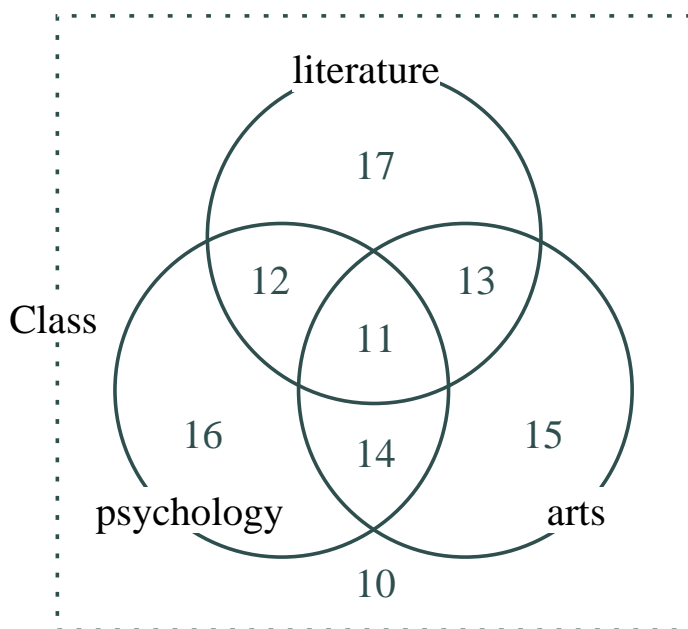


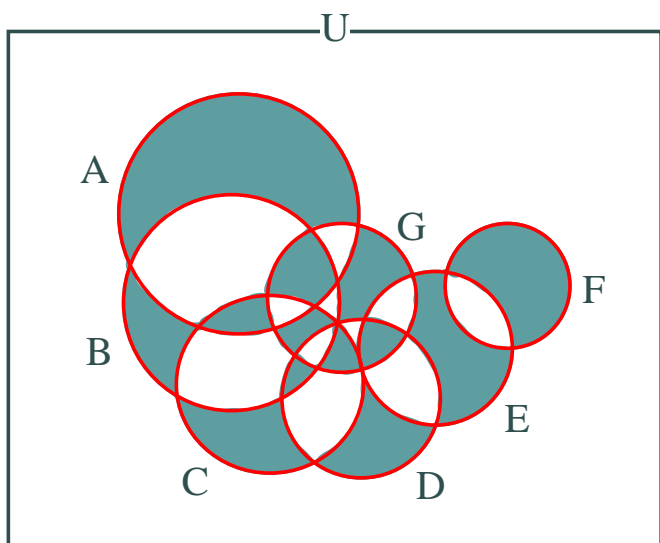
離散系論 演習問題の解答図版

by K. Asai

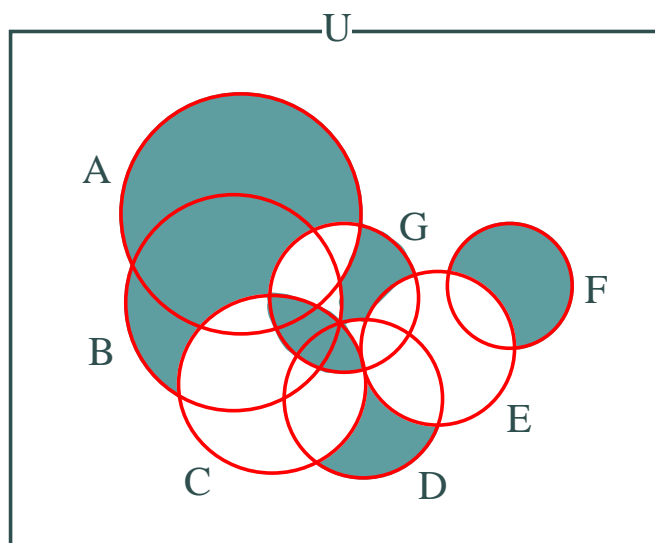
6. (2)



7. (1)

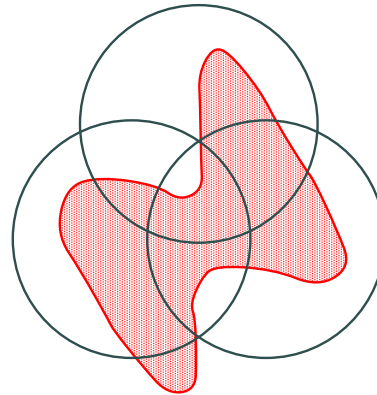
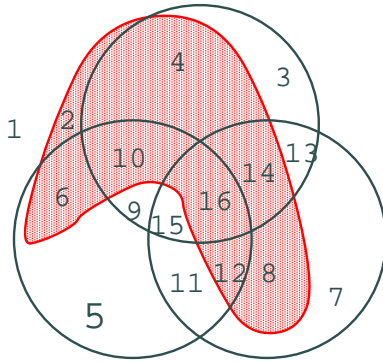


(2)

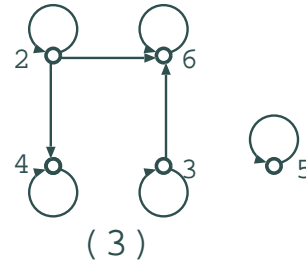
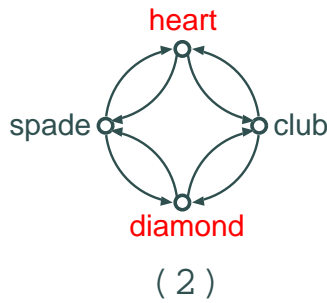
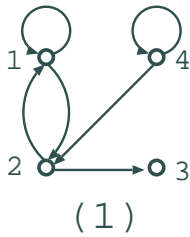


3.(2) The following are examples of the answer.

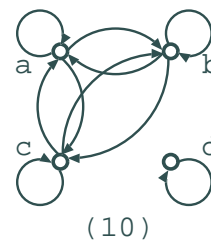
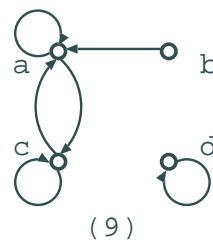
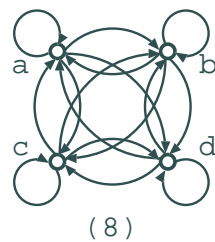
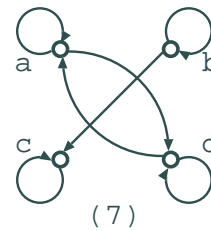
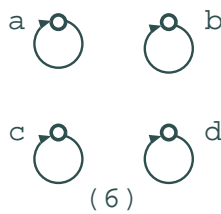
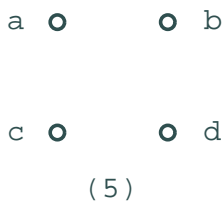
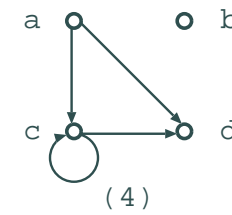
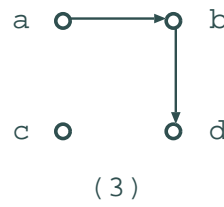
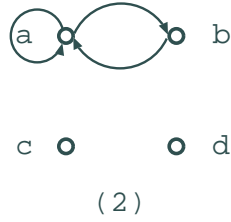
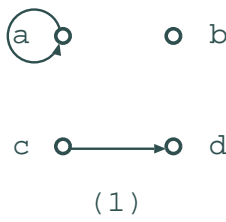
These diagrams divide the plane into $2^4=16$ regions.



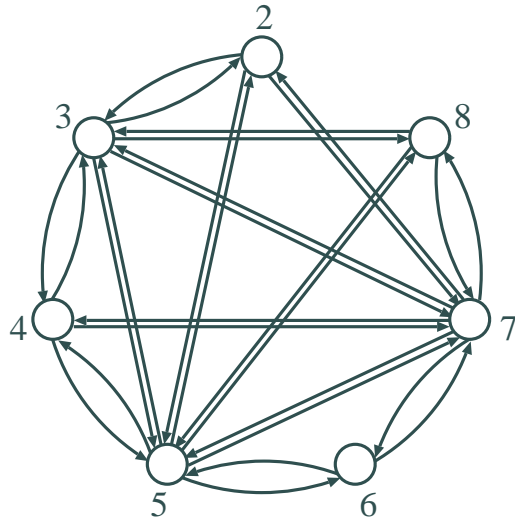
11.



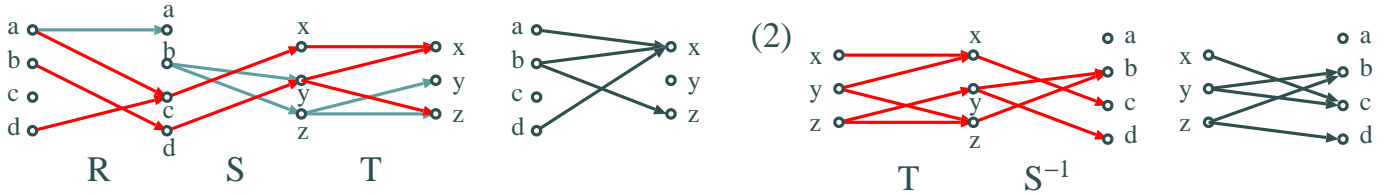
12.



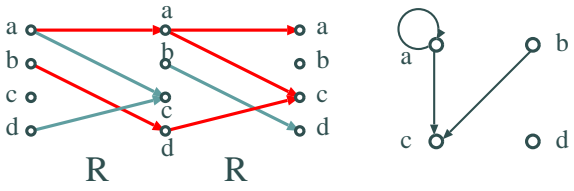
9.(1)



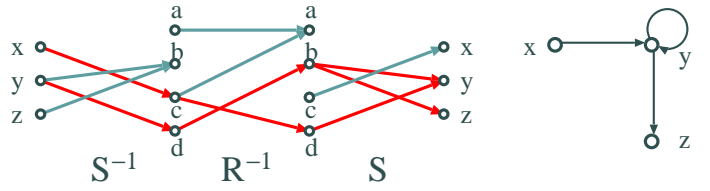
15.(1)



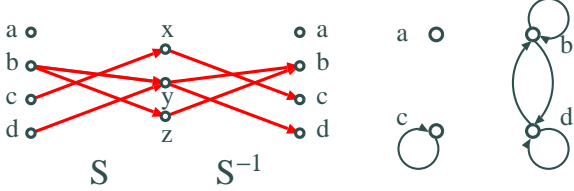
(3)



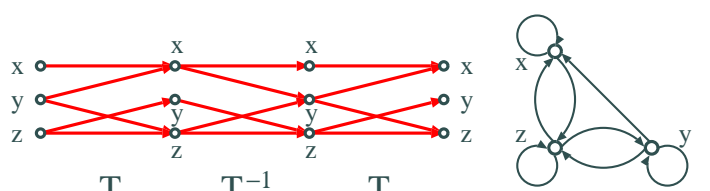
(4)



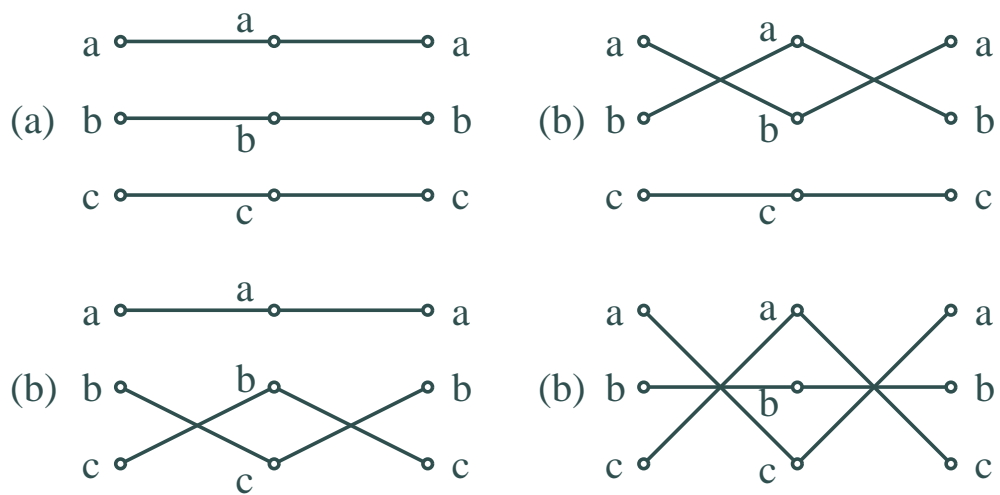
(5)



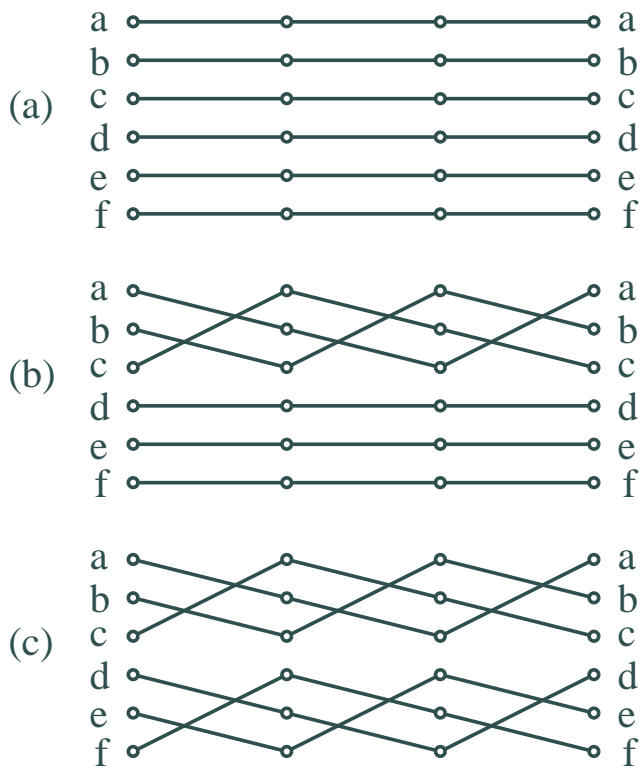
(6)



