Will Gausher M 12 Hw

12.1.1

a.) 14

b.) 1,2,3,4,6

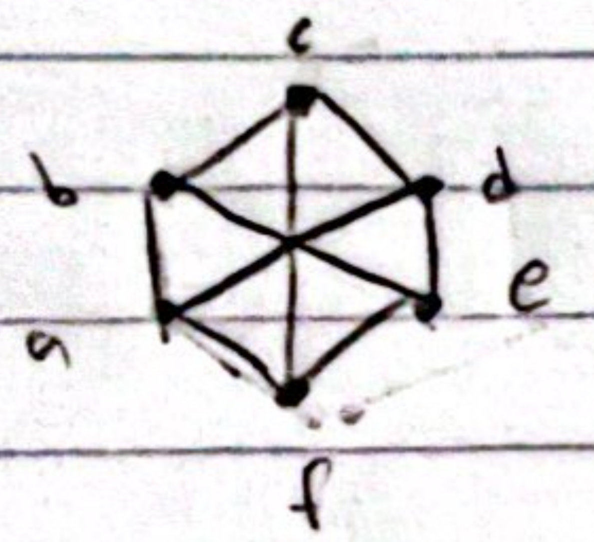
c.) 1

d. 2,5

12.1.3

a.) No, it is not possible. The vertices would result in a 15 degree which is not even.

b.) Yes:



12.1.4

a.) There are 12 edges.
No, this is not a regular graph.

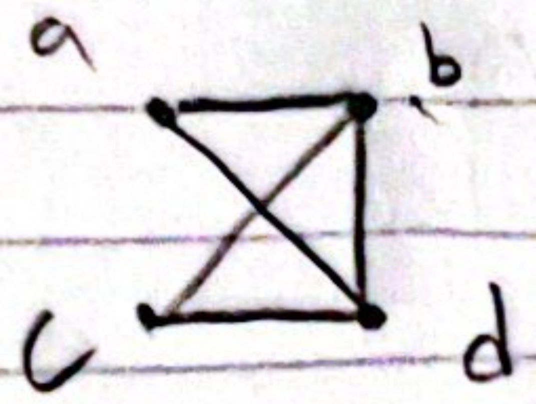
b.) There are 10 edges.
Yes, K_5 is a regular graph.

