Homework06

26. For which values of n do these graphs have an Euler circuit?

a) K_n **b)** C_n **c)** W_n **d)** Q_n

10.5. Ex26

a) for the Kn graph one node has path to the oth node. so one node has a degree of $n-1$
If the graph has Eular circuit, every node has even degree. So $n-1$ is an even number.
$n = 3, 5, 7 \cdots\cdots$

b) each node has even degree whether the n is.
$n = 3, 4, 5, 6 \cdots$

c) each node has odd degree whether the n is

d) when n is an even number. each node has even number
so $n = 2, 4, 6 \cdots\cdots$

44. For which values of n do the graphs in Exercise 26 have a Hamilton circuit?

10.5 Ex.44

a) $n = 3, 4, 5 \ldots$

Because every two nodes in the K_n have edge

b) $n = 3, 4, 5 \ldots$

from one node in the C_n and go through the whole graph

c) every node has 3 degrees

According to diarc's theorem

degree of every nod $\geq \frac{n}{2}$ so n is no larger than 6

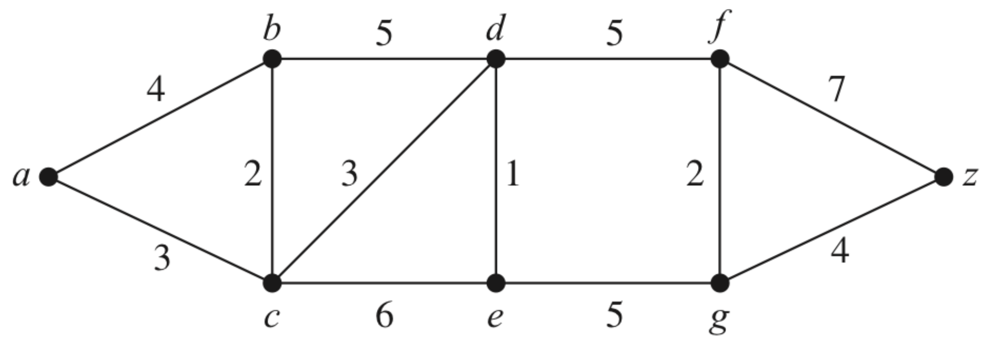
$n = 3, 4, 5, 6$.

d) for every node in Q_n, it has n degree, and a Q_n has 2^n nodes

$n \geq 2^{n-1}$

$n = 1, 2$

3.



6. Find the length of a shortest path between these pairs of vertices in the weighted graph in Exercise 3.

a) a and d

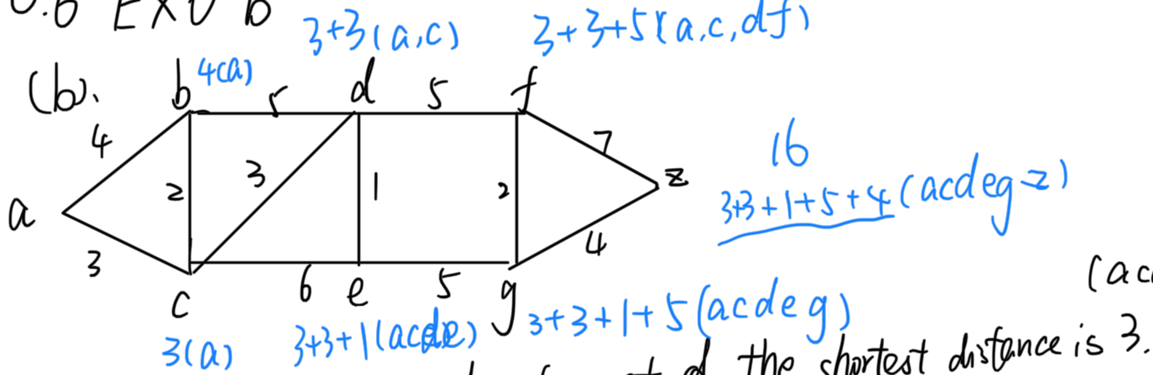
b) a and f

c) c and f

d) b and z

10.6 Ex6-b

(b).



the shortest distance is 3.