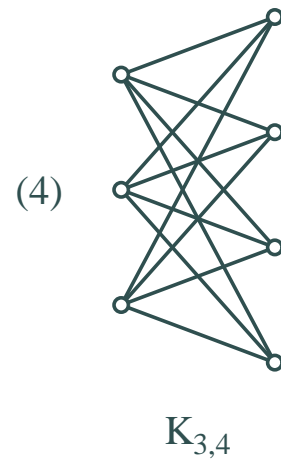
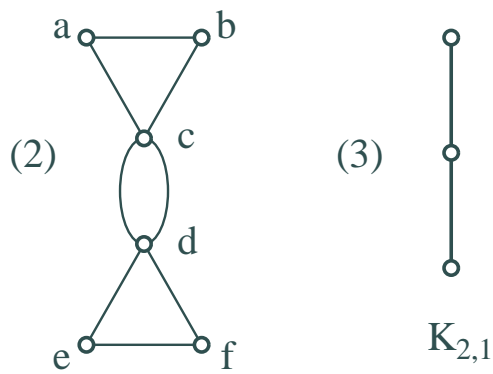
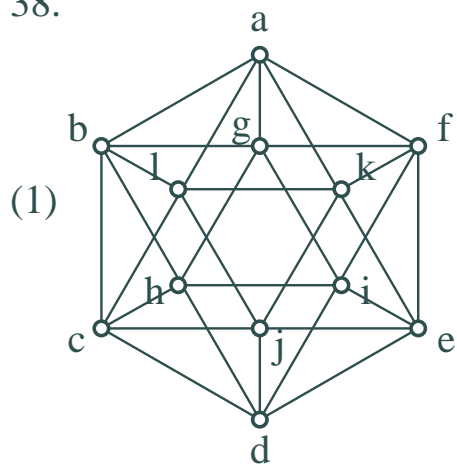
31.(1)



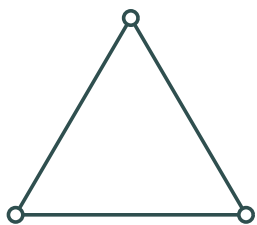
31.(2)



38.

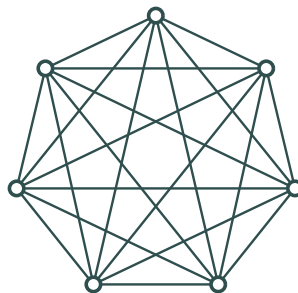


(5)



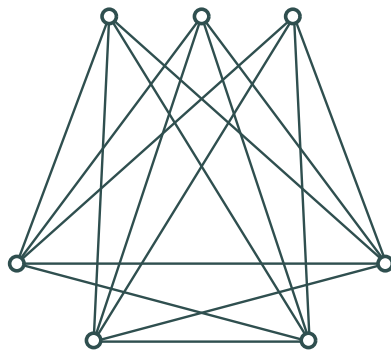
$K_{1,1,1}$

(6)



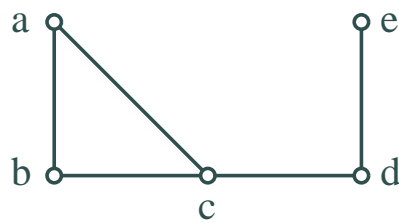
K_7

(7)



$K_{3,2,2}$

41. (2)

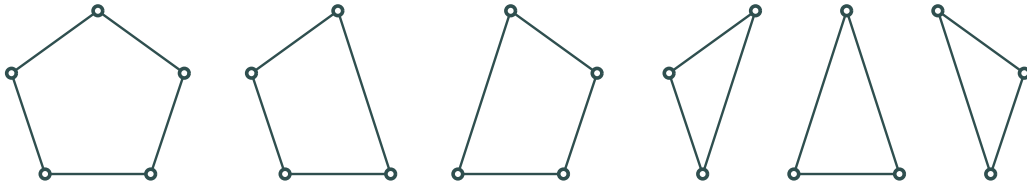
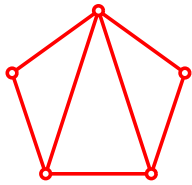


(3)

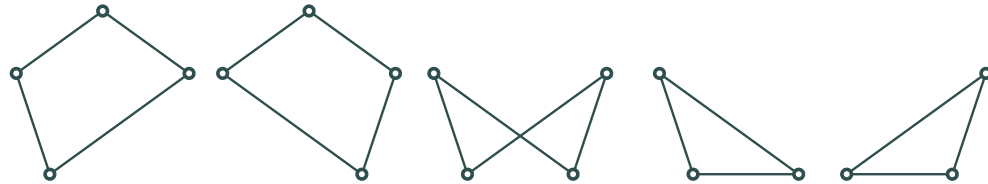
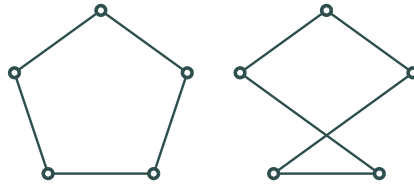
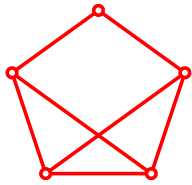


45.

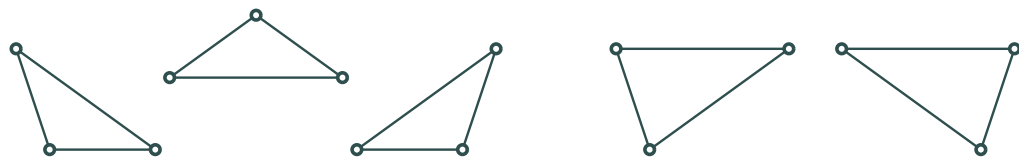
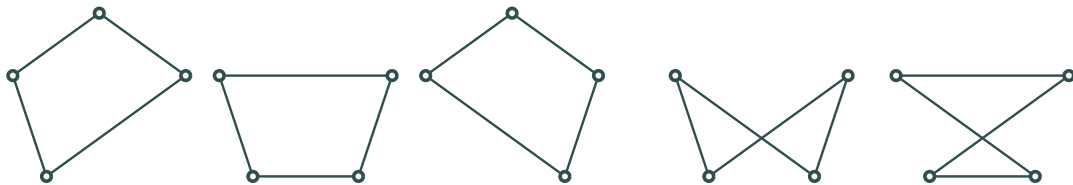
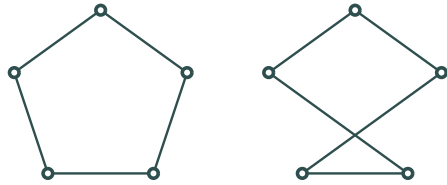
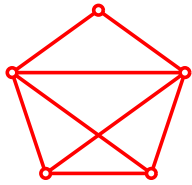
(1)



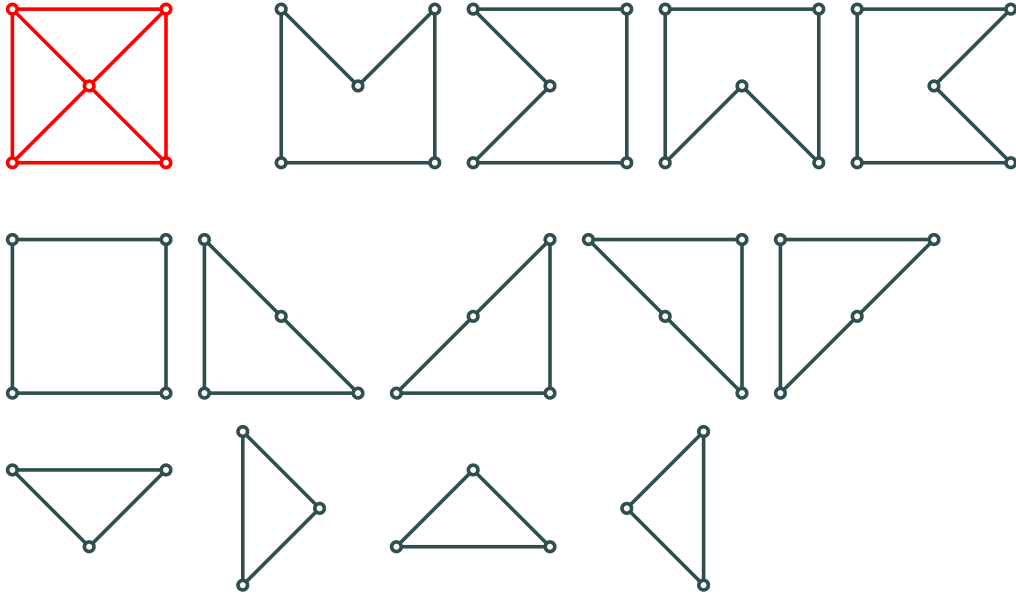
(2)



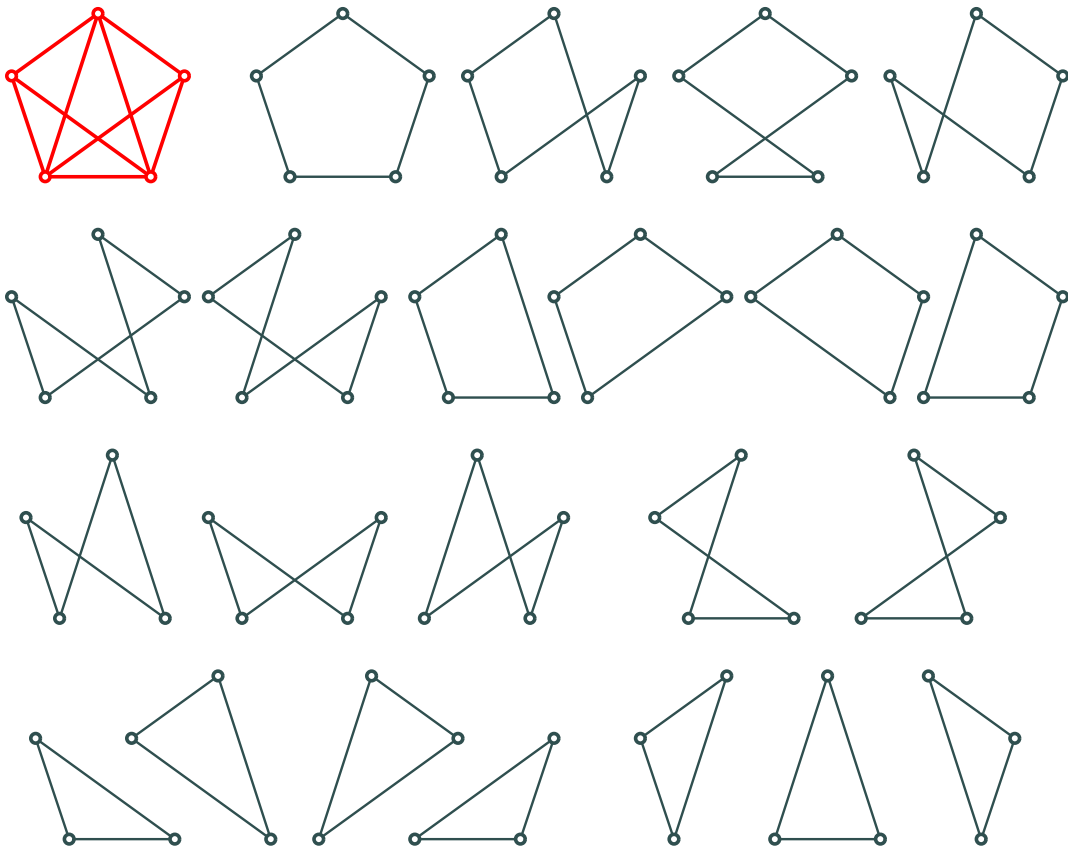
(3)



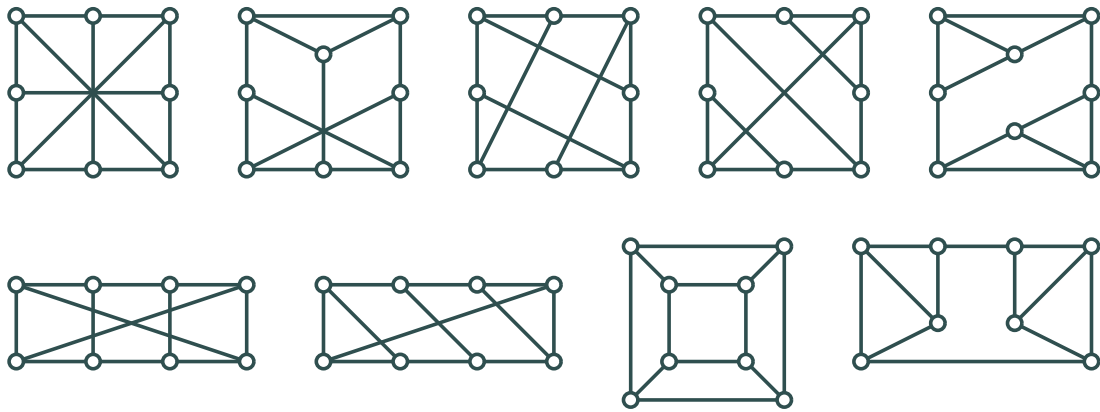
45.(4)



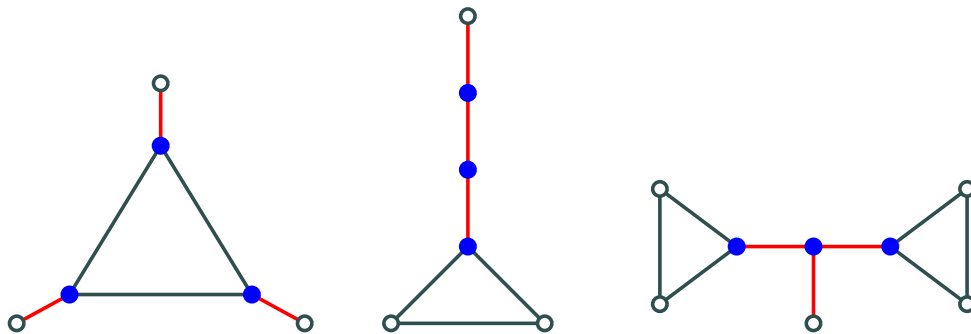
(5)



