Exercise-set 10.

Solutions

1. a) $\max f = 8$, min cut: $X = \{S, A, F\}$,
b) $\max f = 20$, min cut: $X = \{S, A, B, C\}$,
c) $\max f = 30$, min cut: $X = \{S, B, C, E\}$,
d) $\max f = 17$, min cut: $X = \{S, B, C, D, E\}$,
e) $\max f = 24$, min cut: $X = \{S, A, D, G\}$,
f) $\max f = 21$, min cut: $X = \{S, D, F\}$,
g) $\max f = 14$, min cut: $X = \{S, A, B, F, I\}$,
h) $\max f = 24$, min cut: $X = \{S, B, D, E, F\}$.

2. The capacity of the cut is 19, $\max f = 18$, min cut: $X = \{S, A, B, G, H\}$.

3. a) $\max f = 21$, min cut: $X = \{S, A, F, G\}$,
b) $\max f = 17$, min cut: $X = \{S, B, D, F, G\}$,
c) $\max f = 24$, min cut: $X = \{S, A, C, F, G\}$.

4. $\max f = 20$, min cut: $X = \{S, D, E\}$.

5. $\max f = 22$, min cut: $X = \{S, D, E\}$.

6. Yes: $e$ must be in the minimum cut.

7. True (we can use augmenting paths of smaller values).

8. The $s, t$-cut with $X = V \setminus \{t\}$ is a minimum $s, t$-cut.

9. The min $s, w$-cut has capacity at least 100.

10. a) True.
b) True.
c) False.
d) We get the same answers as for a), b), c).