

Real Quiz 2

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1.

(i) (2 points) Show that there are exactly $2^{n(n-1)/2}$ labeled simple graphs on n vertices.

For a graph with n vertices, there are $\binom{n}{2} = \frac{n(n-1)}{2}$ possible edges.

For each edge, there are two possibilities, the edge exists or it does not exist.

So, there are $2^{\frac{n(n-1)}{2}}$ labeled simple graphs on n vertices.

(ii) (2 points) How many of these have exactly m edges?

From $\frac{n(n-1)}{2}$ possible edges, we want to choose m of them to exist.

So, there are $\binom{\frac{n(n-1)}{2}}{m}$ possible labeled simple graphs on n vertices with exactly m edges.

2. (4 points) Draw at least four (unlabeled) simple cubic graphs with at most 8 vertices.