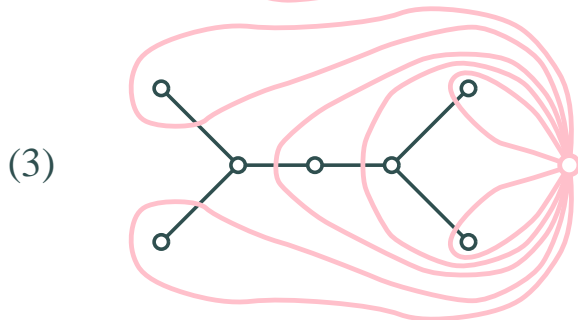
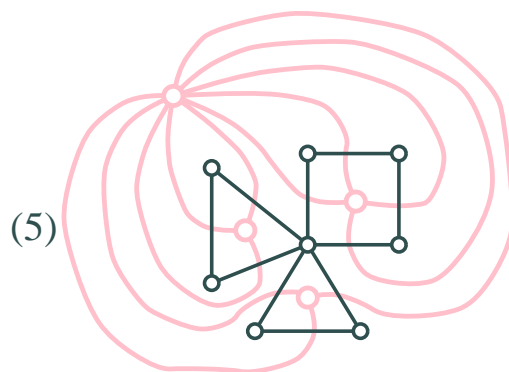
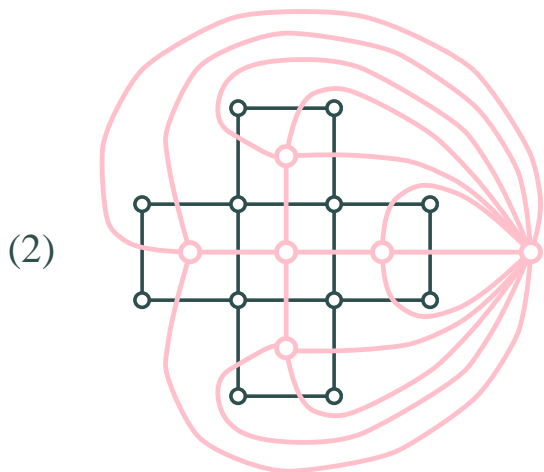
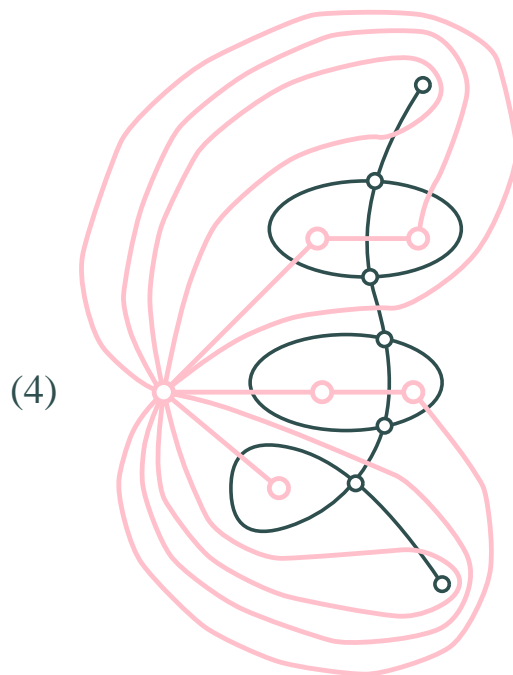
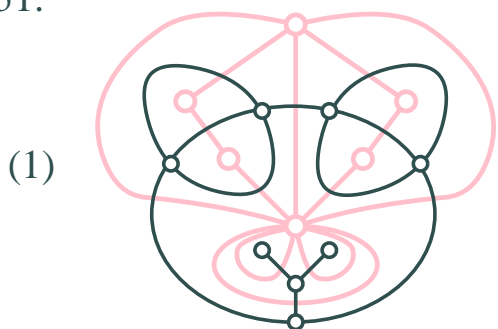
46.(1)



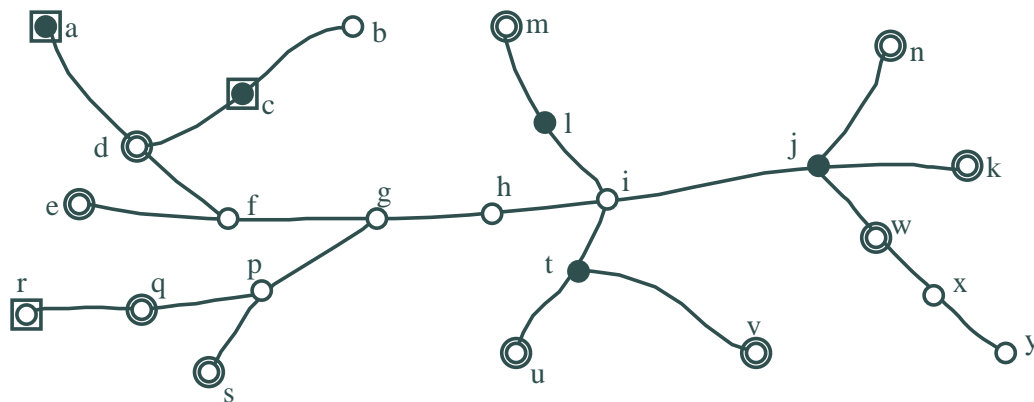
(2)



51.

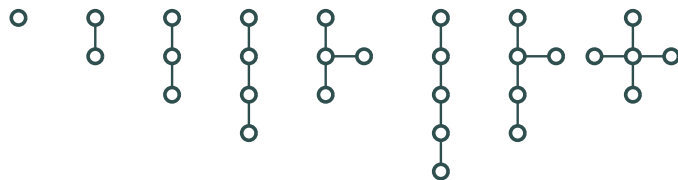


60.

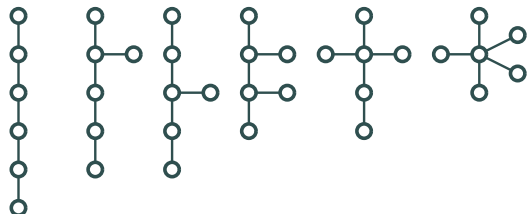


- T
- (1) (2) (3)

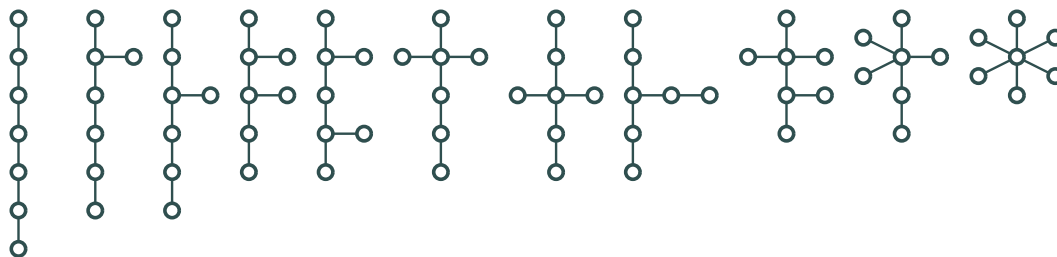
47.



48.



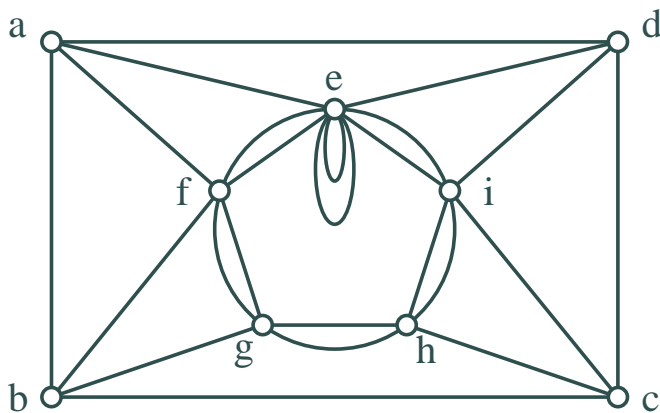
54. (1)



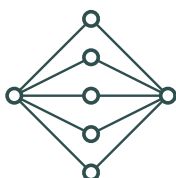
(2)



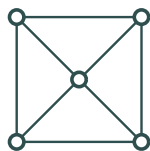
55. (1)



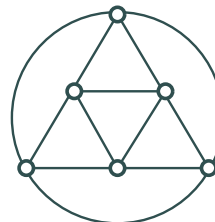
(2)



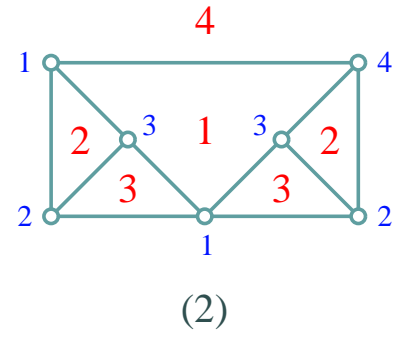
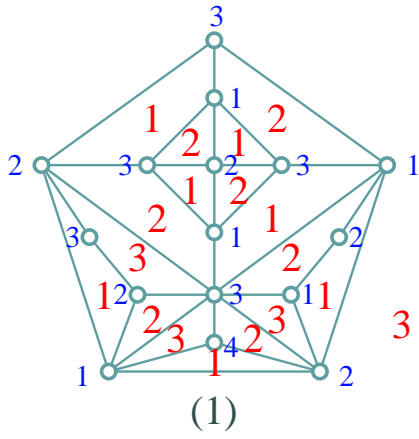
(3)



(4)

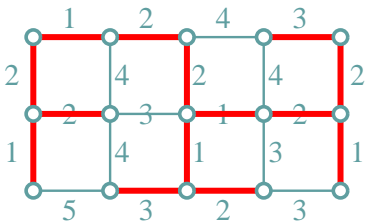


58.

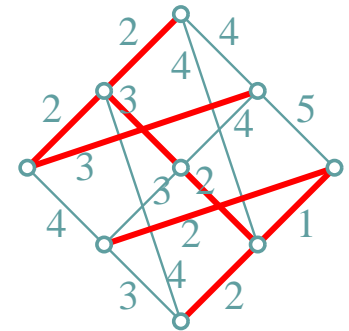


59.

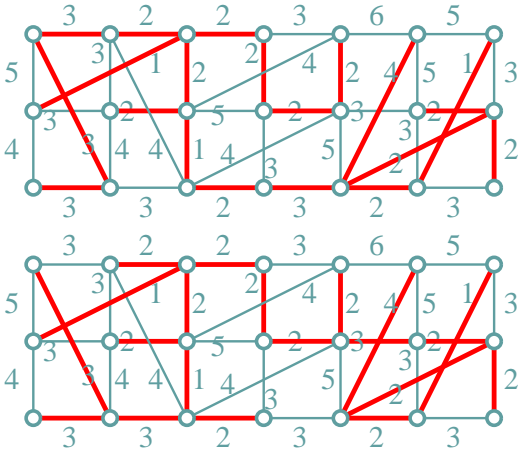
(1)



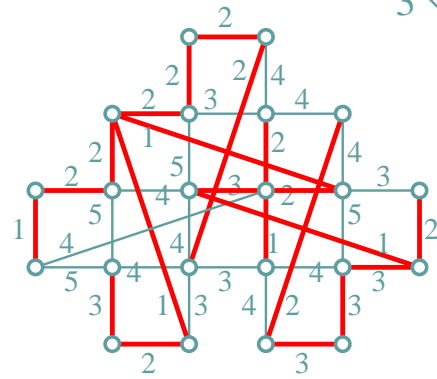
(2)



(3)

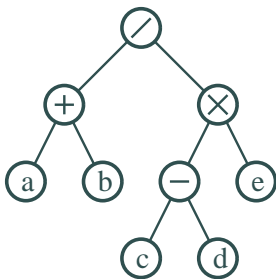


(4)

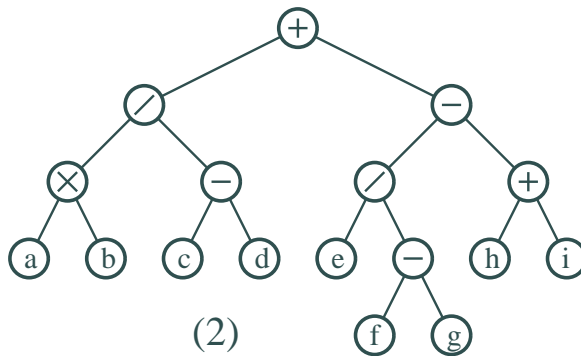


63.

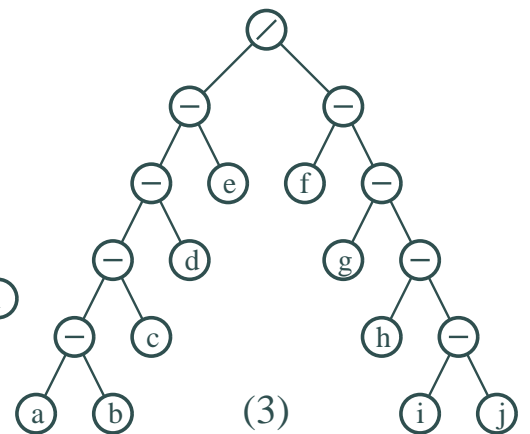
(1)



(2)

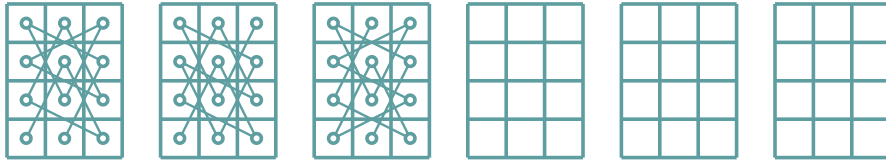


(3)

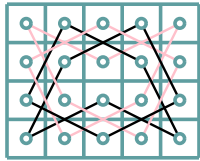


57.

