



Figure 7.27 What is the value of the depicted flow? Is it a maximum flow? What is the minimum cut?

- (b) Find a minimum s - t cut in the flow network pictured in Figure 7.27, and also say what its capacity is.
4. Decide whether you think the following statement is true or false. If it is true, give a short explanation. If it is false, give a counterexample.

Let G be an arbitrary flow network, with a source s , a sink t , and a positive integer capacity c_e on every edge e . If f is a maximum s - t flow in G , then f saturates every edge out of s with flow (i.e., for all edges e out of s , we have $f(e) = c_e$).

5. Decide whether you think the following statement is true or false. If it is true, give a short explanation. If it is false, give a counterexample.

Let G be an arbitrary flow network, with a source s , a sink t , and a positive integer capacity c_e on every edge e ; and let (A, B) be a minimum s - t cut with respect to these capacities $\{c_e : e \in E\}$. Now suppose we add 1 to every capacity; then (A, B) is still a minimum s - t cut with respect to these new capacities $\{1 + c_e : e \in E\}$.

6. Suppose you're a consultant for the Ergonomic Architecture Commission, and they come to you with the following problem.

They're really concerned about designing houses that are "user-friendly," and they've been having a lot of trouble with the setup of light fixtures and switches in newly designed houses. Consider, for example, a one-floor house with n light fixtures and n locations for light switches mounted in the wall. You'd like to be able to wire up one switch to control each light fixture, in such a way that a person at the switch can *see* the light fixture being controlled.