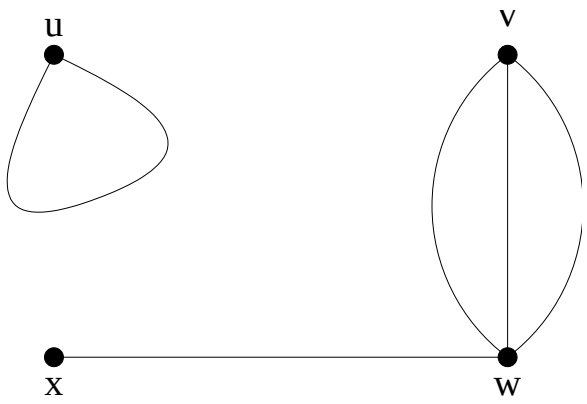
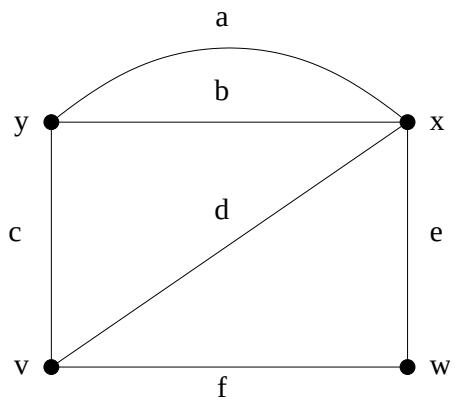
VanWyk's 103 **Section 6.2 Homework Problems**

1. Create an adjacency matrix for the following graph:



2. Below is a graph.



Find a closed path at *v* of each of the following lengths:

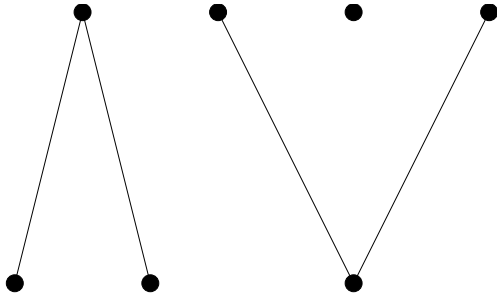
(a) 3

(b) 4

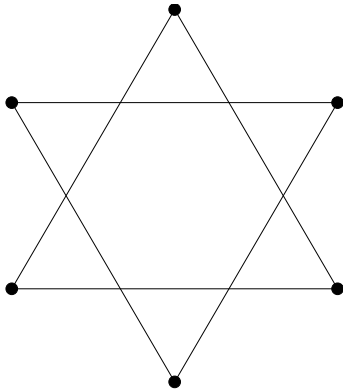
(c) 5

3. Find the connected components of each of the following graphs:

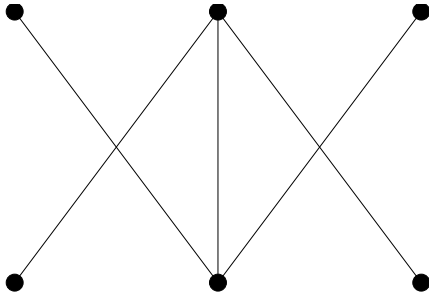
(a)



(b)

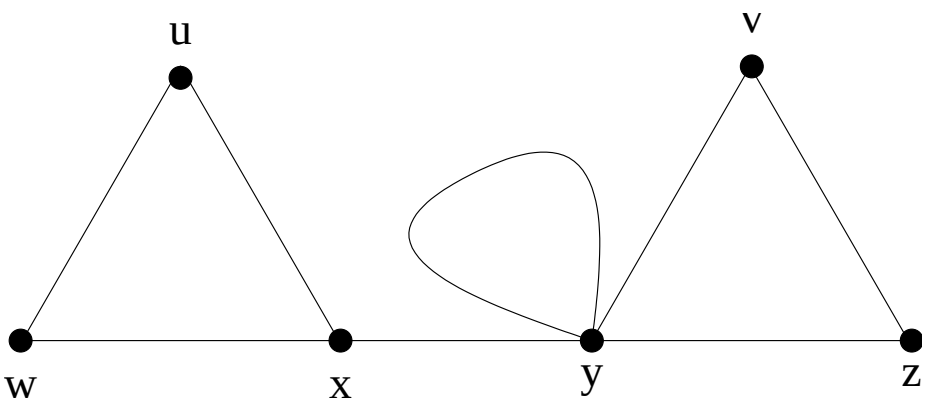


(c)



4. How many cut vertices does K_n have? C_n? $C_n - \{e\}$ for any edge e?

5. Here is a graph:



(a) Find all its cut vertices and cut edges.

(b) If this graph represents a communications network, which links (edges) should be backed up to help avoid a breakdown of the network?

1.

	u	v	w	x
u	1	0	0	0
v	0	0	3	0
w	0	3	0	1
x	0	0	1	0

2a.

$$v \xrightarrow{d} x \xrightarrow{b} y \xrightarrow{c} v$$

There are others.

2b.

$$v \xrightarrow{f} w \xrightarrow{e} x \xrightarrow{b} y \xrightarrow{c} v$$

There are others.

2c.

$$v \xrightarrow{f} w \xrightarrow{e} x \xrightarrow{d} v \xrightarrow{f} w \xrightarrow{f} v$$

There are others.

3a. There are three components.
3b. There are two components.
3c. This graph is connected, so there is only one component.

4. K_n and C_n have no cut vertices. $C_n - \{e\}$ has $n-2$ cut vertices (all the "interior" vertices).

5a. x and y are cut vertices. The edge xy is a cut edge.
5b. You should back up the edge xy with another edge. That way, if xy fails, the network still operates.