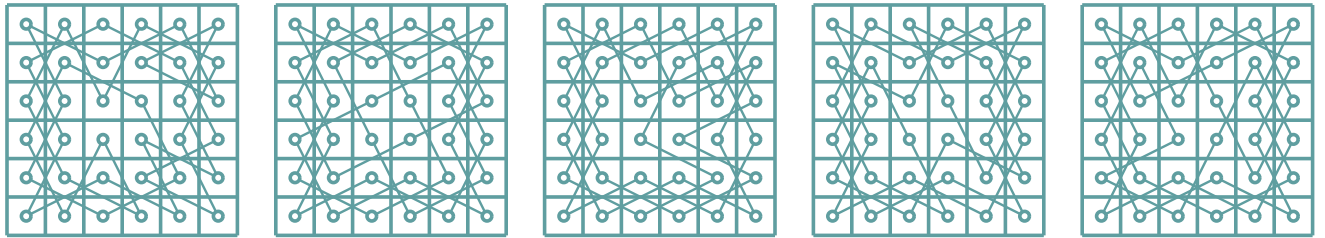
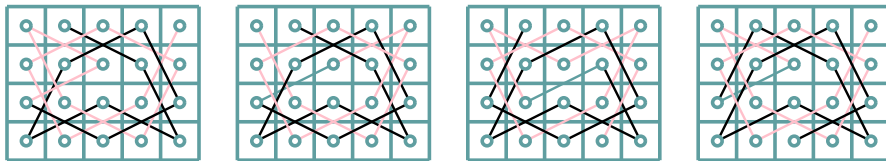
(1)



(2)



two cycles

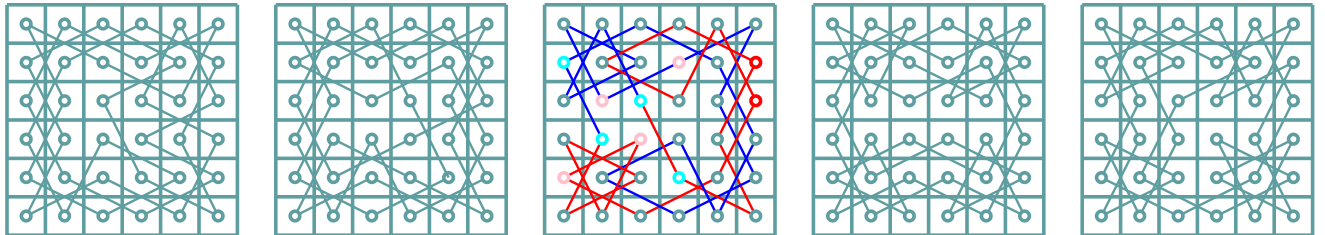


YSTR's 01

TOMOE's 01

Onose's 03

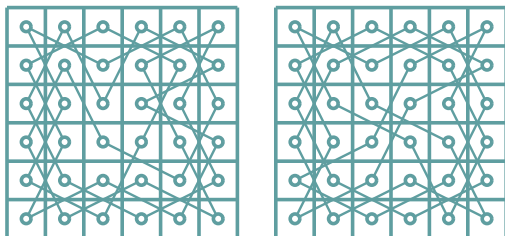
(3)



Yokoyama's 04 Obara&Fujiwara 05

Horiguchi's 07

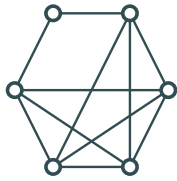
Iguro's 13



Otsuka's 15

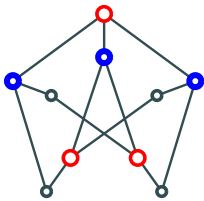
Ejiri's 15

68. The following are subgraphs homeomorphic to K_5 or $K_{3,3}$.

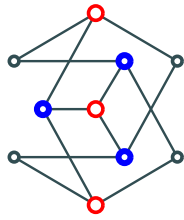


(g)

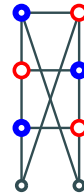
: Homeomorphic to K_5 .



(h)



(j)

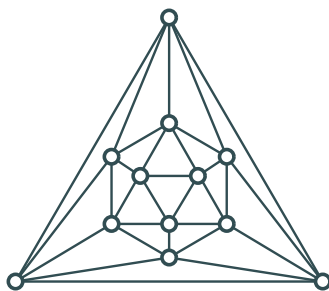
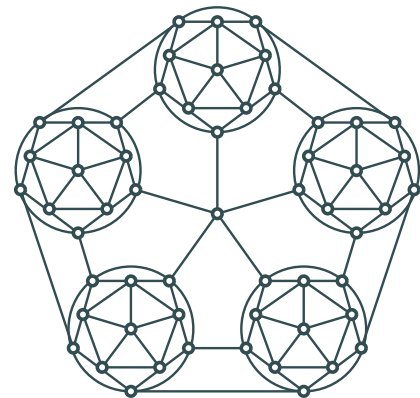
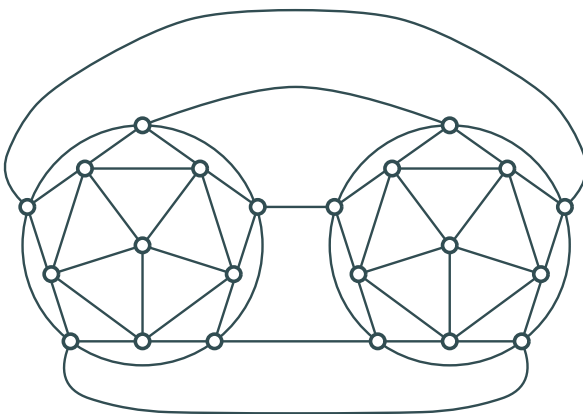


(l)

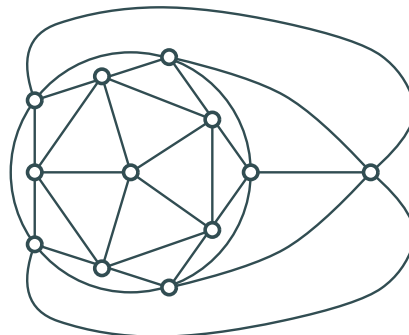
These are homeomorphic to $K_{3,3}$.

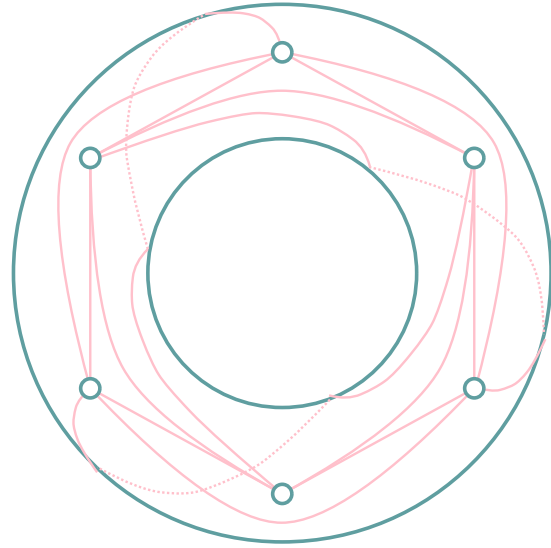
The vertices \circ are middle vertices inserted in $K_{3,3}$.

71. (1) Examples of 5-regular plane graphs.
There are many other solutions.

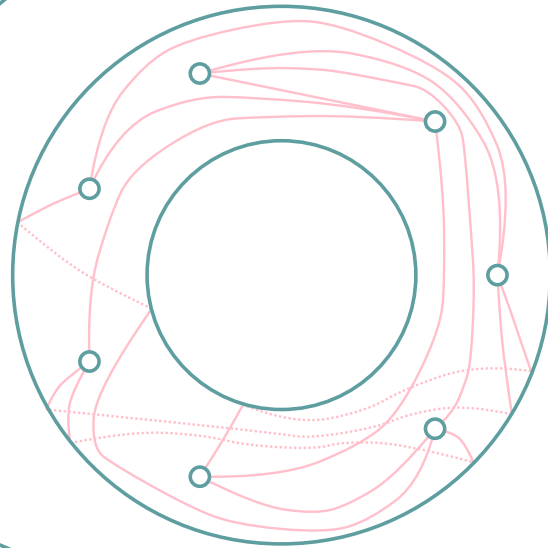


=

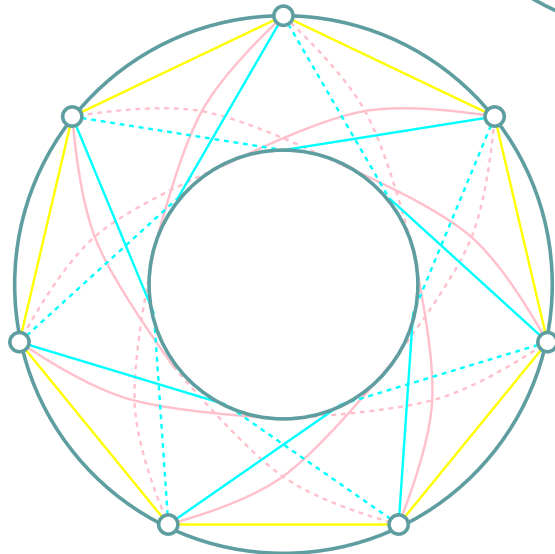




73.(1)

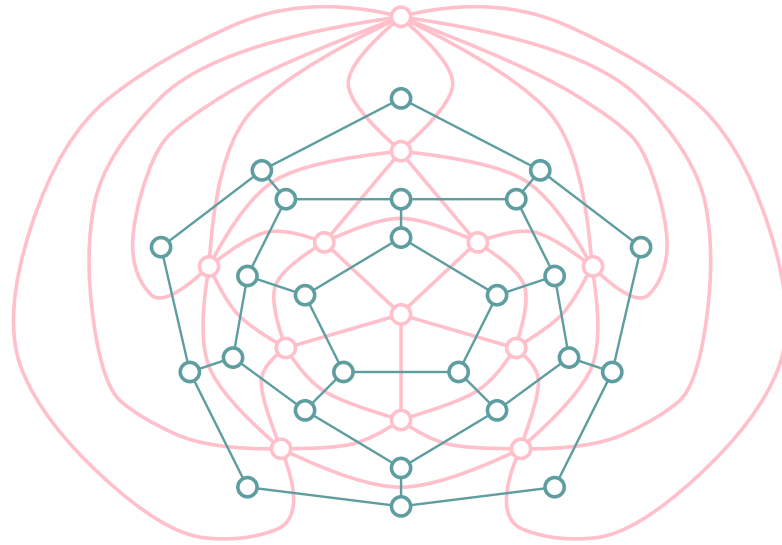


(2)

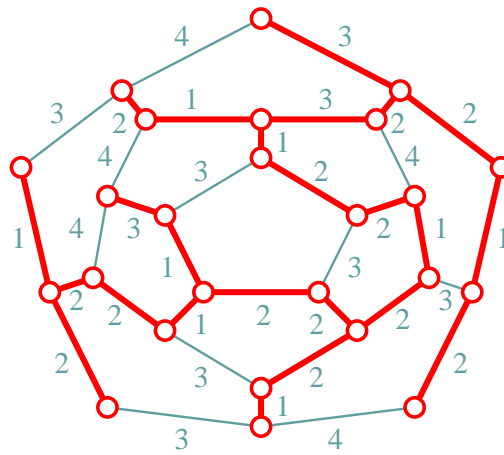


(3)

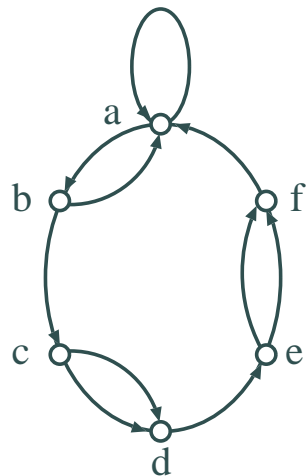
70.(2)



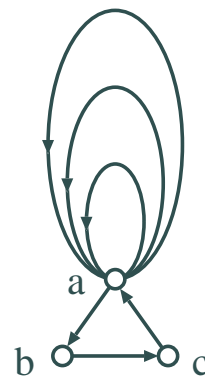
(4)



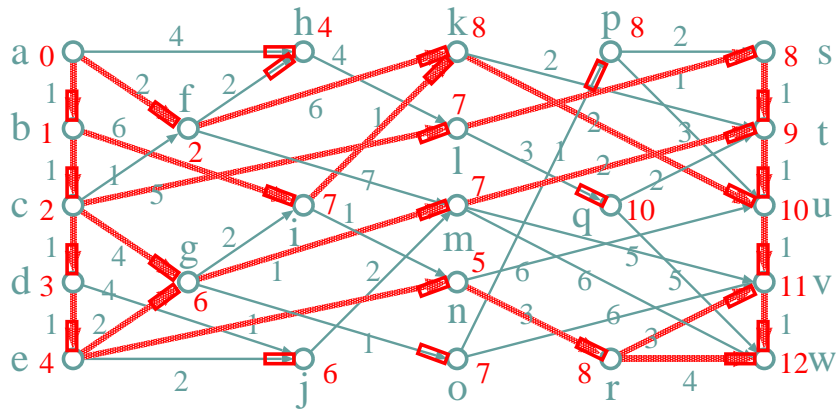
74.(1)



