8-4 Additional Practice

The Complex Plane

Round all answers to the nearest tenth.

1. What point in the complex plane represents $-8 + 5i$? **$(-8, 5)$**

2. Find the midpoint of the segment that joins the complex numbers $12 - 3i$ and $-16 - 9i$. **$-2 - 6i$**

3. Find the modulus of the complex number $-5 - 13i$. **13.9**

4. Find the distance between the complex numbers $r = 3 - 2i$ and $s = 12 + 5i$. **11.4**

5. Find the distance between the complex numbers $r = -2 + 4i$ and $s = -5 + 2i$. **3.6**

6. Correct the error of the following student's solution.

   Find the midpoint between the complex numbers $r = 6 + 9i$ and $s = 5 - 4i$.

   Midpoint $= \frac{(6 + 9i) + (5 - 4i)}{2}$

   Midpoint $= \frac{(6 + 9) + (5 - 4i)}{2}$

   Midpoint $= \frac{20 - 4i}{2}$

   Midpoint $= 8i$

   Midpoint $= \frac{(6 + 9i) + (5 - 4i)}{2}$

   Midpoint $= \frac{11 + 5i}{2}$

   Correct answer: $5.5 + 2.5i$

7. The total impedance of an electrical circuit is defined by $Z = \frac{Z_1 Z_2}{Z_1 + Z_2}$, where $Z_1 = 3 - 2i$ and $Z_2 = 3 + 2i$ are the parallel impedances of the circuit. What ordered pair describes the total impedance of the circuit?

   $\frac{(3 - 2i)(3 + 2i)}{(3 - 2i) + (3 + 2i)} = \frac{3^2 - (2i)^2}{6} = \frac{9 - 4i^2}{6} = \frac{13}{6}$

8. Two alternate resistors connected to a circuit have voltages of $6.4 + 5i$ and $7 - 4.2i$. What is the total voltage of the circuit? **$13.4 + 0.8i$**