from the previous node to get d

for e start from d. one way de with distance 1

from c three ways, cde distance 4

cbde 8

ce 6

from b three ways bde distance 6

bcde 6

bce 8

so the shortest length to e is 3+4

for f from d two ways df distance 5

degf 8

from e two ways edf distance 6

egf 7

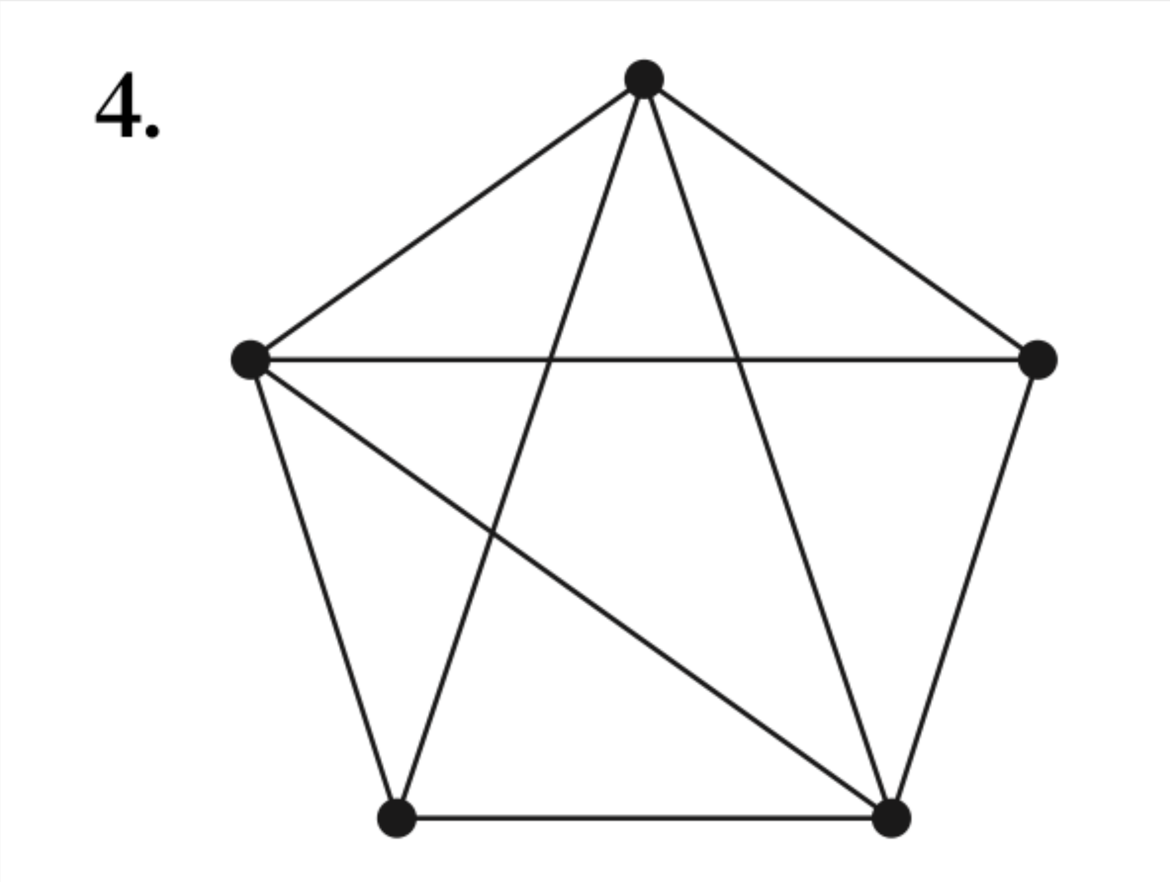
Since $\underbrace{3+3+5}_{\text{from d to f}} < \underbrace{3+3+1+6}_{\text{from e to f}}$

So the shortest length from a to f is 11

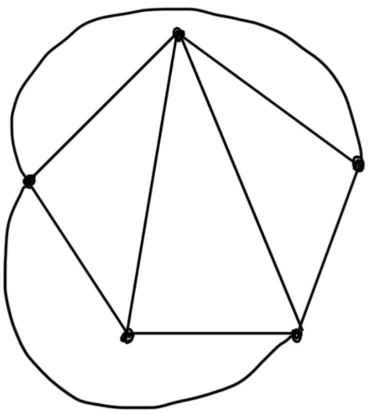
the path is a c d f

1. Can five houses be connected to two utilities without connections crossing?

In Exercises 2–4 draw the given planar graph without any crossings.