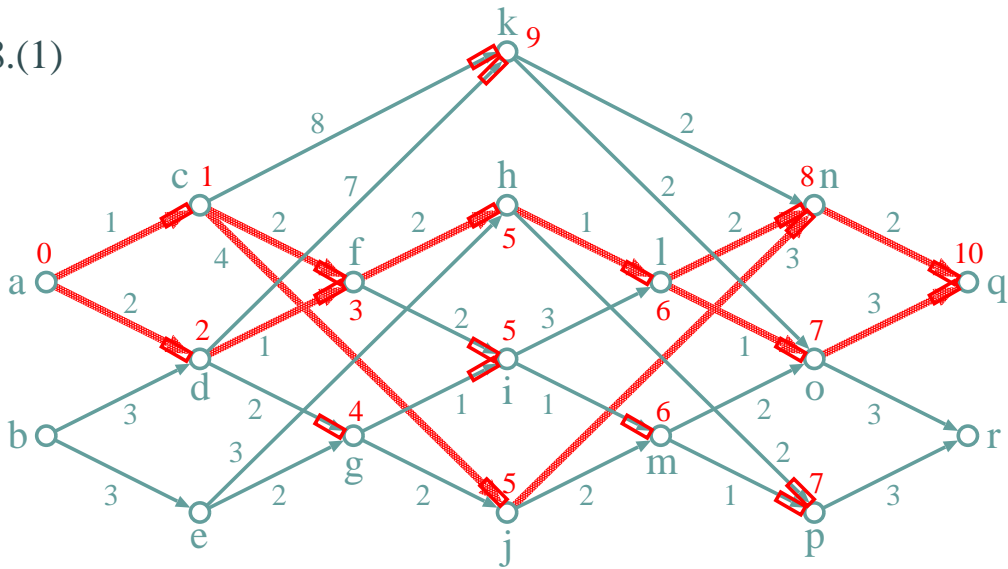
(2)



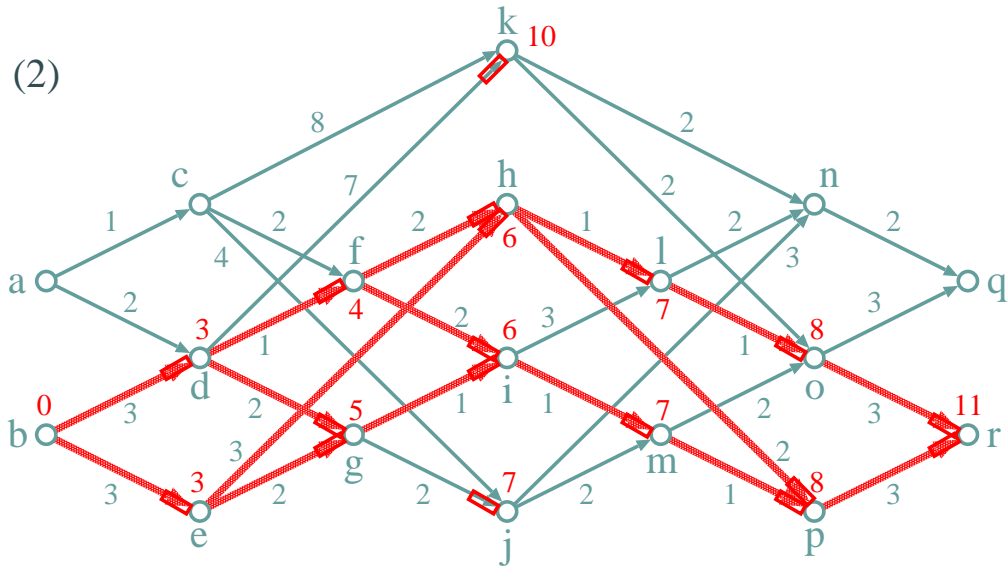
77.



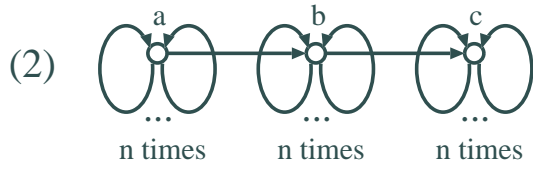
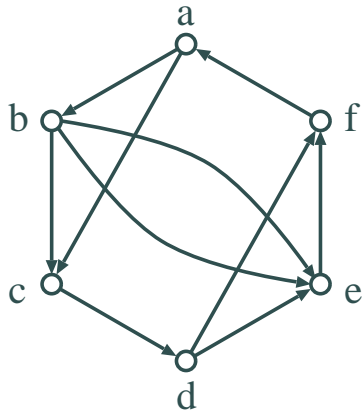
78.(1)



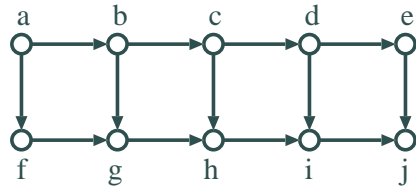
(2)



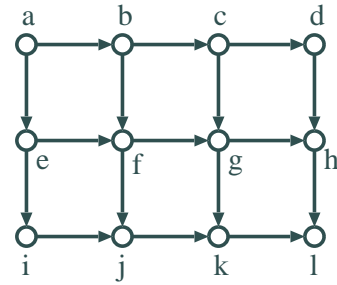
79.(3)



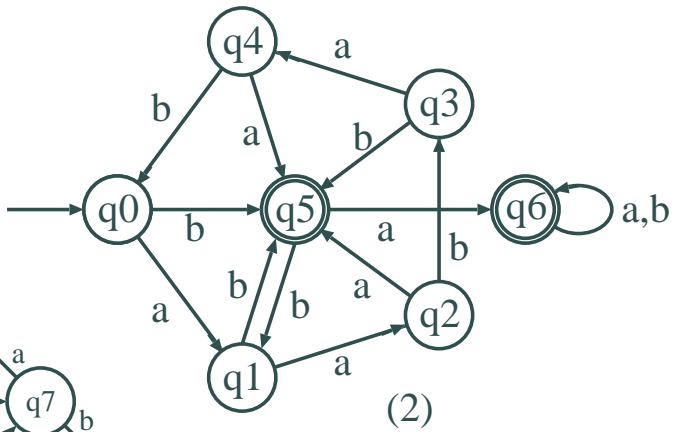
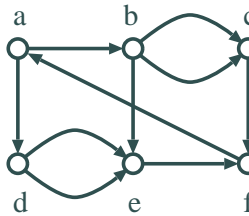
80.(1)



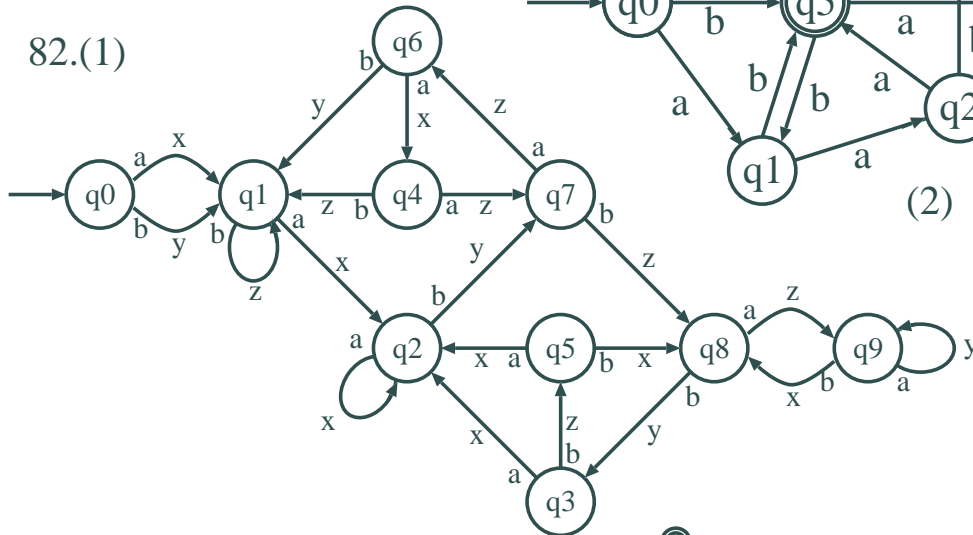
(2),(3)



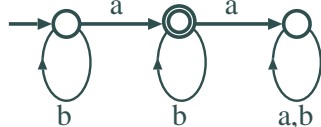
(1)



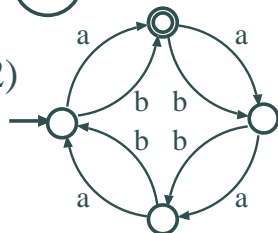
82.(1)



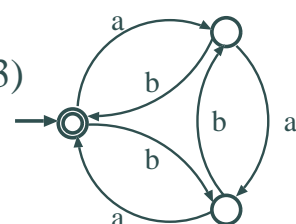
85.(1)



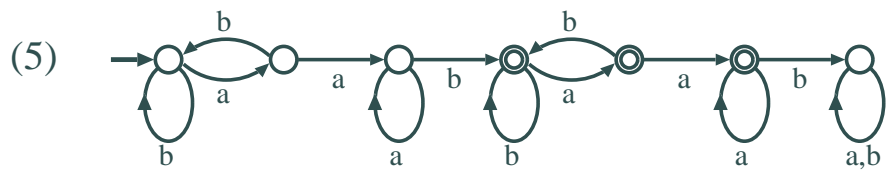
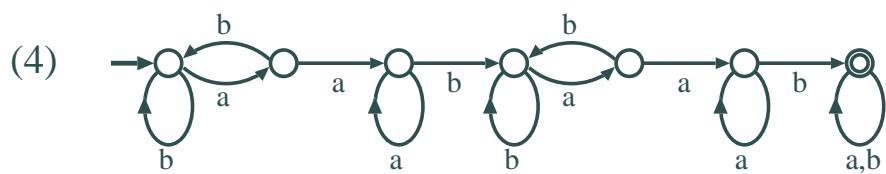
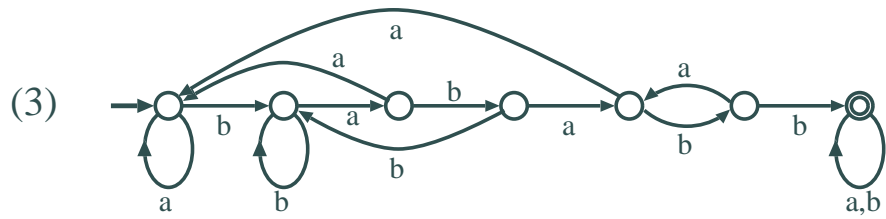
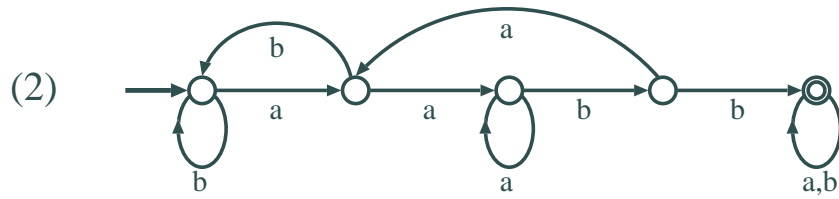
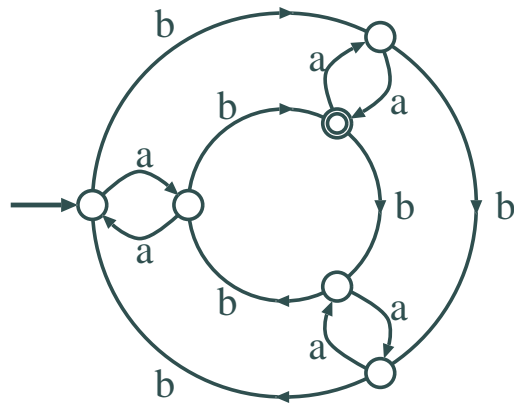
(2)



(3)

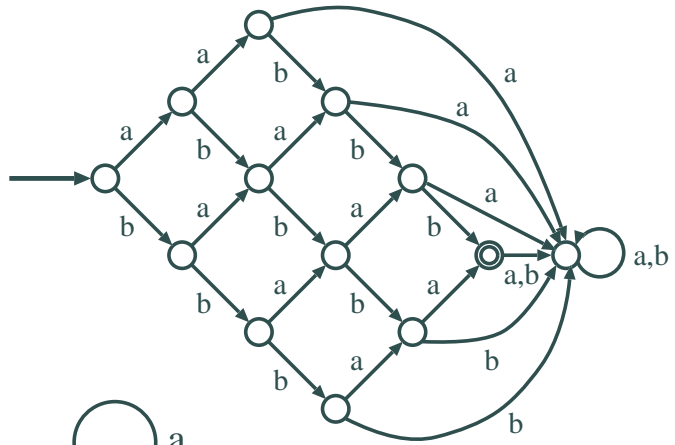


86.(1)

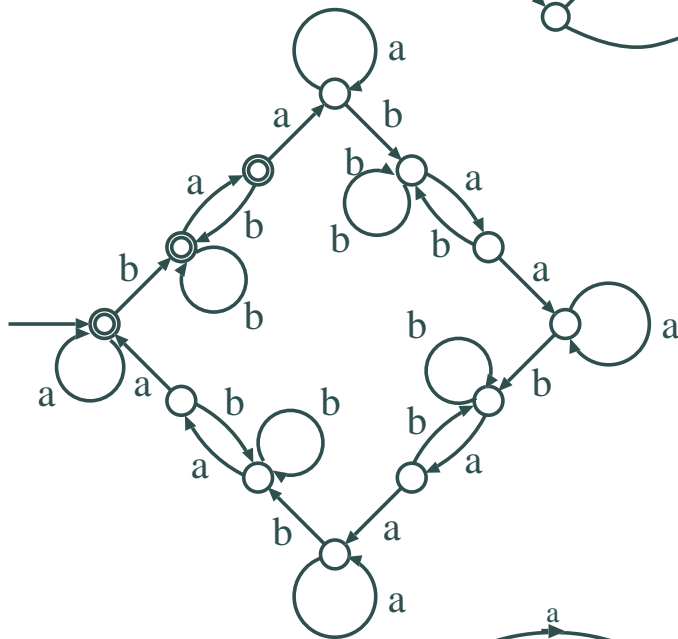


87.

