



e) Give an example of a graph having more than one central vertex.

f) Let  $x, y, z$  be vertices of  $G$ . Show that  $d_G(x, z) \leq d_G(x, y) + d_G(y, z)$ .

g) We showed that the graph distance  $d_G$  is a metric. In addition to what is discussed in the previous item, what other two properties are needed to show that  $d_G$  is a metric?

h) Let  $u, v \in V$ . In the following, I give you an additional piece of information about  $G$ . What can you deduce for  $d_G(u, v)$ ?

*Example. Information: There is a  $z \in V$  such that  $\{u, z\} \in E$  and  $\{v, z\} \in E$ .*

*Answer:  $d_G(u, v) \in \{0, 2\}$ .*

(1) Information:  $G$  contains a path  $x_1x_2 \dots x_{29}$  and  $u = x_1$  and  $v = x_{29}$ .

(2) Information:  $G$  contains a cycle  $x_1x_2 \dots x_{29}x_1$  and  $u = x_2$  and  $v = x_{18}$ .

**Feedback:**

How many hours did you spend working on the assignment sheet?

The material covered last week was [ ] easy, [ ] fine, [ ] difficult, [ ] very difficult.

Comments?



e) Let  $u, v \in V$ . In the following, I give you an additional piece of information about  $G$ . What can you deduce for  $d_G(u, v)$ ?

*Example.* Information: There is a  $z \in V$  such that  $\{u, z\} \in E$  and  $\{v, z\} \in E$ .

Answer:  $d_G(u, v) \in \{0, 2\}$ .

(1) Information:  $G$  contains a path  $x_1x_2 \dots x_{26}$  and  $u = x_1$  and  $v = x_{26}$ .

(2) Information:  $G$  contains a cycle  $x_1x_2 \dots x_{26}x_1$  and  $u = x_2$  and  $v = x_{18}$ .

f) What does it mean that  $G$  has a girth of 26?

g) Draw a connected graph that has girth 5 and diameter 5.

h) Define what is a path of length 26 in  $G$ .

**Feedback:**

How many hours did you spend working on the assignment sheet?

The material covered last week was [ ] easy, [ ] fine, [ ] difficult, [ ] very difficult.

Comments?