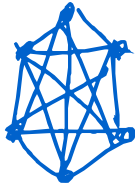



① diameter = $\boxed{2}$
~~distance~~ distance between
 any 2 non-center nodes
 is 2.

② $\frac{(5 \cdot 4)}{2}$ pairs have distance 2
 5 pairs have distance 1

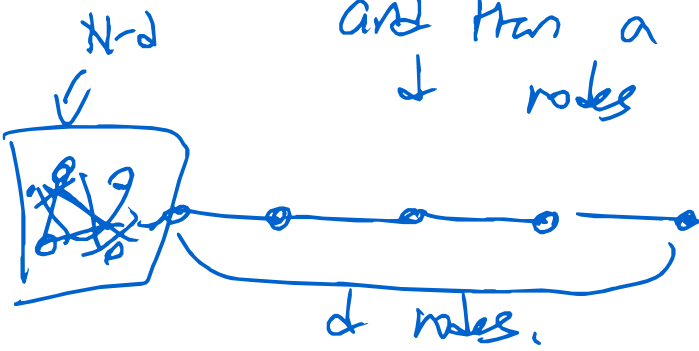
$$\Rightarrow \frac{10(2) + 5(1)}{15} = \frac{25}{15} = \boxed{\frac{5}{3}}$$

③ $\boxed{1}$ fully connected



④ $\boxed{5}$ 

⑤ Yes. consider graph with
 $(N-d)$ nodes fully connected
 and then a line of
 d nodes leaving it.



This has diameter d .

As $N \rightarrow \infty$, the
 average distance $\rightarrow 1$.

$$\Rightarrow \frac{\text{diameter}}{\text{avg distance}} \rightarrow d.$$

for $d > 4$

intuitively, the fully connected
 graph side "dominates"
 the average distance
 calculation.