview	Result
2.12132+2.12132i, -2.12132+2.12132i, -2.12132-2.12132i, 2.12132-2.12132i	$3e^{\frac{\pi i}{4}}, 3e^{\frac{3\pi}{4}i}, 3e^{\frac{5\pi}{4}i}, 3e^{\frac{7\pi}{4}i}$	correct
1, 0.309017+0.951057i, -0.809017+0.587785i, -0.809017-0.587785i, 0.309017-0.951057i	$1, e^{\frac{2\pi}{5}i}, e^{\frac{4\pi i}{5}}, e^{\frac{6\pi}{5}i}, e^{\frac{8\pi}{5}i}$	correct
0.92388+0.382683i, -0.382683+0.92388i, -0.92388-0.382683i, 0.382683-0.92388i	$i^{\frac{1}{4}}, i^{\frac{1}{4}}e^{\frac{\pi}{2}i}, i^{\frac{1}{4}}e^{\pi i}, i^{\frac{1}{4}}e^{\frac{3\pi i}{2}}$	correct

All of the answers above are correct.

(1 point) Find all the values of the following.

(1) $(-81)^{\frac{1}{4}}$

Place all answers in the following blank, separated by commas:

3*e^((pi)i/4),3*e^(3pi/4*i),3*e^(5pi/4*i),3*e^(7pi/4*i)

(2) $1^{\frac{1}{5}}$

Place all answers in the following blank, separated by commas:

1,e^(2pi/5*i),e^(4pi*i/5),e^(6pi/5*i),e^(8pi/5*i)

(3) $i^{\frac{1}{4}}$

Place all answers in the following blank, separated by commas:

i^(1/4),i^(1/4)*e^(pi/2*i),i^(1/4)*e^(pi*i),i^(1/4)*e^(3pi*i/2)

(1 point)

Select True or False from each pull-down menu, depending on whether the corresponding statement is true or false.

False **1.** $\text{Arg}\,\frac{z_1}{z_2} = \text{Arg}\,z_1 - \text{Arg}\,z_2$, if $z_1 \neq 0$, $z_2 \neq 0$.

True **2.** $\text{Arg}(0)$ is undefined.

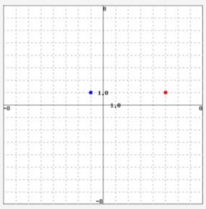
True **3.** $\text{Arg}\,\overline{z} = -\text{Arg}\,z$, if z is not real.

False **4.** $\text{Arg}\,z_1 z_2 = \text{Arg}\,z_1 + \text{Arg}\,z_2$, if $z_1 \neq 0$, $z_2 \neq 0$.

True **5.** $\arg z = \text{Arg}\,z + 2\pi k, (k = 0, \pm 1, \pm 2, \pm 3 ...)$ and if $z \neq 0$.

(1 point) More on complex numbers.

An apology: The exponents don't print very well on the screen version of this problem. You can get a better idea of what the notation looks like from the hard copy and/or you can use the "typeset" mode to get a better printing. Unfortunately in typset mode you won't be able to enter the answers which are within equations.



The red point represents the complex number $z_1 =$ 5+i ,

and the blue point represents the complex number $z_2 =$ -1+i .

$|z_1| =$ sqrt(26) .

We can also write these complex numbers in polar coordinates (r, θ). The angle is sometimes called the "argument" of the complex number and r is called the "modulus" or the absolute value of the number.

By comparing Taylor series we find that

$$e^{i\theta} = \cos(\theta) + i\sin(\theta).$$

This is a very important and very useful formula. One use is to relate the polar coordinate and cartesian coordinate formulas for the complex number. If z can be represented by both coordinates $x + iy$ and by polar coordinates r, θ then

$$re^{i\theta} = r\cos(\theta) + ir\sin(\theta) = x + iy = z.$$

A. Find r and θ (use an angle between $-\pi$ and π) such that the red point $z_1 = re^{i\theta}$:

$r =$ sqrt(26)