c.) $n=3$

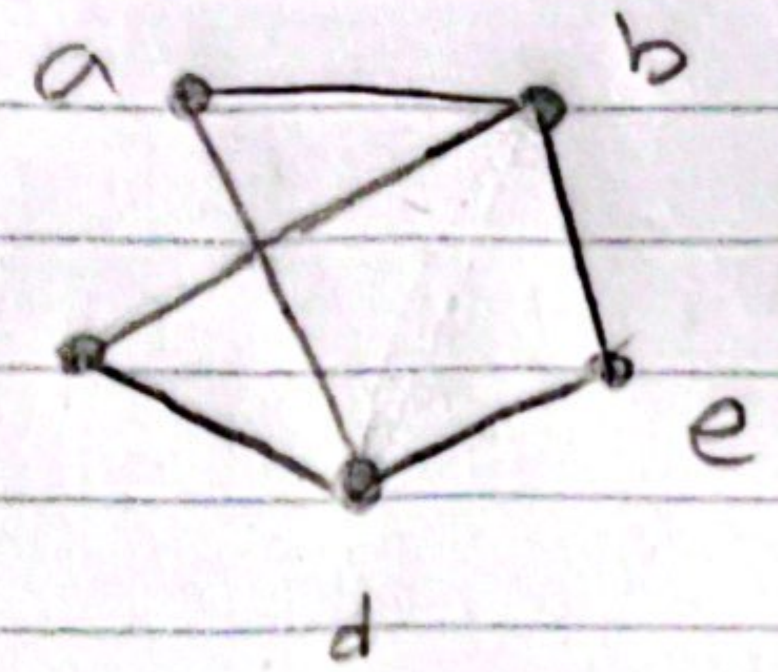
d.) $n=4$

12.2.1

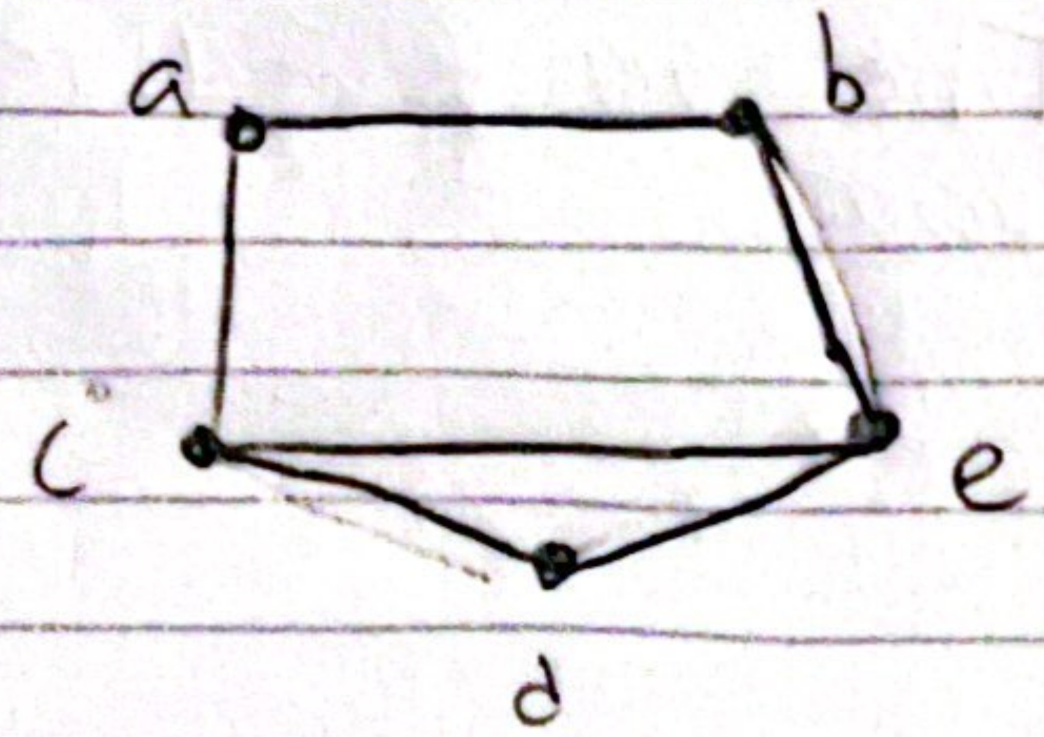
a.)



b.)



c.)



12.2.2

a.)

$\boxed{1} \rightarrow \boxed{2}\boxed{5}$

$\boxed{2} \rightarrow \boxed{1}\boxed{3}\boxed{5}$

$\boxed{3} \rightarrow \boxed{2}\boxed{5}$

$\boxed{4} \rightarrow \boxed{5}$

$\boxed{5} \rightarrow \boxed{1}\boxed{2}\boxed{3}\boxed{4}\boxed{6}$

$\boxed{6} \rightarrow \boxed{5}$

b.)

$$\begin{bmatrix} 0 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

12.2.3

a.) Yes

b.) Yes

c.) NO

d.) Yes

12.4.1

a.) {a, b, c} {d, e} {f, h, i, j} {g}

b.) {a} {b} {c} {d} {e}

c.) {a, b, c, d, e, f}

12.4.2

a.) Edge: 3
Vertex: 1

b.) Edge: 1
Vertex: 1

c.) Edge: 4
Vertex: None / ∞

12.4.4

a.) Yes. this is the definition. Each pair must be 2-edge connected to be deemed a 2-edge-connected graph.

b.) It is not transitive. The 2-edge connected case does not hold between some arbitrary point. If v and y are 2 edge connected and y and w are, it is not certain v and w are 2-edge connected.

c.) Yes this is transitive because regardless which vertices we remove, the path from v to y or v to w will be preserved unless two are removed at. Also, removing two vertices to disconnect v from y also disconnects w and vice versa. Therefore it is transitive.

12.5.1

a.) {a, c, b, e, d, c, f, d, a, b, f, a}

b.) No, odd degree

c.) No, odd degree

d.) {a, b, c, d, e, b, f, d, a, f, g, c, a}