Name: _____

N.CN.A.2: Operations with Complex Numbers 2

1 Melissa and Joe are playing a game with complex numbers. If Melissa has a score of $5 - 4i$ and Joe has a score of $3 + 2i$, what is their total score?
1) $8 + 6i$
2) $8 + 2i$
3) $8 - 6i$
4) $8 - 2i$

2 The expression $(3 - 7i)^2$ is equivalent to
1) $-40 + 0i$
2) $-40 - 42i$
3) $58 + 0i$
4) $58 - 42i$

3 The expression $(-1 + i)^3$ is equivalent to
1) $-3i$
2) $-2 - 2i$
3) $-1 - i$
4) $2 + 2i$

4 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?
1) $8 + i$
2) $8 + 7i$
3) $4 + i$
4) $4 - i$

5 The product of $\left(2\sqrt{2} + 5i\right)$ and $\left(5\sqrt{2} - 2i\right)$ is
1) 30
2) $30 + 21i\sqrt{2}$
3) $30 + 29i\sqrt{2}$
4) $10 + 21i\sqrt{2}$

6 If $x = 3i$, $y = 2i$, and $z = m + i$, the expression xy^2z equals
1) $-12 - 12mi$
2) $-6 - 6mi$
3) $12 - 12mi$
4) $6 - 6mi$

7 The expression $(x + i)^2 - (x - i)^2$ is equivalent to
1) 0
2) -2
3) $-2 + 4xi$
4) $4xi$

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

9 If x is a real number, express $2xi(i - 4i^2)$ in simplest $a + bi$ form.

10 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.

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Answer Section

1 ANS: 4 REF: 060111b

2 ANS: 2

$(3-7i)(3-7i) = 9-21i-21i+49i^2 = 9-42i-49 = -40-42i$

REF: fall0901a2

3 ANS: 4

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

REF: 010219b

4 ANS: 1

$E = \overline{IZ} = (3+2i)(2-i) = 6-3i+4i-2i^2 = 6+i-2(-1) = 8+i$

REF: 060304b

5 ANS: 2

$\left(2\sqrt{2}+5i\right)\left(5\sqrt{2}-2i\right) = 10\sqrt{4}-4i\sqrt{2}+25i\sqrt{2}-10i^2 = 30+21i\sqrt{2}$

REF: 011717a2

6 ANS: 3

$(3i)(2i)^2(m+i)$

$(3i)(4i^2)(m+i)$

$(3i)(-4)(m+i)$

$(-12i)(m+i)$

$-12mi-12i^2$

$-12mi+12$

REF: 061319a2

7 ANS: 4

$(x+i)^2-(x-i)^2 = x^2+2xi+i^2-(x^2-2xi+i^2) = 4xi$

REF: 011327a2

8 ANS:

3. $(2+i)^2 = (2+i)(2+i) = 4+4i+i^2 = 4+4i-1 = 3+4i$.

REF: 080621b

9 ANS:

$2xi(i-4i^2) = 2xi^2-8xi^3 = 2xi^2-8xi^3 = -2x+8xi$

REF: 011533a2

10 ANS:
$-7+i$. $E = IZ = (3+i)(-2+i) = -6+3i-2i+i^2 = -6+i-1 = -7+i$

REF: 010325b