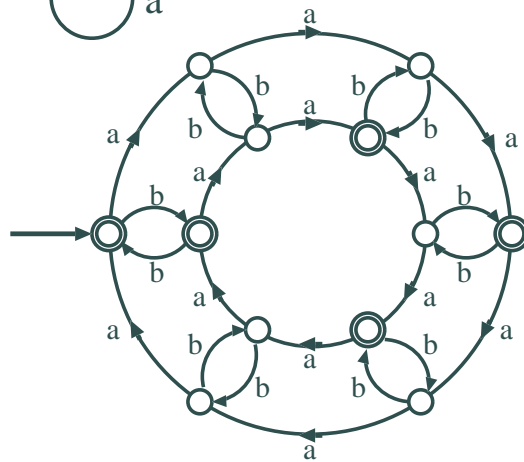
(1)



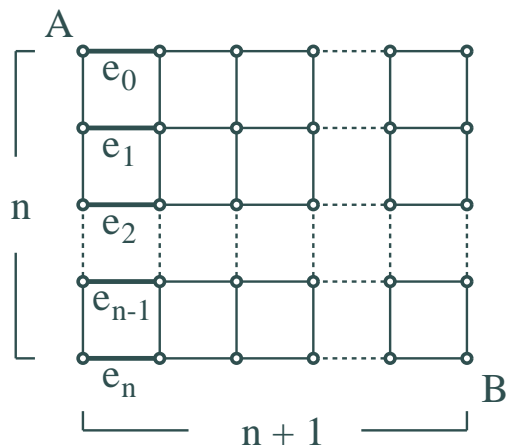
(2)



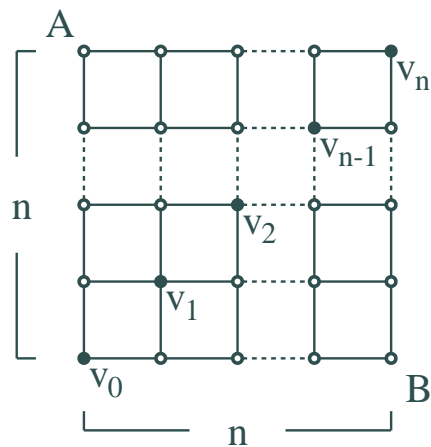
(3)



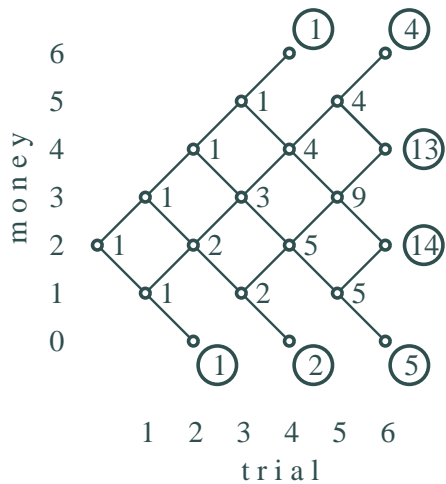
92.(2)



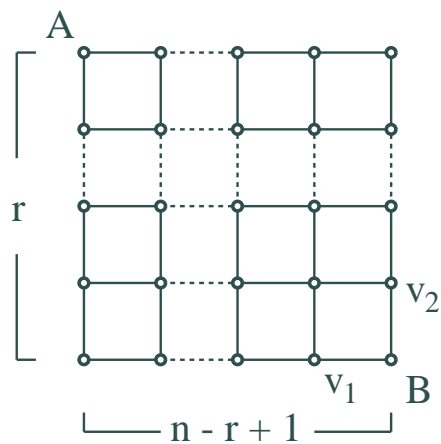
95.



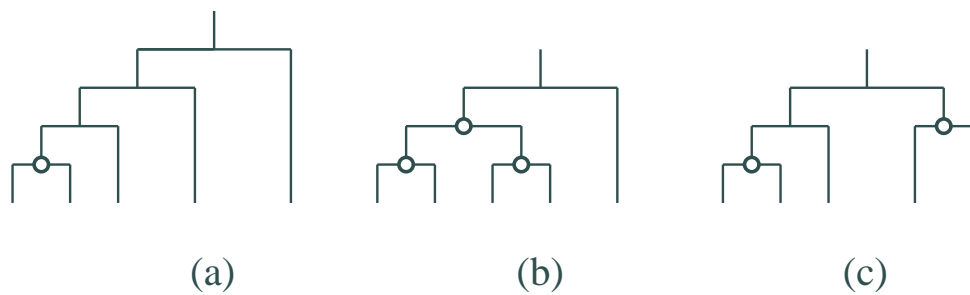
96.



97.



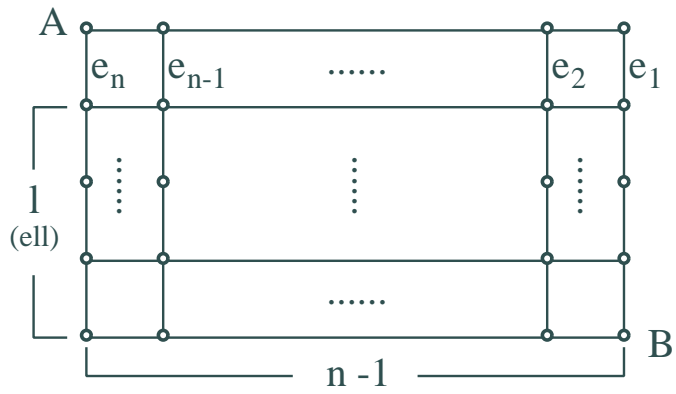
101.



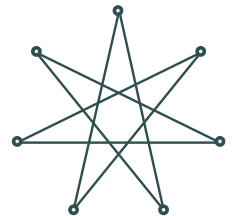
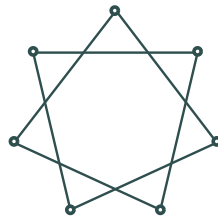
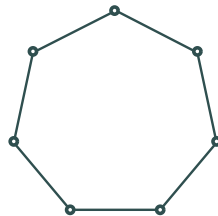
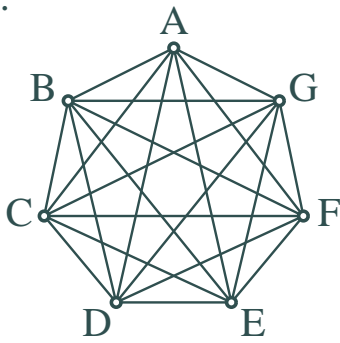
102.



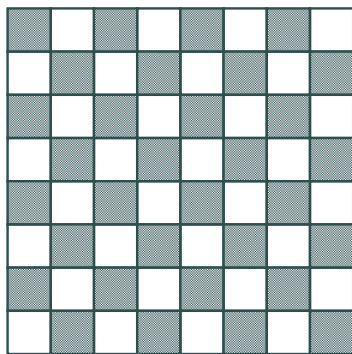
106.



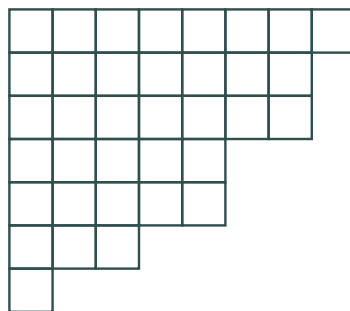
103.



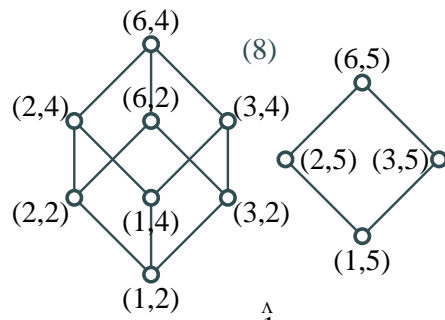
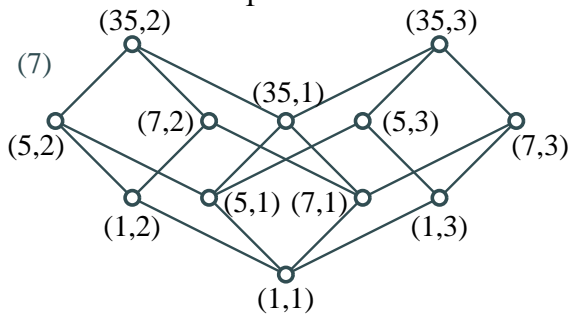
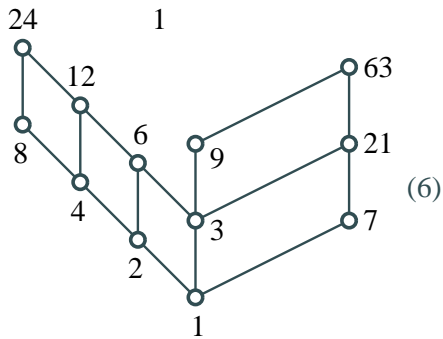
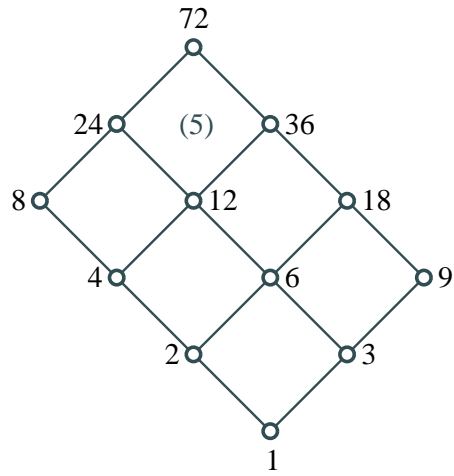
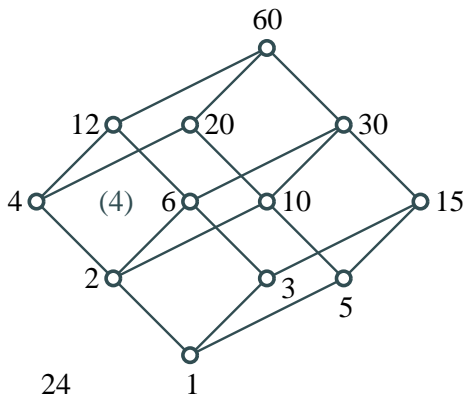
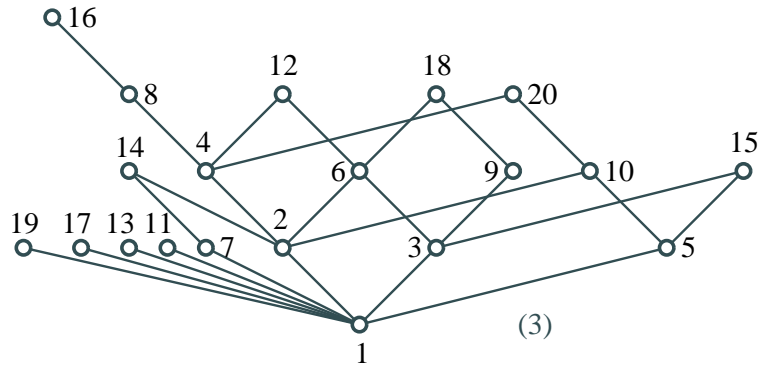
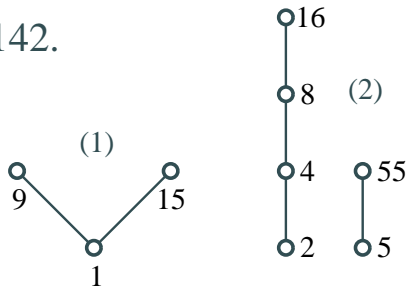
109.



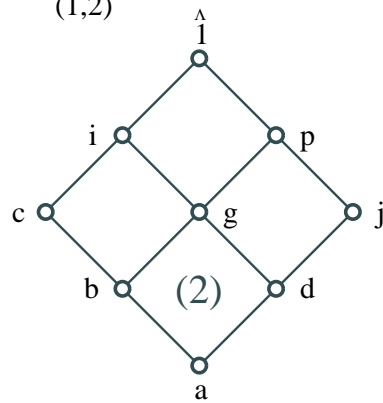
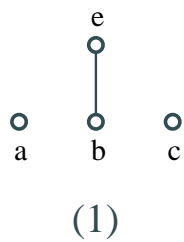
110.



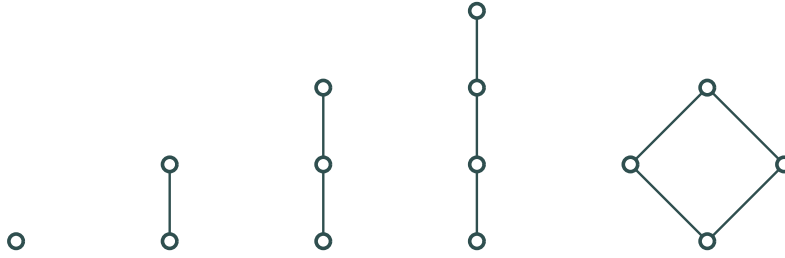
142.



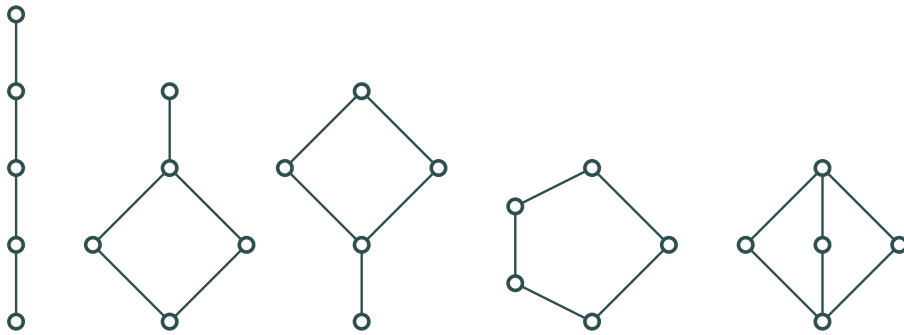
149.



