

NAME: \_\_\_\_\_ Score \_\_\_\_\_/10

Please **print** your name**SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION****WBF on your paper means Wrong But Follows from your previous work.****STOP DRAWING BOXES !****LEARN THE DEFINITIONS !**

1. The complex component of the complex number  $5 - 6i$  is **-6**.

**A definition**

2. If  $(3x-2) + bi = 1 + (y+4)i$ , then  $x = \mathbf{1}$  and  $y = \mathbf{b - 4}$ .

$$\text{Solve } 3x - 2 = 1$$

$$\text{Solve } b = y + 4$$

$$x = 1$$

$$y = b - 4$$

**This question determines if you understand what it means to say two complex numbers are equal.**

3. Compute the sum of the two complex numbers

$$(3 - xi) + (7 + \sqrt{5}i) = \mathbf{(3 + 7) + (-x + \sqrt{5})i = 10 + (\sqrt{5} - x)i.}$$

**A definition**

4. The opposite of a complex number  $3 + 4i$  is **-3 - 4i**.

**A definition**

5. The difference  $(a + bi) - (c + di)$  is defined to be  $(a + bi) + \mathbf{(-c - di)}$

**A definition**

6. Compute the product  $(2 + 3i)(-3 + 5i) = \mathbf{6 + 10i - 9i + 15i^2 = -21 + i}$

**When two expressions are equal, you should indicate that fact with proper use of the = symbol.**

**If  $i^2$  occurs in a computation, you should replace it with -1**

**When computing with complex numbers the result should be written in the standard form for a complex number  $a + bi$  not as  $bi + a$  or  $a + bi + ci^2$ .**

7. The norm of the complex number  $5 - 2i$  is  $\mathbf{5^2 + (-2)^2 = 29}$

**A definition**

8. The conjugate of  $5 - 2i$  is  $\mathbf{5 + 2i}$

**A definition**

9. Write the multiplicative inverse of  $5 - 2i$   $\frac{\mathbf{5 + 2i}}{\mathbf{29}}$

**A definition**

10. Compute the quotient  $(7 - 3i) \div (5 - 2i)$  (**Hint: Look at Problem 9**)

$$\begin{aligned} (7 - 3i) \left( \frac{5 + 2i}{29} \right) &= \frac{1}{29} (7 - 3i)(5 + 2i) = \frac{1}{29} (35 + 14i - 15i - 6i^2) \\ &= \frac{1}{29} (41 - i) \end{aligned}$$

**When you are explicitly asked to compute something, it is expected that the computation be done. Simply indicating the product in this situation is generally unacceptable.**

**This question determines if you understand that ALL divisions are accomplished by converting to a multiplication problem.**