Flow in networks 3A

1 **a** Flow into B = flow out of B $w=3$

Flow into A = flow out of A $x=4$

Flow into E = flow out of E $y=4$

Flow into D = flow out of D $z=13$

b Feasible flow = 28

c CE and ED are saturated

d BD has capacity 8

e Along SAT the current flow is 8

2 **a** Flow into A = flow out of A $w=9$

Flow into E = flow out of E $x=5$

Flow into C = flow out of C $y=2$

Flow into D = flow out of D $14=y+x+z \Rightarrow 14=2+5+z \Rightarrow z=7$

b Feasible flow = 38

c BE and AC are saturated

d Flow along SD is 14

e Flow along $SBET=15$

3 **a** Source vertex is F

b Sink vertex is C

c Flow into A = flow out of A $w=8$

Flow into B = flow out of B $x=3$

Flow into D = flow out of D $y=20$

Flow into G = flow out of G $z=4$

d Feasible flow = 27

e Saturated arcs are AC, FC, FG

f Capacity of FB is 8

4 **a** Source vertex is E

b Sink vertex is C

4 c Flow into A = flow out of A $w = 5$

Flow into B = flow out of B $x = 3$

Flow into G = flow out of G $y = 4$

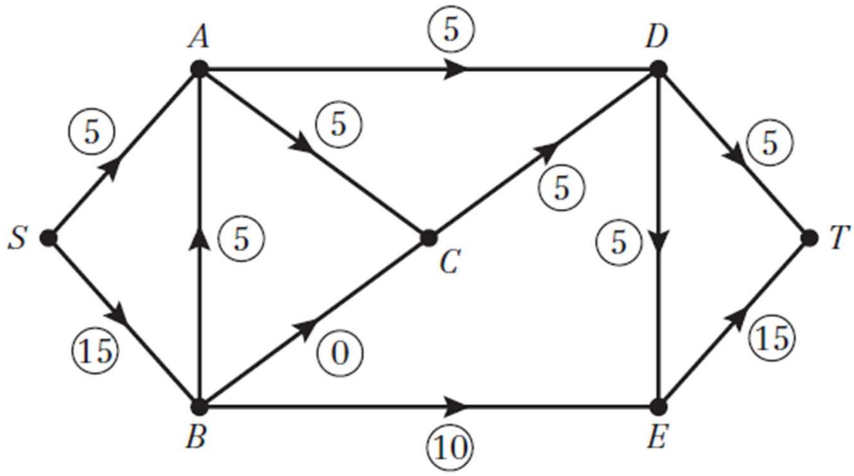
Flow into D = flow out of D $z = 5$

d Feasible flow = 20

e Saturated arcs are BA, ED, DG, GF

f Flow along FC = 11

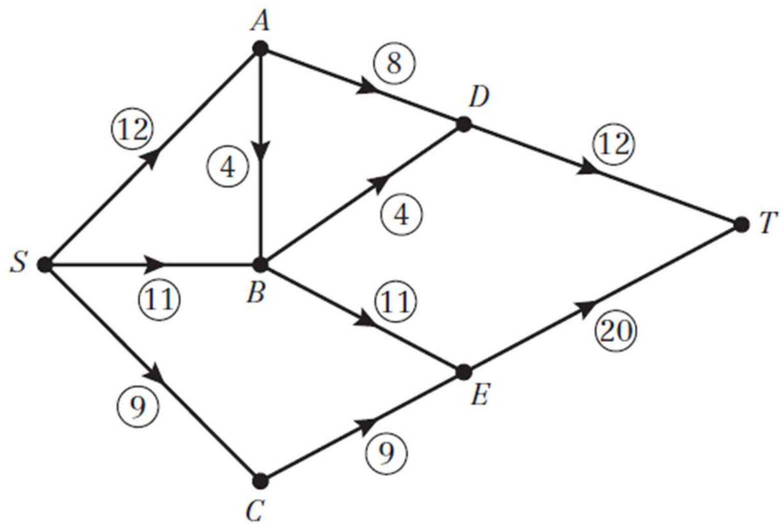
5 For example:



There are many other answers.

6 a The network has been modelled with S being the source vertex, T being the sink and the directed paths between vertices do not allow for 'turning back', i.e. you have to move along the network always going to the vertex marked with a letter further in the alphabet that your current vertex.

b There are many possibilities here. When you look for feasible flow, make sure to pay attention to the bottlenecks, i.e. paths where very little traffic is allowed – they will determine the maximum amount of traffic allowed in. An example of feasible flow:



c The capacity of SB is 14, BE 11 and ET 22. Hence the maximum number of tourist that can move along this path each minute is 11.