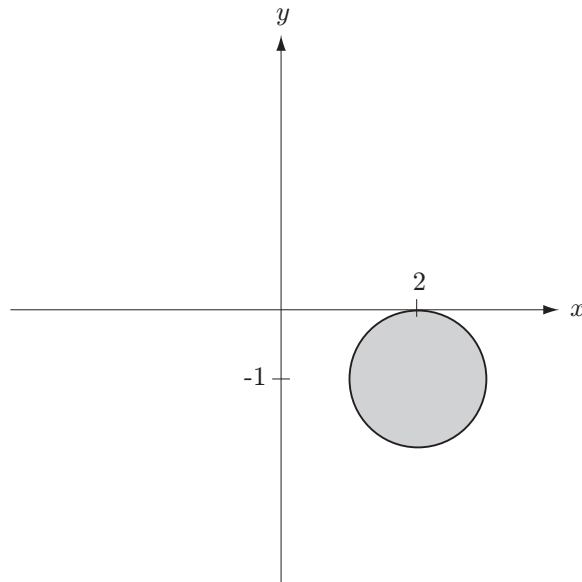


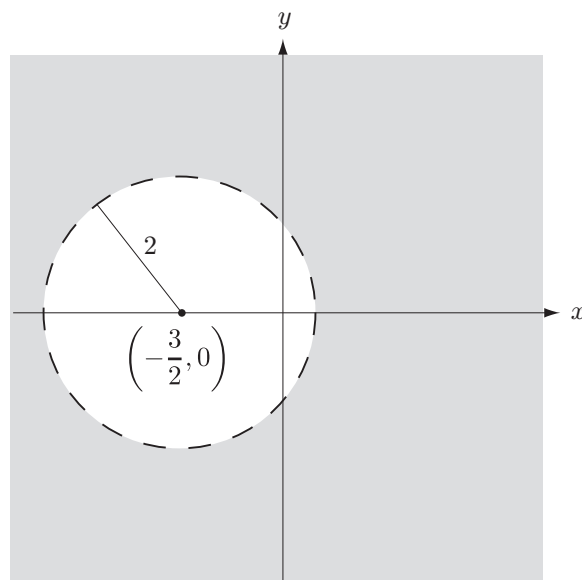
Math 417 – Section 10 Solutions

1. Each of the following sets is connected. However, only (b) and (c) are open (they contain none of their boundary points). Therefore, only (b) and (c) are domains.

