TMA4115 Calculus 3
Spring 2016

Øving 1

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In Problems 5, 9 and 12, write the number in the form $a + bi$.

1.1.5.

$(a) \quad -3\left(\dfrac{i}{2}\right)$ $(b) \quad (8 + i) - (5 + i)$ $(c) \quad \dfrac{2}{i}$

1.1.9.

$$\dfrac{2 + 3i}{1 + 2i} - \dfrac{8 + i}{6 - i}$$

1.1.12.

$(2 + i)(-1 - i)(3 - 2i)$

1.1.15. Let k be an integer. Show that

$$i^{4k} = 1, \qquad i^{4k+1} = i, \qquad i^{4k+2} = -1, \qquad i^{4k+3} = -i.$$

1.1.17. Use the result of Problem 15 to evaluate

$$3i^{11} + 6i^3 + \dfrac{8}{i^{20}} + i^{-1}.$$

1.1.20. Solve each of the following equations for z.

$(a) \quad iz = 4 - zi$ $(d) \quad z^2 + 16 = 0$

1.2.3. Which of the points i, $2 - i$, and -3 is farthest away from the origin?

1.2.4. Let $z = 2 + 3i$. Plot the points z, $-z$, $\bar{z}$, $-\bar{z}$, and $1/z$ in the complex plane.

1.2.7. Describe the set of points z in the complex plane that satisfies each of the following.

$(a) \quad \text{Im } z = -2$ $(b) \quad |z - 1 + i| = 3$ $(c) \quad |2z - i| = 4$
$(g) \quad |z| = 3|z - 1|$ $(j) \quad |z| > 6$