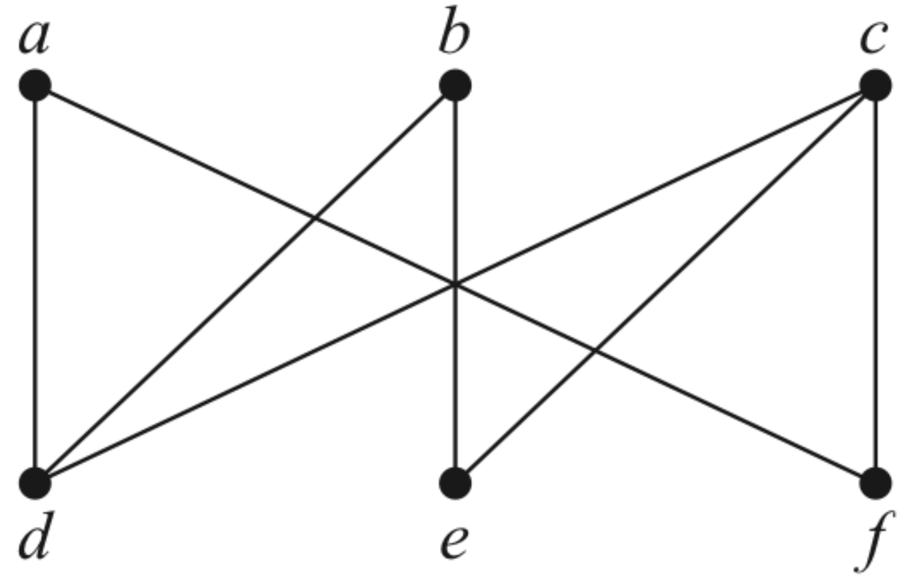


10.7 Ex.4



In Exercises 5–9 determine whether the given graph is planar. If so, draw it so that no edges cross.

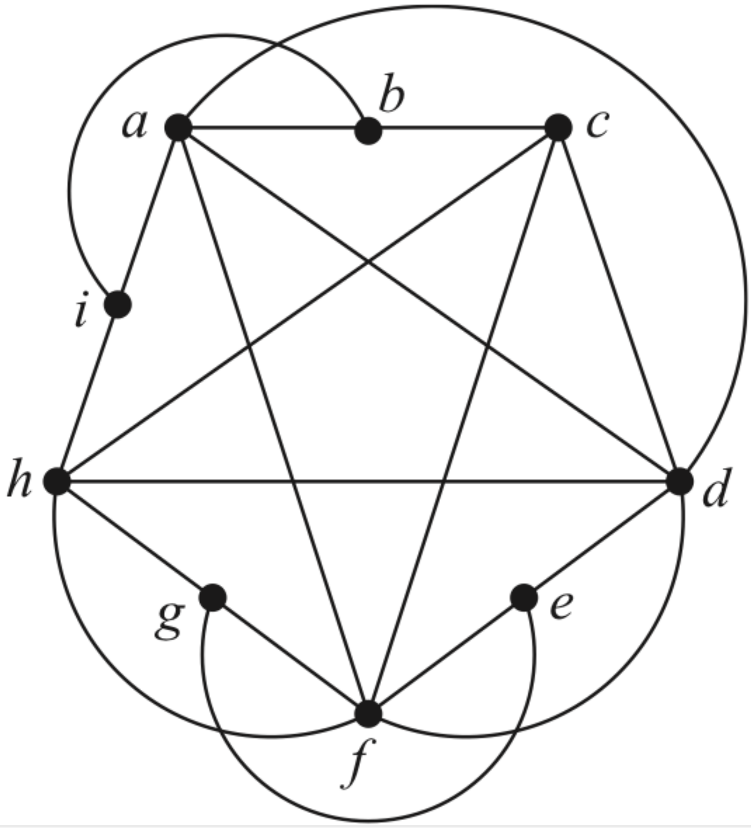
6.



10.7 Ex.6 for
corollary 1 of the Euler's formula
this graph has 7 edges and 6 vertices
since $7 \leq 3 \times 6 - 6$
so it is a planar

In Exercises 23–25 use Kuratowski's theorem to determine whether the given graph is planar.

24.



10.7 Ex 24

Suppose this graph ~~as~~ is $G = <V, E>$

Suppose K_5 is $G' = <V', E'>$.

$V' = \{a\ c\ d\ f\ h\}$ $\therefore V' \subset V$

$E' = \{ac, cd, df, fh, ha\}$ $\therefore E' \subset E$

So K_5 is a subgraph of G

according to Kuratowski's theorem

the given graph is not a planar