

NAME: _____ Score _____/10

Please **print** your name

1. What is the real component of $8 - 7i$?

The real component is 8.

2. What is the complex component of $8 - 7i$?

The complex component is -7 .

3. If α and β are complex numbers and they are multiplicative inverses, what is their product $\alpha\beta$?

$\alpha\beta = 1$

4. Consider the expression $(4 + 3i) \div (5 + 7i)$. What is the divisor?

The divisor is $5 + 7i$.

5. Consider the expression $(4 + 3i) \div (5 + 7i)$. What is the dividend?

The dividend is $4 + 3i$.

6. Write the norm of the complex number $3 - 2i$. (Write the norm in simplest form)

The norm of $3 - 2i$ is $3^2 + (-2)^2 = 13$

7. Write the conjugate of the complex number $3 - 2i$.

The conjugate of $3 - 2i$ is $3 + 2i$.

8. Write the multiplicative inverse of the complex number $3 - 2i$.

Recall the multiplicative inverse of a complex number is its conjugate divided by its norm.

Therefore the multiplicative inverse of $3 - 2i$ is $\frac{3+2i}{13}$

9. Use your answer to Question 8 to perform the indicated division.

$$(2 + i) \div (3 - 2i) = (2 + i) \left(\frac{3 + 2i}{13} \right) = \left(\frac{1}{13} \right) (2 + i)(3 + 2i) = \left(\frac{1}{13} \right) (6 + 4i + 3i + 2i^2) = \left(\frac{1}{13} \right) (4 + 7i)$$

Recall every division is converted to multiplication of the dividend by the multiplicative invers of the divisor.

10. Use your answer to Question 8 to solve the equation $(3 - 2i)x = 3$.

Multiply both sides of the equation by the multiplicative inverse of $3 - 2i$ to obtain

$$x = 3 \left(\frac{3 + 2i}{13} \right) = \frac{9 + 6i}{13}$$