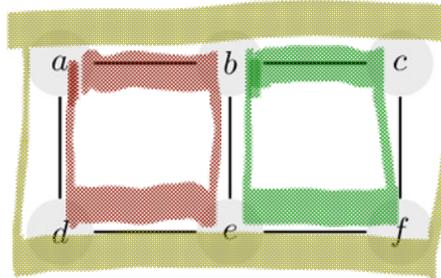


Exercise 0.1 – Paths, Walks, Cycles

Consider the following graph $G = (V, E)$.



1. Which paths of length 4 (i.e. consisting of 4 edges) are there from a to e ?
2. Which walks of length 4 (i.e. consisting of 4 edges) are there from a to e ?
3. Which cycles are there in G ? *How many*
4. How many closed walks are there in G ?

1. $\langle a, b, c, f, e \rangle$

2. Bspw. $\langle a, b, a, d, e \rangle$, 12 in total

3. 3 essentially different cycles ■ ■ ■

But in total $8 + 8 + 12$ cycles

(We can start from each vertex in 2 directions)

Examples: $\langle a, b, c, f, e, d, a \rangle$ when starting from a in ■
 $\langle a, d, e, f, c, b, a \rangle$

4. There are infinitely many, e.g. $\langle a, b, a \rangle$, $\langle a, b, a, b, a \rangle$, ...