(c) Prove that the two definitions of acceptance—the one given in part (a) involving ϵ-closure and the one given in Lecture 10 involving homomorphisms—are equivalent.

11. Give regular expressions for each of the following subsets of $\{a, b\}^*$. Recall that regular expressions over $\{a, b\}$ may use ϵ, $\emptyset$, a, b, and operators $+$, *, and $\cdot$ only.

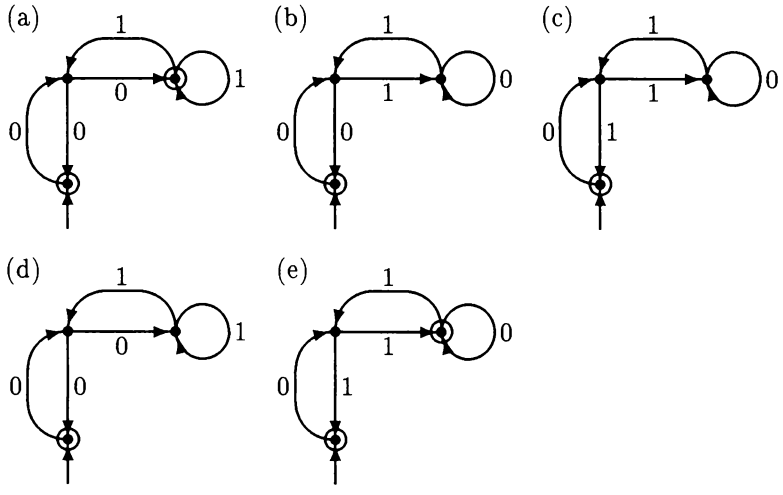
    (a) $\{x \mid x$ does not contain the substring $a\}$

    (b) $\{x \mid x$ does not contain the substring $ab\}$

    **(c) $\{x \mid x$ does not contain the substring $aba\}$

    Try to simplify the expressions as much as possible using the algebraic laws of Lecture 9.

12. Match each NFA with an equivalent regular expression.



    (i) $\epsilon + 0(01^*1 + 00)^*01^*$

    (ii) $\epsilon + 0(10^*1 + 10)^*10^*$

    (iii) $\epsilon + 0(10^*1 + 00)^*0$

    (iv) $\epsilon + 0(01^*1 + 00)^*0$

    (v) $\epsilon + 0(10^*1 + 10)^*1$