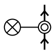
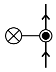
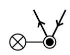
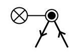
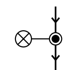
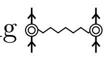
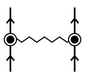
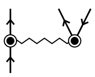
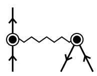
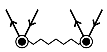
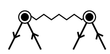
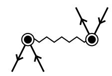
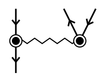
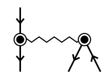
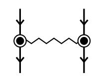
1. Come up with an example to illustrate each of the following terms.

(a) equivalent lines
(b) closed graph
(c) open graph
(d) interchangeable operators
(e) equivalent operators
(f) interchangeable subgraphs
(g) equivalent subgraphs
(h) Goldstone path
(i) Hugenholtz path
(j) open cycle
(k) loop
(l) connected graph
(m) disconnected graph
(n) unlinked graph
(o) equivalent contractions
(p) energy graph
(q) coefficient graph
(r) wavefunction graph

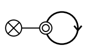
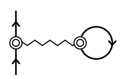
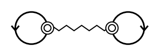
2. Using  $\equiv f_p^q \tilde{a}_q^p$, interpret each of the following as an algebraic expression.

(a) 
(b) 
(c) 
(d) 

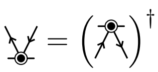
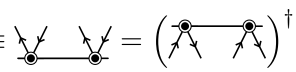
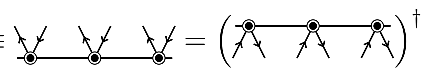
3. Using  $\equiv \left(\frac{1}{2}\right)^2 \overline{g}_{pq}^{rs} \tilde{a}_{rs}^{pq}$, interpret each of the following as an algebraic expression.

(a) 
(b) 
(c) 
(d) 
(e) 
(f) 
(g) 
(h) 
(i) 

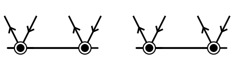
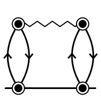
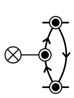
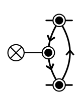
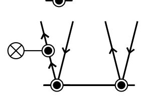
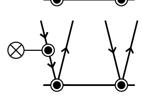
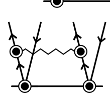
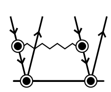
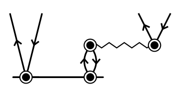
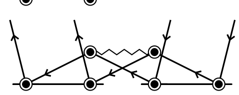
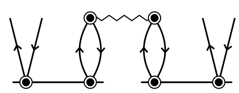
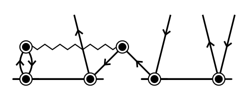
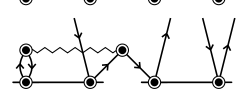
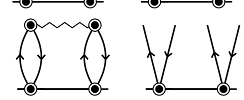
4. Interpret each of the following as an algebraic expression.

(a) 
(b) 
(c) 

5. Diagrams for the singles, doubles, and triples operators have the form

$c_a^i \tilde{a}_i^a \equiv$  $\quad \left(\frac{1}{2}\right)^2 c_{ab}^{ij} \tilde{a}_{ij}^{ab} \equiv$  $\quad \left(\frac{1}{3!}\right)^2 c_{abc}^{ijk} \tilde{a}_{ijk}^{abc} \equiv$ 

where the coefficients $c_{abc\cdots}^{ijk\cdots}$ are antisymmetric in their upper and lower indices.
Interpret each of the following as an algebraic expression.

(a) 
(b) 
(c) 
(d) 
(e) 
(f) 
(g) 
(h) 
(i) 
(j) 
(k) 
(l) 
(m) 
(n) 
(o) 
(p)