Ex 11.1.2 : a) bcbcd

b) bcabed

c) bcd

d) bedcacb

e) bcgfedcb

f) bedcb

Ex 11.1.4 : Starting with string with only 0's we can get to any string of weight 2 where the weight of a string is the sum of its digits.

→ More generally two connected have their weight that differs 0 or 2.

→ Strings with even weight are connected

→ Strings of odd weight are connected

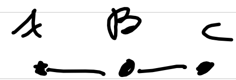
And the two components are disconnected. So we get 2 components for G.

Ex 11.1.6: The vertices at distance 1: c, f, e

" 2: h, g

" 3: l, m, j, k

" 4: i

Ex 11.1.10: For example 

Ex 11.1.14: a) ~~For~~ W_3 there are 3 4-cycles given by $v_1v_2v_3v_4v_1$ and rotating.

For W_4: there are 4 4-cycles given by $v_1v_2v_3v_5v_1$ and rotating and one that doesn't pass through v_5: $v_1v_2v_3v_4v_1$.

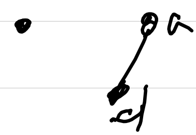
For W_5: there are 5 4-cycles given by $x_1x_2x_3x_6x_1$.

b) (i) There are n cycles of length 4 in W_n given in the same way by rotating around the wheel.

(ii) There are $n+1$ cycles of lengths n on W_n given by the outer cycle and rotating cycles that pass through the center.

Ex 11.2.2: a) If there is an edge between vertices of G_1 in G that is not in G_1.

b)



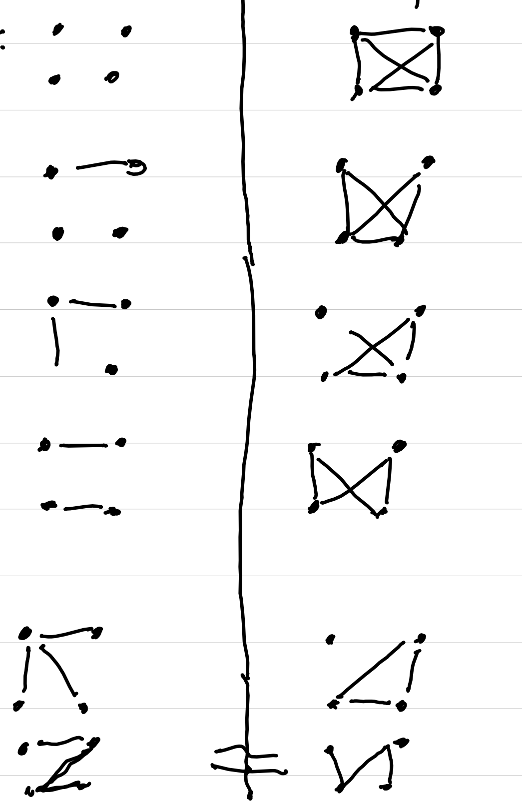
Ex 11.2.6: with 0 edge:

There are 11 graphs 1 edge:
with 6 connected.

2 edges:

3 edges:

Complement



Ex 11.2.8 : a) We can choose any vertex to start (7 choices). The second vertex in the path can be any other (6 choices). We can continue this way to get:

$$\frac{7\times 6\times 5\times 4\times 3}{2}$$

b) The same reasoning gives:

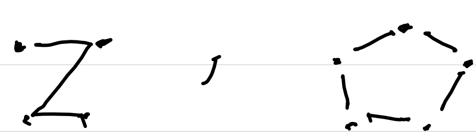
$$\frac{n(n-1)\cdots(n-m+1)}{2}.$$

Ex 11.2.10 : K_n has $\binom{n}{2}$ edges, so

$\overline{G}$ has $\binom{n}{2}-e$ edges.

Ex 11.2.12 : a) We should have

$$\binom{n}{2}-e=e \quad \text{so} \quad e=\binom{n}{2}\Big/2.$$

b) 

c) We have from a) that $\binom{n}{2}$ is divisible by 2.

But: $\binom{n}{2} = \frac{n(n-1)}{2}$

so n or $n-1$ is divisible by 4

hence $n = 4k$ or $n = 4k+1$.