

Constructions on Diagrams Exercises

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Problem 1. Draw diagrams for $S^3 \times S^1$ and $S^2 \tilde{\times} S^2$.

Problem 2. What is $D(\natural_m S^k \times D^{n-k})$? What is $D(X \natural Y)$?

Problem 3. Draw a Kirby diagram for a **closed** manifold X with:

(i) $\pi_1(X) = \langle a \mid a^n = 1 \rangle$

(ii) $\pi_1(X) = \langle a, b \mid aba = 1 \rangle$

(iii) Some fixed group with finite presentation.

Hints: Draw the 2-handlebody Y , then define $X = DY$. Why don't the new 2-handles change π_1 ?