

Homework Solutions - Section 3.2

1.

(a)

$$\gamma(a) = (x,v); \gamma(b) = (x,v); \gamma(c) = (v,w);$$

$$\gamma(d) = (w,y); \gamma(e) = (w,y); \gamma(f) = (y,x)$$

(b)

$$\gamma(a) = (u,v); \gamma(b) = (x,u); \gamma(c) = (v,w); \gamma(d) = (v,y);$$

$$\gamma(e) = (x,w); \gamma(f) = (x,y); \gamma(g) = (w,z); \gamma(h) = (y,z)$$

(c)

$$\gamma(a) = (w,x); \gamma(b) = (x,w); \gamma(c) = (y,z); \gamma(d) = (z,y)$$

(d)

$$\gamma(a) = (x,x); \gamma(b) = (y,y); \gamma(c) = (z,z); \gamma(d) = (x,y); \gamma(e) = (y,z)$$

3.

(a) yes

(b) yes

(c) no - there is no edge from t to x

(d) no - there is no edge from y to s

(e) yes

(f) no - there is no edge from u to x

9.

(a) $(v,w), (v,y), (v,z)$

(b) $(v,s), (v,t), (v,u), (v,w)$

(c) all of them

10.

(a) yes (b) yes (c) yes

(d) no - $\{z, z\}$ is not an edge

(e) no - $\{w, z\}$ is not an edge

(f) yes

(g) yes

11.

(a) 2

(b) 7

(c) 3

(d) not a path

(e) not a path

(f) 2

(g) 3

15.

(a)

$$A = \{(w,w), (w,x), (x,w), (y,y), (w,y), (y,w), (x,z), (z,x)\}$$

$$R = \{(w,w), (w,x), (w,y), (w,z), (x,w), (x,x), (x,y), (x,z), \\ (y,w), (y,x), (y,y), (y,z), (z,w), (z,x), (z,y), (z,z)\}$$

(b)

$$A = \{(v,w), (w,v), (v,y), (y,v), (w,w), (z,z)\}$$

$$R = \{(z,z), (v,v), (v,w), (v,y), (w,v), (w,w), (w,y), (y,v), (y,w), (y,y)\}$$