**Problem 7.6.** Let \( a \neq 0, b, \) and \( c \) be complex constants. Show that the quadratic equation \( a \cdot z^2 + b \cdot z + c = 0 \) has one or two roots.
Problem 7.7. Let $b$ and $c$ be complex constants such that $z^2 + b \cdot z + c = 0$ has only real roots. Show that $b$ and $c$ are real.
8. Geometric figures described using complex numbers

Problem 8.1. Sketch and describe the set of complex numbers satisfying $|z| = 2$ without using a calculator.
Answer to 8.1: The circle at \((0, 0)\) of radius 2.
**Problem 8.2.** Sketch and describe the set of complex numbers satisfying $|z - 1| = 2$ without using a calculator.
Answer to 8.2: The circle at $(1, 0)$ of radius 2.
Problem 8.3. Sketch and describe the set of complex numbers satisfying $|z/2-1| = 2$ without using a calculator.
Answer to 8.3: The circle at \((2, 0)\) of radius 4.
Problem 8.4. Sketch and describe the set of complex numbers satisfying $|2 \cdot z - i| > 4$ without using a calculator.
Answer to 8.4: Outside of the circle at \((0, 1/2)\) of radius 2.
Problem 8.5. Sketch and describe the set of complex numbers satisfying $|2z + i| < 4$ without using a calculator.
Answer to 8.5: Inside of the circle at $(0, -1/2)$ of radius 2.
**Problem 8.6.** Sketch and describe the set of complex numbers satisfying $|z - 2| = |z - 1|$ without using a calculator.
**Answer to 8.6:** The vertical line passing through \((1.5, 0)\).
Problem 8.7. Sketch and describe the set of complex numbers satisfying $|z - 2 \cdot i| = |z - 1 \cdot i|$ without using a calculator.
**Answer to 8.7:** The horizontal line passing through $(0, 1.5)$. 
**Problem 8.8.** Sketch and describe the set of complex numbers satisfying \( Re(z) = 2 \) without using a calculator.
Answer to 8.8: The vertical line passing through $(2, 0)$. 
**Problem 8.9.** Sketch and describe the set of complex numbers satisfying $Re(z) > 2$ without using a calculator.
Answer to 8.9: The half-plane to the right of the vertical line passing through $(2, 0)$. 
Problem 8.10. Sketch and describe the set of complex numbers satisfying $Im(z) = 2$ without using a calculator.
Answer to 8.10: The horizontal line passing through \((0, 2)\).
Problem 8.11. Sketch and describe the set of complex numbers satisfying $Im(z) < 2$ without using a calculator.
Answer to 8.11: The half-plane below the horizontal line passing through \((0, 2)\).
Problem 8.12. Sketch and describe the set of complex numbers satisfying $Re(2/z) = 1$ without using a calculator.
Answer to 8.12: The circle at $(1, 0)$ of radius 1 minus origin.
**Problem 8.13.** Sketch and describe the set of complex numbers satisfying $Im(2/z) = 1$ without using a calculator.
Answer to 8.13: The circle at $(0, -1)$ of radius 1 minus origin.
**Problem 8.14.** Sketch and describe the set of complex numbers satisfying $Re(2/(z - 1)) = 1$ without using a calculator.
Answer to 8.14: The circle at (2, 0) of radius 1 minus (1, 0).
**Problem 8.15.** Sketch and describe the set of complex numbers satisfying $\text{Im}(2/(z - 1)) = 1$ without using a calculator.
Answer to 8.15: The circle at (1, −1) of radius 1 minus (1, 0).
Problem 8.16. Sketch and describe the set of complex numbers satisfying \(|2 \cdot \frac{z}{z + 3}| = 1\) without using a calculator.
Answer to 8.16: The circle at $(1, 0)$ of radius 2.
Problem 8.17. Sketch and describe the set of complex numbers satisfying \(|(z+4)/(z+1)| = 2\) without using a calculator.
Answer to 8.17: The circle at \((0, 0)\) of radius 2.
**Problem 8.18.** Suppose $a \neq 0$ and $b$ are complex constants. Show that $Im(a \cdot z + b) = 0$ is the equation of a straight line on the plane. Can every straight line be expressed by such an equation?
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