Answer on Question#38225 – Math - Other

1) *Complement of a CFL need not be recursive.* False. All context-free languages are recursive.
2) *If L is recursive then L^* is also recursive.* True. Recursive languages are closed under the following operations. That is, if L is recursive language, then L^* is recursive as well.
3) *If L_1 is recursive and L_2 is recursively enumerable then $L_2 - L_1$ is need not be recursively enumerable.* True. Recursively enumerable languages are not closed under set difference or complementation. The set difference $L_2 - L_1$ may or may not be recursively enumerable. If L_1 is recursively enumerable, then the complement of L_1 is recursively enumerable if and only if L_1 is also recursive.
4) Recursive sets are closed under complement and substitution. True. Recursive languages are closed under the following operations: the intersection $L_1 \cap L_2$, the complement of L, the image $\varphi(L)$ under an e-free homomorphism φ (substitution).