MA437 - 2019 Spring - Sample Assessment - Dr. Clontz

Name: _____

Circle the most appropriate response for each.

Module 1 Computation

1. Let $z = 4 - 3i$. Find z^{-1}.
   A. $\frac{4}{25} + \frac{3}{25}i$
   B. $-\frac{4}{25} + \frac{3}{25}i$
   C. $\frac{3}{25} - \frac{4}{25}i$
   D. None of these.
2. Simpify $\overline{\sqrt{2} + 3i - i(5 + i\sqrt{2})}$.
   A. $-5\sqrt{2} - 3i$
   B. $7\sqrt{2} - 1 - i$
   C. $2\sqrt{2} + 2i$
   D. None of these.
3. Compute $|5 - 12i|$
   A. -7
   B. 13
   C. 17
   D. None of these.
4. Find the exponential form of $\sqrt{3} - i$.
   A. $2e^{-i\pi/6}$
   B. $3e^{-i\pi/3}$
   C. $4e^{i\pi/4}$
   D. None of these.
5. Compute $(2 - 2\sqrt{3}i)^{-3}$.
   A. $\frac{1}{16}i$
   B. $\frac{1}{4} - \frac{1}{3}i$
   C. $-\frac{1}{64}$
   D. None of these.

Module 1 Knowledge

6. The product $(0,1)(0,y)$ simplifies to $(-y,0)$.
   A. True
   B. False

7. The additive inverse of $x+yi$ is $\frac{x}{x^2+y^2} - i\frac{y}{x^2+y^2}$.
   A. True
   B. False

8. The graph of $\{z : |z+2-i| = 3\}$ is a parabola.
   A. True
   B. False

9. $|Re(z)| \leq |z|$ for all complex z.
   A. True
   B. False

10. $Arg(zw) = Arg(z) + Arg(w)$ for all nonzero complex z, w.
    A. True
    B. False

Module 1 Proofs

Choose at most one of the following exercises to submit to the instructor.

11. The statement $Im(z) = \frac{z+\overline{z}}{2i}$ is false. Fix the formula and prove that your fixed formula is true.

12. Let w, z be nonzero complex numbers. Prove that the multiplicative inverse of wz is the product of the multiplicative inverse of w with the multiplicative inverse of z.

13. Prove that for any value of $arg(\frac{3}{z})$, there exists an equal value for $-arg(z)$.