1016-420-02
Complex Variables

In-Class Exercise Solutions

2012 November 27

NAME:

Using what you know about algebra, and the fact that $i^2 = -1$, write the following expressions in the form $a + bi$, where a and b are ordinary real numbers, i.e., write a real number (possibly zero or negative) in each box.

1.
$$(1+2i)+(3+i) = (1+3)+(2+1)i = \left(\boxed{4}\right) + \left(\boxed{3}\right) i$$

2.
$$(1+2i)-(3+i) = (1-3)+(2-1)i = \left(\boxed{-2}\right) + \left(\boxed{1}\right) i$$

3.
$$2(2+i) = \left(\boxed{4}\right) + \left(\boxed{2}\right) i$$

4.
$$(-3i)(2+i) = -6i - 3i^2 = -6i - 3(-1) = \left(\boxed{3}\right) + \left(\boxed{-6}\right) i$$

5.
$$(2-3i)(2+i) = (4+2i)+(3-6i) = (4+3)+(2-6)i = \left(\boxed{7}\right) + \left(\boxed{-4}\right) i$$

6.

$$(1-3i)(1+3i) = 1+3i-3i-9i^2 = 1+9 = \left(\boxed{10}\right) + \left(\boxed{0}\right) i$$

7.

$$\frac{1+3i}{(1-3i)(1+3i)} = \frac{1+3i}{10} = \left(\boxed{0.1}\right) + \left(\boxed{0.3}\right) i$$

8.

$$\frac{1+3i}{1+3i} = \left(\boxed{1}\right) + \left(\boxed{0}\right) i$$

9.

$$\frac{1}{1-3i} = \frac{1}{1-3i}\frac{1+3i}{1+3i} = \left(\boxed{0.1}\right) + \left(\boxed{0.3}\right) i$$