Mod 12

12.1.1

a. 14

b. $\{6, 1, 2, 3, 4\}$

c. 1

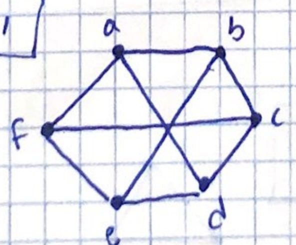
d. $\{2, 5\}$

12.1.3

a. **NO,** the sum of degrees or total degree must be even and $3 \cdot 5 = 15$ is odd

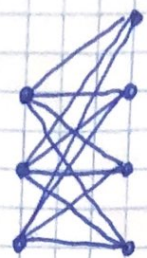
b.

Yes,



$\boxed{12.1.4}$

a.



$K_{3,4}$

$\text{Edges} = \dfrac{3 \cdot 4 + 4 \cdot 3}{2} = \boxed{12}$

not regular

b.

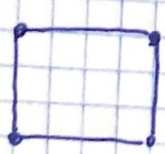
K_5

$\text{Edges} = \dfrac{5 \cdot 4}{2} = \boxed{10}$, regular

c. 3 , $K_3 = C_3$

d.

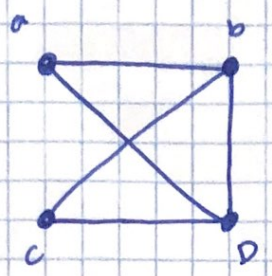
$Q_2 \Rightarrow$



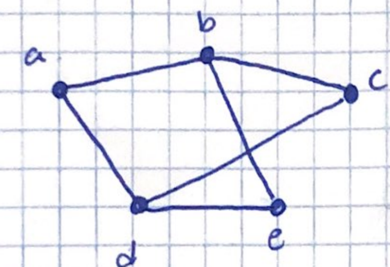
$Q_2 = C_4$, $n=4$

12.2.1

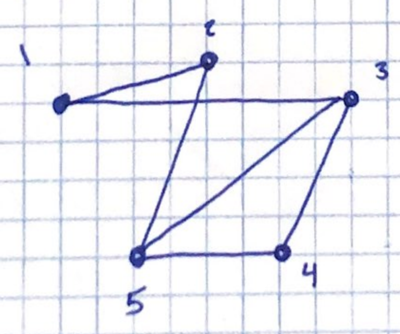
(a.)



(b.)



(c.)



12.2.2

a.

$1 \to 2\ 5$
$2 \to 1\ 3\ 5$
$3 \to 2\ 5$
$4 \to 5$
$5 \to 1\ 2\ 3\ 4\ 6$
$6 \to 5$

b.

$$\begin{array}{c c} & \begin{array}{cccccc} 1 & 2 & 3 & 4 & 5 & 6 \end{array} \\ \begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{array} & \begin{bmatrix} 0 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 \end{bmatrix} \end{array}$$

12.2.3

a. equal

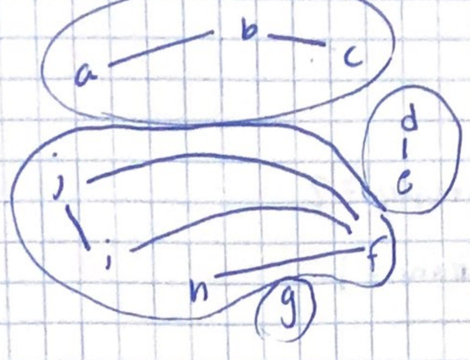
b. equal

c. <u>Not</u> equal

d. equal

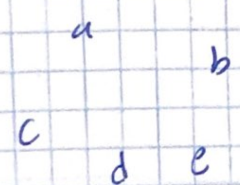
12.4.1

a.



$\boxed{\{a, b, c\}, \{d, e\}, \{f, h, i, j\}, \{g\}}$

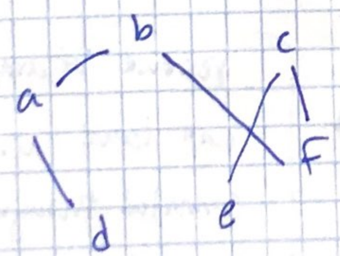
b.



~~none~~

$\boxed{\{a\}, \{b\}, \{c\}\{d\}, \{e\}}$

c.



$\boxed{\{a, b, c, d, e, f\}}$

12.11.2

(a.) edge connectivity = 2

vertex connectivity = 1

(b.) edge connectivity = 1

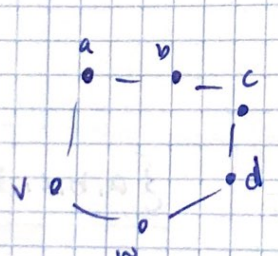
Vertex connectivity = 1

(c.) edge connectivity = 3

vertex connectivity = 3

12.4.4

(a.)



$\Rightarrow$

removal of any edge will leave v, w connected through same connected component

(b) using the same graph above replace d with y. removing any edge will leave v and ~~x~~ y in same connected component thus showing transitive property

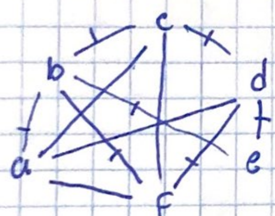
12.4.4

(c.)

using graph from 'a' replace 'd' with 'y'. if v and w are two vertex connected then y and v are two vertex connected. then removing w will show this

12.5.1

(a.)



~~{a, b, c, d, e~~

$\boxed{a-b-d-c-e-b-f-d-a-c-f-a}$

(b.) no Euler circuit, some vertices have an odd degree

(c.) No Euler circuit, some vertices have an odd degree

(d.) $\boxed{a-b-c-d-a-c-g-f-b-e-d-f-a}$