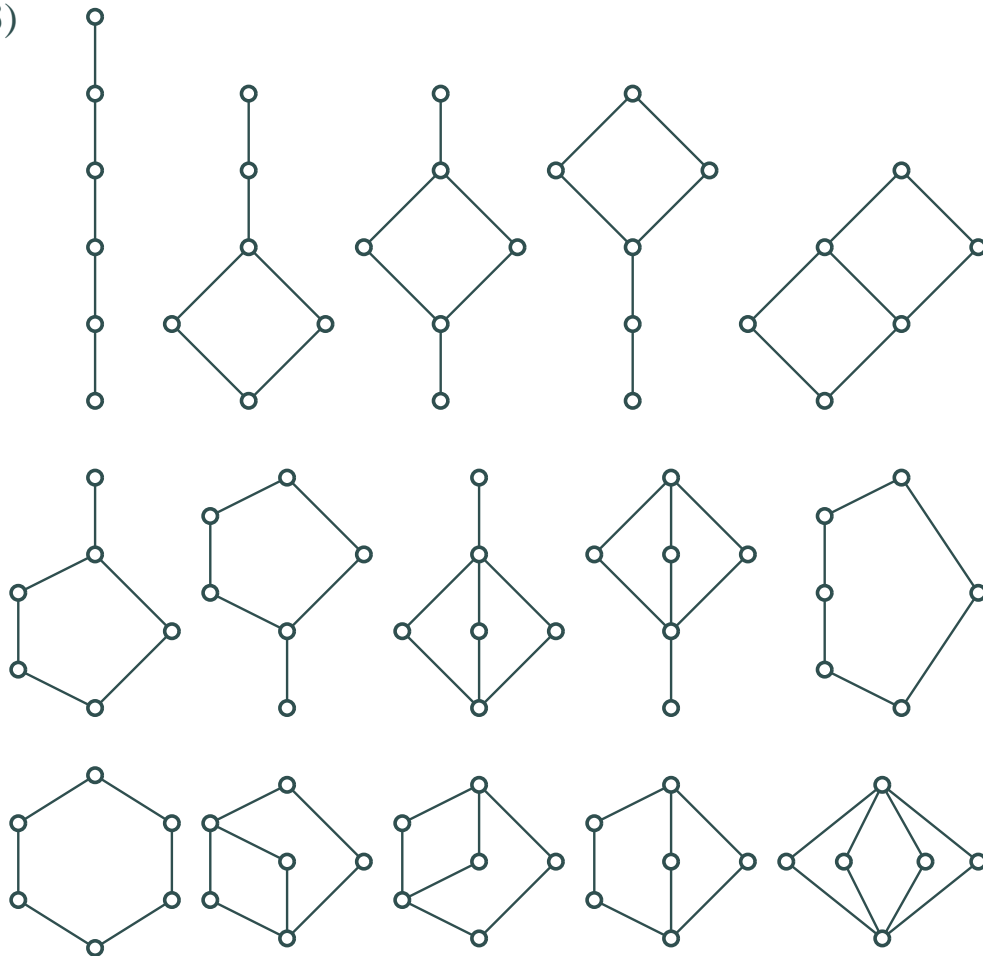
144.(1)



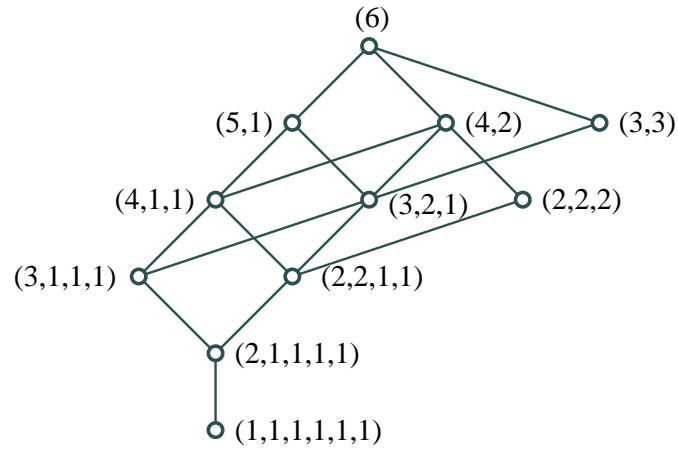
(2)



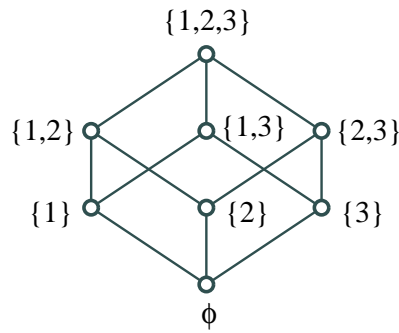
(3)



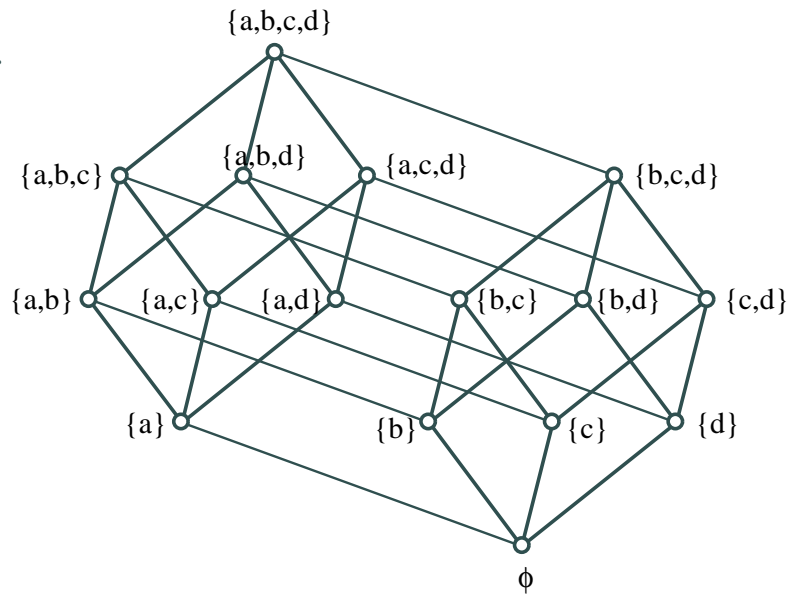
143.



146.



147.



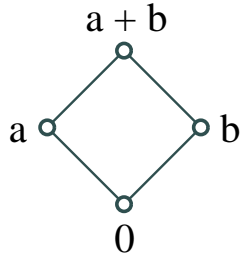
151.

(1)



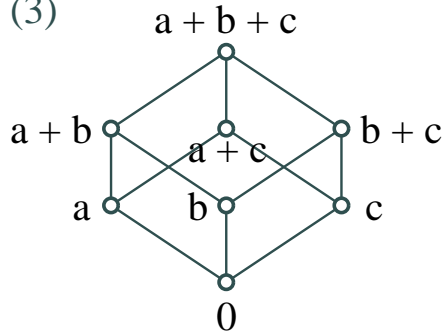
B_1

(2)



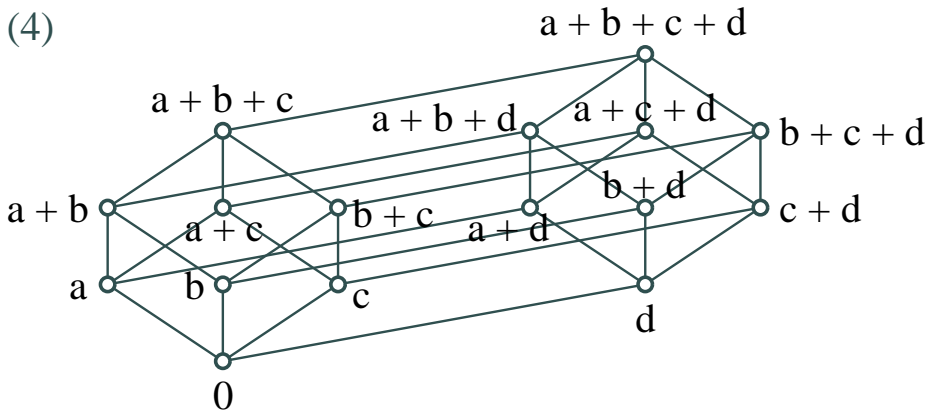
B_2

(3)



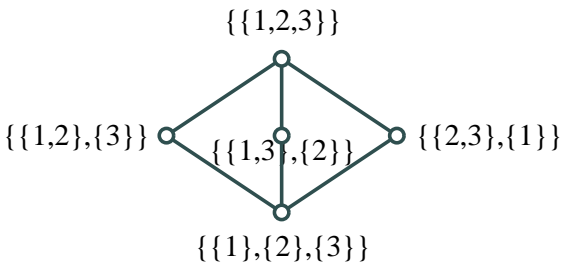
B_3

(4)

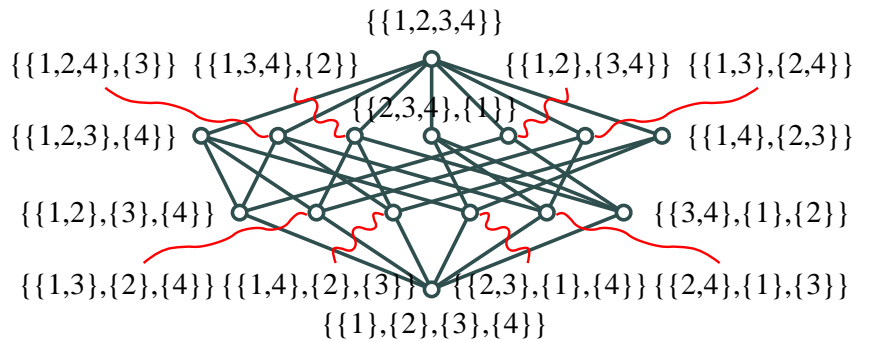


B_4

152.

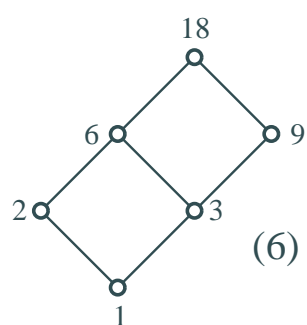
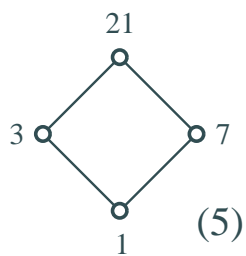
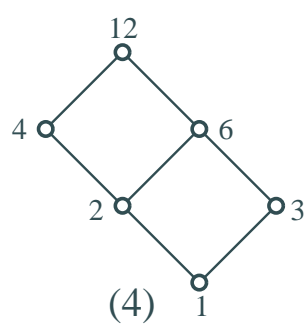
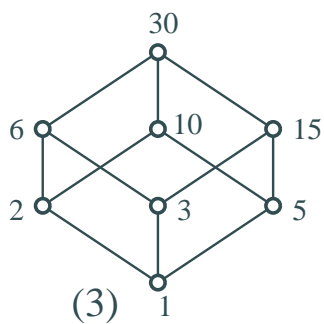
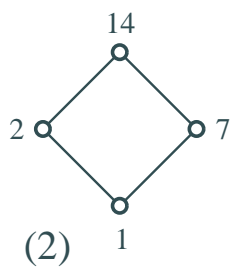


(1)

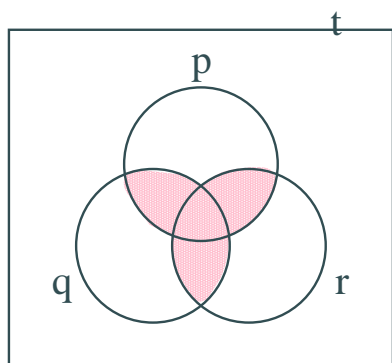


(2)

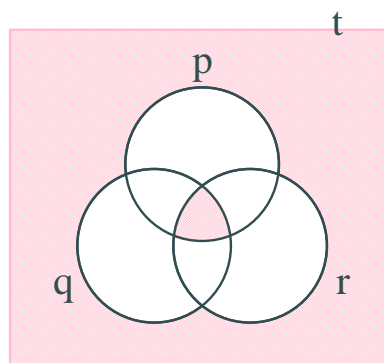
153.