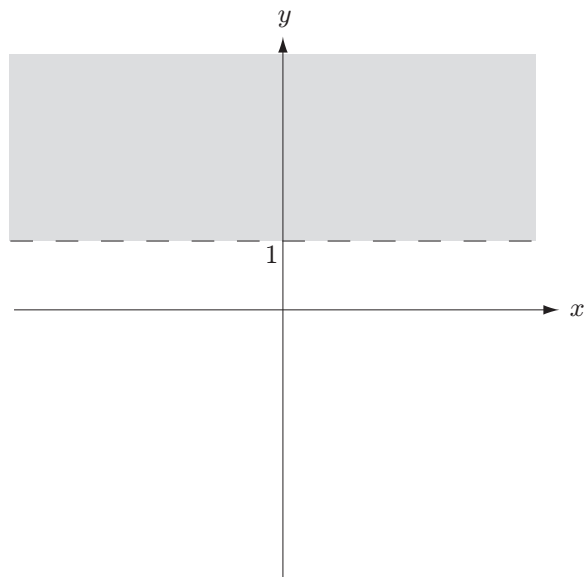
(a) $|z - (2 - i)| \leq 1$



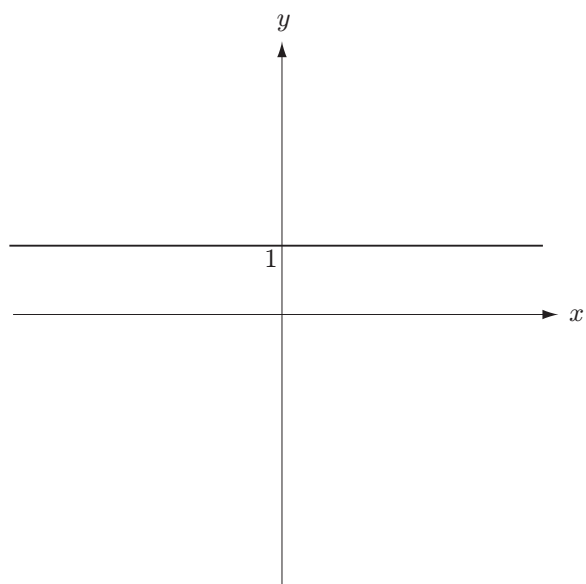
(b) $|2z + 3| > 4 \Rightarrow |z - (-\frac{3}{2})| > 2$



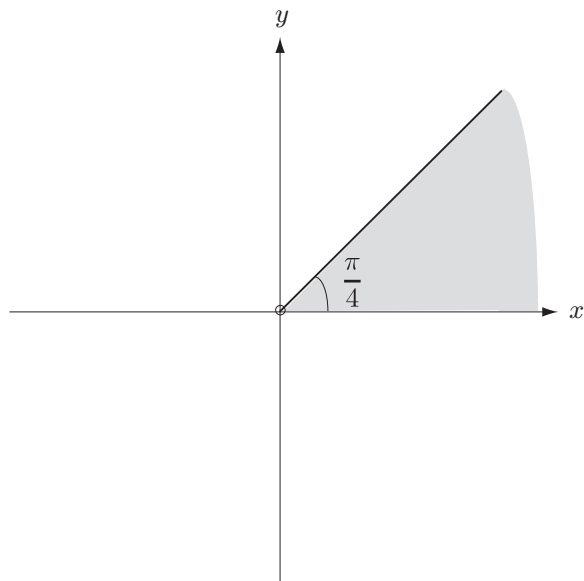
(c) $\text{Im } z > 1$



(d) $\text{Im } z = 1$

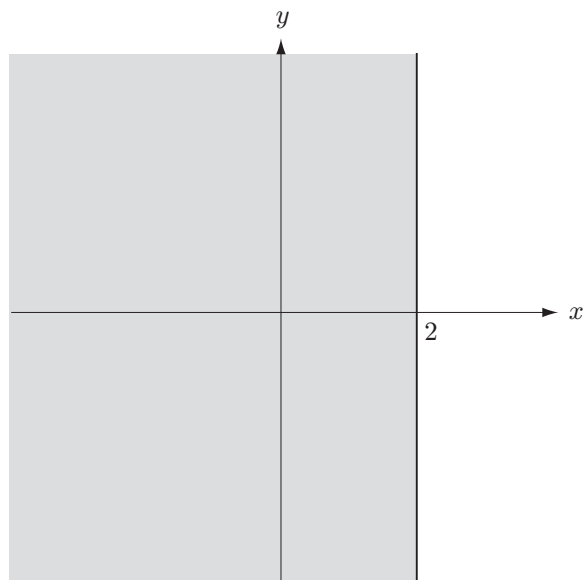


(e) $0 \leq \arg z \leq \frac{\pi}{4}$ ($z \neq 0$)



(f) $|z - 4| \geq |z|$

$$\begin{aligned}
 |z - 4| &\geq |z| \\
 |z - 4|^2 &\geq |z|^2 \\
 (x - 4)^2 + y^2 &\geq x^2 + y^2 \\
 -8x + 16 &\geq 0 \\
 x &\leq 2
 \end{aligned}$$



2. Sets (a), (d), and (f) are all closed because they contain all of their boundary points. Set (e) is neither open nor closed ($z = 0$ is a boundary point but is not contained in the set).
3. Set (a) is bounded (all points in the set can be contained in a circle $|z| = R$).