

In order to receive full credit, you must **show all your work** and simplify your answers.

1. Perform the indicated operations on the complex numbers. Write the result in the form $a + bi$.

a. $(2 + 5i) - (7 - 2i) + (-3 + 4i)$

Solution:

$$(2 + 5i) - (7 - 2i) + (-3 + 4i) = (2 - 7 - 3) + (5i + 2i + 4i) = -8 + 11i$$

b. $i(3 - 4i)$

Solution:

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

c. $(4 + 7i)(2 - 3i)$

Solution:

$$(4 + 7i)(2 - 3i) = 8 - 12i + 14i - 21i^2 = 8 + 2i + 21 = 29 + 2i$$

d.

$$\frac{2 + 9i}{1 - 4i}$$

Solution:

$$\frac{2 + 9i}{1 - 4i} \times \frac{1 + 4i}{1 + 4i} = \frac{2 + 2(4i) + 1(9i) + (9i)(4i)}{1 + 4i - 4i - 16i^2} = \frac{2 + 17i - 36}{1 + 16} = \frac{-34 + 17i}{17} = \frac{-34}{17} + \frac{17i}{17} = -2 + i$$

Check: $(-2 + i)(1 - 4i) = -2 + -2(-4i) + i - 4i^2 = -2 + 8i + i + 4 = 2 + 9i \checkmark$

2. Simplify the complex number in order to write it in the form $a + bi$.

$$\frac{14 + \sqrt{-40}}{2}$$

Solution:

$$\frac{14 + \sqrt{-40}}{2} = \frac{14 + \sqrt{-4(10)}}{2} = \frac{14 + 2i\sqrt{10}}{2} = 7 + i\sqrt{10}$$