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Homework 4  
Due: Friday, September 14

1. [BC] 10.1, 10.2, 10.3. Give a brief explanation for each answer; one-word responses will not suffice.
2. Let  $S$  be a subset of  $\mathbb{C}$ . Prove that every point of  $S$  is an interior point of  $S$  if and only if  $S$  contains none of its boundary points. (This is asserted, but left unproved, in the text.)
3. [BC] 10.10.
4. Suppose that  $S$  and  $T$  are open subsets of  $\mathbb{C}$ . Show that  $S \cup T$  is open, too.
5. Let  $S$  and  $T$  be domains. Is  $S \cap T$  necessarily a domain? Prove or give a counterexample.
6. [BC] 11.1.
7. Write each of the following functions in the form  $w = u(x, y) + iv(x, y)$ .
  - (a)  $f(z) = 3z^2 + 5z + i + 1$ .
  - (b)  $g(z) = \exp(z) + \exp(-z)$ .