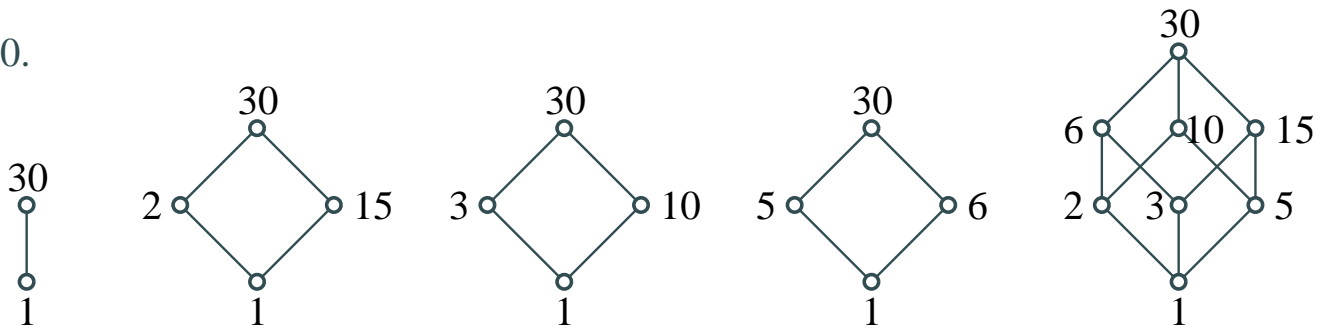
155.(6)



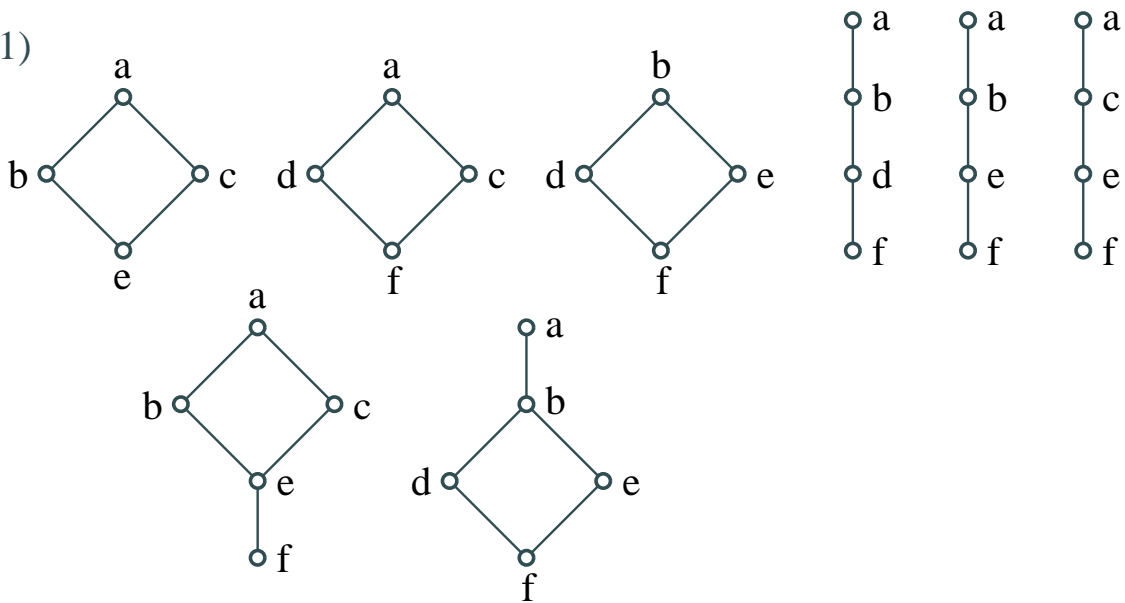
157.(2)



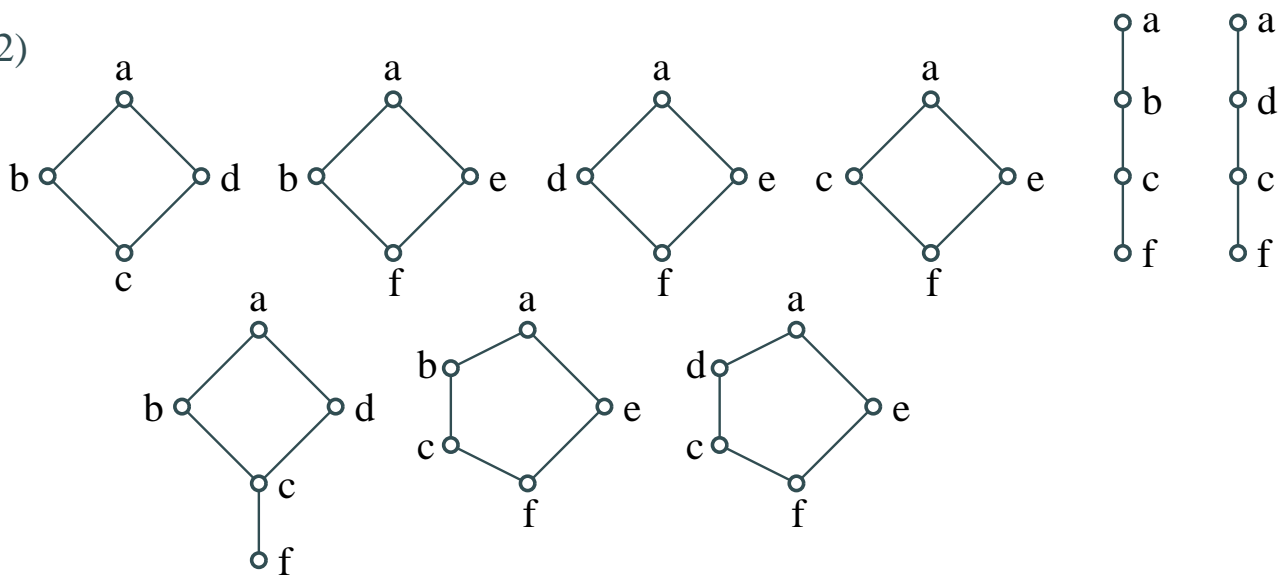
160.



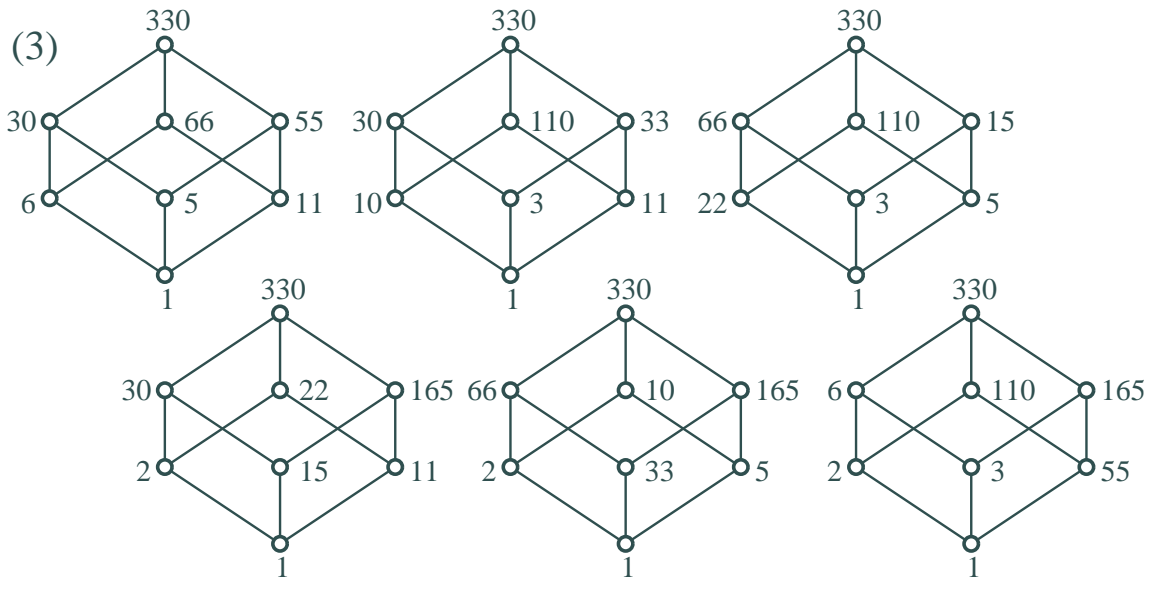
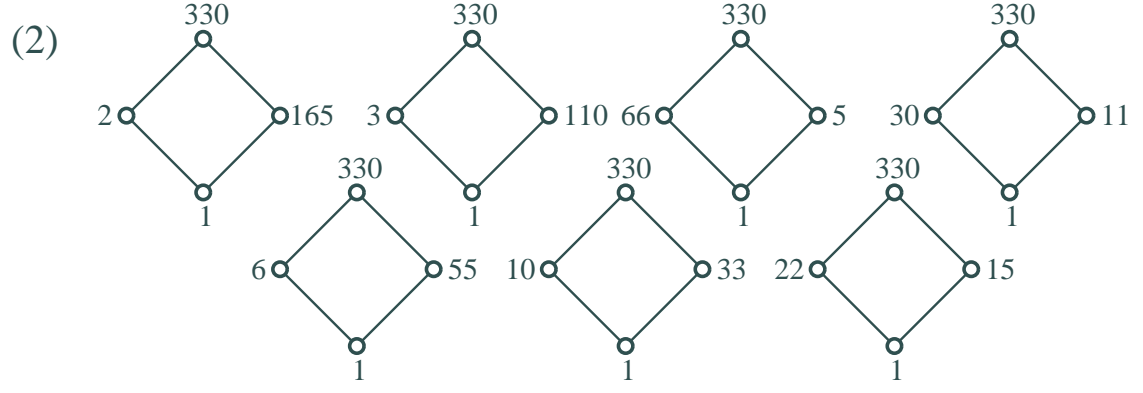
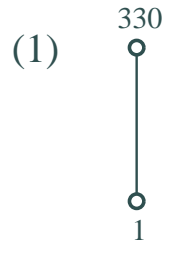
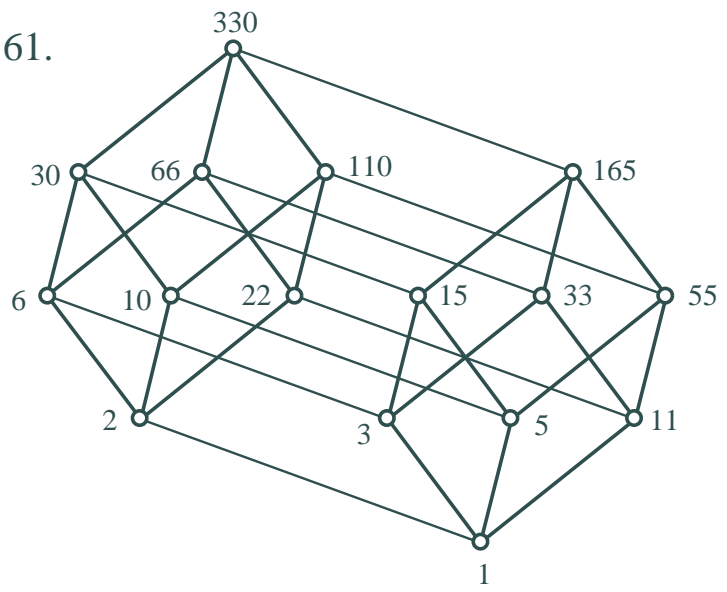
162. (1)



(2)



161.



172.

(1)

	yz	yz'	y'z'	y'z
x		✓	✓	
x'	✓			✓

$xz' + x'z$

(2)

	y	y'
x	✓	✓
x'	✓	

$x + y$

(3)

	yz	yz'	y'z'	y'z
x	✓	✓		✓
x'		✓	✓	✓

$xy + x'z' + y'z$

	yz	yz'	y'z'	y'z
x	✓	✓		✓
x'		✓	✓	✓

$xz + yz' + x'y'$

(4)

	zt	zt'	z't'	z't
xy	✓			✓
xy'	✓	✓		
x'y'		✓		✓
x'y	✓			✓

$yt + x'z't + y'zt' + xzt$
 $yt + x'z't + y'zt' + xy'z$

(5)

	zt	zt'	z't'	z't
xy		✓	✓	✓
xy'	✓	✓	✓	
x'y'	✓	✓		
x'y	✓			✓

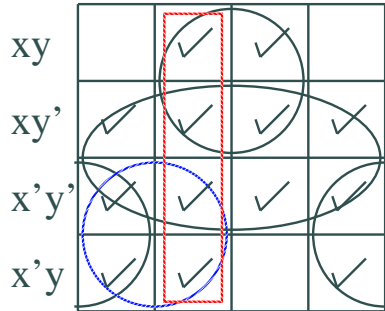
$y'z + xt' + x'yt + yz't$

	zt	zt'	z't'	z't
xy		✓	✓	✓
xy'	✓	✓	✓	
x'y'	✓	✓		
x'y	✓			✓

$y'z + xt' + x'yt + xyz'$
 $y'z + xt' + x'zt + yz't$

173.

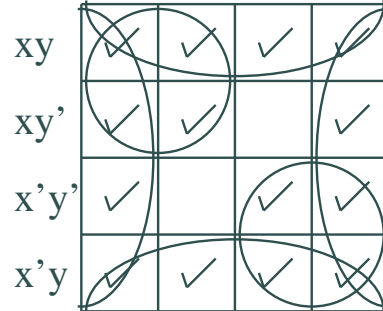
(1) $zt \quad zt' \quad z't' \quad z't$



$$y' + xt' + x't + x'z$$

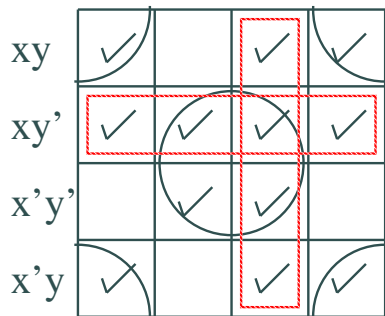
$$y' + xt' + x't + zt'$$

(2) $zt \quad zt' \quad z't' \quad z't$



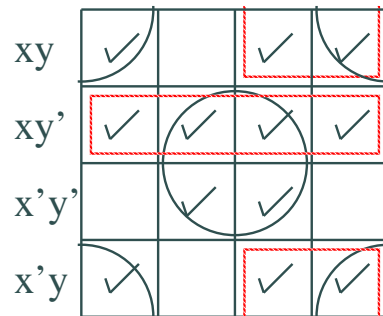
$$y + t + xz + x'z'$$

(3) $zt \quad zt' \quad z't' \quad z't$



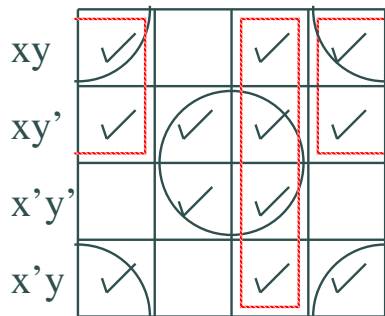
$$yt + y't' + xy' + z't'$$

$zt \quad zt' \quad z't' \quad z't$



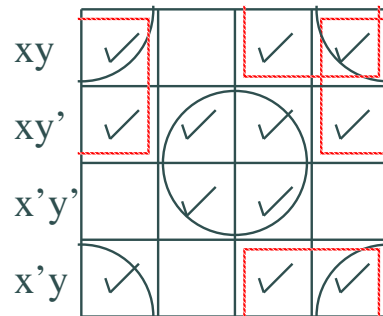
$$yt + y't' + xy' + yz'$$

$zt \quad zt' \quad z't' \quad z't$



$$yt + y't' + xt + z't'$$

$zt \quad zt' \quad z't' \quad z't$



$$yt + y't' + xt + yz'$$

173. (4)

