

N.CN.A.3: Division of Complex Numbers 1

1 What is the multiplicative inverse of $3i$?

- 1) $-3i$ 2) -3 3) $\frac{1}{3}$ 4) $-\frac{i}{3}$

2 What is the multiplicative inverse of $3 - i$?

- 1) $\frac{3-i}{8}$ 2) $\frac{3+i}{8}$ 3) $\frac{3-i}{10}$ 4) $\frac{3+i}{10}$

3 The expression $\frac{1}{2-i}$ is equivalent to

- 1) $2+i$ 2) $-2-i$ 3) $\frac{2+i}{5}$ 4) $\frac{2+i}{3}$

4 Expressed in $a + bi$ form, $\frac{5}{3+i}$ is equivalent to

- 1) $\frac{15}{8} - \frac{5}{8}i$ 2) $\frac{5}{3} - 5i$ 3) $\frac{3}{2} - \frac{1}{2}i$ 4) $15 - 5i$

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

- 1) $3-i$ 2) $3+i$ 3) $\frac{15+15i}{4}$ 4) $\frac{5}{4}$

6 The expression $\frac{1}{5+2i}$ is equivalent to

- 1) $\frac{5+2i}{21}$ 2) $\frac{5+2i}{29}$ 3) $\frac{5-2i}{21}$ 4) $\frac{5-2i}{29}$

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

- 1) $\frac{-6+9i}{13}$ 2) $\frac{6+9i}{13}$ 3) $\frac{-6-9i}{13}$ 4) $\frac{6-9i}{13}$

8 The expression $\frac{5}{4+3i}$ is equivalent to

- 1) $\frac{4-3i}{5}$ 2) $\frac{4+3i}{5}$ 3) $\frac{20+15i}{7}$ 4) $\frac{20-15i}{7}$

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

- 1) $\frac{6+5i}{8}$ 2) $\frac{6+i}{8}$ 3) $\frac{7-5i}{10}$ 4) $\frac{7+i}{10}$

10 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 $Z_2 = 1 - 2i$?

- 1) 1 2) 0 3) $\frac{5}{2}$ 4) $-\frac{3}{2}$

11 Express $\frac{5}{2-i}$ in simplest $a + bi$ form.

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Answer Section

1 ANS: 4

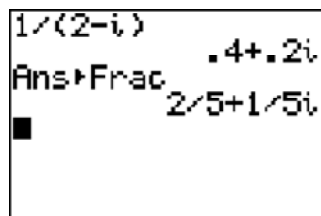
$$\frac{1}{3i} \cdot \frac{3i}{3i} = \frac{3i}{9i^2} = \frac{3i}{-9} = -\frac{i}{3}$$

REF: 060614b

2 ANS: 4

REF: 068521siii

3 ANS: 3



$$\frac{1}{2-i} \cdot \frac{2+i}{2+i} = \frac{2+i}{4-i^2} = \frac{2+i}{5}$$

REF: 061014b

4 ANS: 3

REF: 069722siii

5 ANS: 1

$$\frac{10}{(3+i)} \cdot \frac{(3-i)}{(3-i)} = \frac{10(3-i)}{9-3i+3i-i^2} = \frac{10(3-i)}{9-(-1)} = \frac{10(3-i)}{10} = 3-i$$

REF: 010811b

6 ANS: 4

REF: 019522siii

7 ANS: 4

REF: 019414siii

8 ANS: 1

REF: 010128siii

9 ANS: 4

$$\frac{(2+i)(3-i)}{(3+i)(3-i)} = \frac{6-2i+3i-i^2}{9-3i+3i-i^2} = \frac{6+i-(-1)}{9-(-1)} = \frac{7+i}{10}$$

REF: 060513b

10 ANS: 3

$$Z_r = \frac{Z_1 Z_2}{Z_1 + Z_2} = \frac{(1+2i)(1-2i)}{(1+2i)+(1-2i)} = \frac{1-2i+2i-4i^2}{2} = \frac{1-4i^2}{2} = \frac{1-4(-1)}{2} = \frac{5}{2}$$

REF: 060509b

11 ANS:

$$2+i$$

REF: 089612siii