12.33 A: adjacency matrix of G.

$\lambda_1(A) \geq$ avg degree G.

$$\lambda_1(A) = \max_1 \frac{x^T A x}{x^T x} \geqq \frac{1^T A 1}{1^T 1} = \frac{\sum\limits_{(u,v) \in E} A(u,v)}{n} = \frac{\sum\limits_{u} d(u)}{n} = \bar{d}$$

where $\bar{d}$ is avg degree.

$\therefore \lambda_1(A) \geq \bar{d}$.