# **Quiz - Introduction to Complex Numbers I**

Due Jun 9 at 11:59pmPoints 20Questions 11Available until Jun 9 at 11:59pmTime Limit NoneAllowed Attempts Unlimited

Take the Quiz Again

### **Attempt History**

	Attempt	Time	Score	
KEPT	Attempt 3	3 minutes	18 out of 20	
LATEST	Attempt 3	3 minutes	18 out of 20	
	Attempt 2	14 minutes	16.67 out of 20	
	Attempt 1	6 minutes	12.83 out of 20	

(!) Correct answers are hidden.

Score for this attempt: 18 out of 20

Submitted Jun 9 at 2:06am This attempt took 3 minutes.

Question 1

2 / 2 pts

**[C01-01]** What is |3i+4| ?

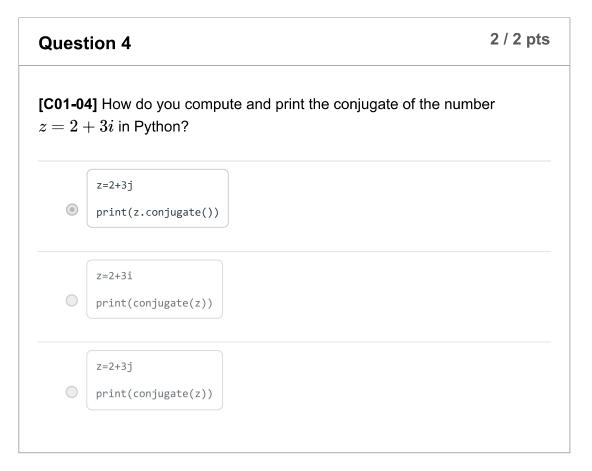
- 25
- 0 7
- 5
- -1

**Question 2** 

2 / 2 pts

**[C01-02]** What is a+b if a=3+2i and b=-i ?

Question 3 2/2 pts [C01-03] What is  $2 \cdot e^{i\pi/3}$  in rectangular form?  $2\sqrt{3} + 2i$   $\sqrt{2} + 2i$   $\sqrt{3} - i$   $1 + \sqrt{3}i$ 



**Question 5** 

2 / 2 pts

**[C01-05]** How do you compute polar form of 2-3i in Python?

- = abs(2-3j)alpha = asin(-3/r)

- r=-3
  alpha = asin(2/r)

Incorrect

**Question 6** 

0 / 2 pts

**[C02a-01]** Given quantum state  $|\psi\rangle=\frac{-2i}{\sqrt{6}}|01\rangle+\frac{1}{\sqrt{6}}(1-i)|11\rangle$ , compute  $|\langle\phi|\psi\rangle|^2$  where  $|\phi\rangle=|11\rangle$ . Write your answer as a fraction in reduced form without any spaces. (Ex: 1/2)

5/6

**Question 7** 

2 / 2 pts

**[C02a-02]** Given that  $|\psi\rangle=-(2+i)|00\rangle+(1-i)|01\rangle+rac{1-i}{3}|11\rangle$  , what is  $\langle\psi|$  ?

$$\bigcirc (2+i)\langle 00| + (1+i)\langle 01| + \frac{1+i}{3}\langle 11|$$

$$\bigcirc -(2+i)\langle 00| + (1-i)\langle 01| + \frac{1-i}{3}\langle 11|$$

$$ullet$$
  $-(2-i)\langle 00| + (1+i)\langle 01| + rac{1+i}{3}\langle 11|$ 

$$\bigcirc (2+i)\langle 00| - (1+i)\langle 01| - \frac{1+i}{3}\langle 11|$$

## Question 8 1 / 1 pts

**[C02b-01]** Given the quantum state  $\left(\frac{\frac{2-i}{3}}{\frac{\sqrt{3}+i}{3}}\right)$ , what is the probability of observing  $|0\rangle$  ?

- 0 1/9
- 5/9
- 0 1/3
- 2/9

#### Question 9 1 / 1 pts

**[C02b-02]** Given that  $\left( \frac{a}{\frac{1-i}{2}} \right)$  is a valid quantum state, select the possible values for a .

- ✓ (i-1)/2
- (i+1)/4
- 1/2
- i/2
- -i/√2

## **Question 10**

2 / 2 pts

**[C03-01]** What is the resulting state if Y operator is applied to the state

$$\left( egin{array}{c} rac{i}{\sqrt{6}} \ rac{2+i}{\sqrt{6}} \end{array} 
ight)$$



$$\bigcirc \left(\begin{array}{c} \frac{2+i}{\sqrt{6}} \\ \frac{1}{\sqrt{6}} \end{array}\right)$$

$$\begin{pmatrix}
\frac{1-2i}{\sqrt{6}} \\
\frac{-1}{\sqrt{6}}
\end{pmatrix}$$

$$\left(\begin{array}{c} \frac{-1}{\sqrt{6}} \\ \frac{2i-1}{\sqrt{6}} \end{array}\right)$$

$$\begin{pmatrix}
\frac{1}{\sqrt{6}} \\
\frac{2i-1}{\sqrt{6}}
\end{pmatrix}$$

#### **Question 11**

2 / 2 pts

[C03-02] Select the unitary matrices.

$$igspace \left(egin{array}{cc} e^{-\pi i/3} & 0 \ 0 & e^{\pi i/3} \end{array}
ight)$$

$$igcup \left(egin{matrix} 1 & 0 \ 0 & e^{\pi i/4} \end{matrix}
ight)$$

$$\qquad \left( \begin{array}{cc} \frac{1}{\sqrt{2}} & -\frac{i}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} & \frac{i}{\sqrt{2}} \end{array} \right)$$

$$\qquad \left( \begin{array}{cc} \frac{1}{\sqrt{2}} & 0\\ \frac{1}{\sqrt{2}} & e^{\pi i/4} \end{array} \right)$$

Quiz Score: 18 out of 20