

NAME: _____

1. 060410b, P.I. A2.N.7

The expression $i^0 \cdot i^1 \cdot i^2 \cdot i^3 \cdot i^4$ is equal to

[A] 1 [B] -1 [C] $-i$ [D] i

2. 010518b, P.I. A2.N.7

The expression $\frac{i^{16}}{i^3}$ is equivalent to

[A] $-i$ [B] i [C] 1 [D] -1

3. 060614b

What is the multiplicative inverse of $3i$?

[A] $\frac{1}{3}$ [B] -3 [C] $-\frac{i}{3}$ [D] $-3i$

4. 080702b, P.I. A2.N.7

The expression $3i(2i^2 - 5i)$ is equivalent to

[A] $-15 - 5i$ [B] $-1 + 0i$
[C] $15 - 5i$ [D] $15 - 6i$

5. 080621b, P.I. A2.N.9

The complex number $c + di$ is equal to $(2 + i)^2$. What is the value of c ?

6. 010219b, P.I. A2.N.9

The expression $(-1 + i)^3$ is equivalent to

[A] $2 + 2i$ [B] $-3i$
[C] $-1 - i$ [D] $-2 - 2i$

7. 080122b, P.I. A2.N.9

Show that the product of $a + bi$ and its conjugate is a real number.

8. 010325b, P.I. A2.N.9

In an electrical circuit, the voltage, E , in volts, the current, I , in amps, and the opposition to the flow of current, called impedance, Z , in ohms, are related by the equation $E = IZ$. A circuit has a current of $(3 + i)$ amps and an impedance of $(-2 + i)$ ohms. Determine the voltage in $a + bi$ form.

9. 060304b, P.I. A2.N.9

The relationship between voltage, E , current, I , and resistance, Z , is given by the equation $E = IZ$. If a circuit has a current $I = 3 + 2i$ and a resistance $Z = 2 - i$, what is the voltage of this circuit?

[A] $8 + 7i$ [B] $8 + i$ [C] $4 - i$ [D] $4 + i$

NAME: _____

10. 010811b, P.I. A2.N.9

The expression $\frac{10}{3+i}$ is equivalent to

- [A] $\frac{5}{4}$ [B] $3-i$
 [C] $\frac{15+5i}{4}$ [D] $3+i$

11. 060513b, P.I. A2.N.9

The expression $\frac{2+i}{3+i}$ is equivalent to

- [A] $\frac{6+i}{8}$ [B] $\frac{7+i}{10}$
 [C] $\frac{7-5i}{10}$ [D] $\frac{6+5i}{8}$

12. 060509b, P.I. A2.N.9

Impedance measures the opposition of an electrical circuit to the flow of electricity. The total impedance in a particular circuit is given by the formula $Z_T = \frac{Z_1 Z_2}{Z_1 + Z_2}$. What is the total impedance of a circuit, Z_T , if $Z_1 = 1+2i$ and $Z_2 = 1-2i$?

- [A] $-\frac{3}{2}$ [B] 1 [C] $\frac{5}{2}$ [D] 0

13. 080905b, P.I. A2.N.6

Expressed in simplest form, $\frac{\sqrt{-20}}{\sqrt{5}}$ is equivalent to

- [A] $-2i$ [B] $\frac{2i}{\sqrt{5}}$ [C] $\sqrt{2}i$ [D] $2i$

14. 080816b, P.I. A2.N.6

The expression $\frac{\sqrt{-50}}{\sqrt{2}}$ is equivalent to

- [A] $-5i$ [B] 5 [C] -5 [D] $5i$

15. 080314b, P.I. A2.N.6

What is the product of $5+\sqrt{-36}$ and $1-\sqrt{-49}$, expressed in simplest $a+bi$ form?

- [A] $47-29i$ [B] $47+41i$
 [C] $-37+41i$ [D] $5-71i$

[1] B _____

[2] B _____

[3] C _____

[4] D _____

[2] 3, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The expression $3 + 4i$ is found, but c is not identified.

or [1] 3, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[5] incorrect procedure. _____

[6] A _____

[2] Appropriate work is shown, such as

$$(a + bi)(a - bi) = a^2 + b^2.$$

[1] The conjugate is incorrect, but multiplication and substitution for i^2 are appropriate.

or [1] The conjugate is correct, but one or more errors in multiplication and/or substitution for i^2 are made.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[7] incorrect procedure. _____

[2] $-7 + i$, and appropriate work is shown, such as $(-2 + i)(3 + i)$.

[1] Appropriate work is shown, but one computational error is made.

or [1] $-7 + i$, but no work is shown.

[0] $(-2 + i)(3 + i)$ is shown but not multiplied, or the values are added instead of multiplied.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[8] obviously incorrect procedure. _____

[9] B _____

[10] B _____

[11] B _____

[12] C _____

[13] D _____

[14] D _____

[15] A _____