Regular Expression Assignment

3. Construct a Regular Expression defining each of the following languages over the alphabet ∑ = {a,b}.

1.	All words in which ***a*** appears tripled, if not at all. This means that every clump of ***a***'s contains 3 or 6 or 9 or 12 …. ***a***'s.	
2.	All words that contain at least one of the strings $\mathbf{s}_1$, $\mathbf{s}_2$, $\mathbf{s}_3$, or $\mathbf{s}_4$.	
3.	All words that contain exactly three ***b***'s in total.	
4.	All words that contain with exactly two ***b***'s or exactly three ***b***'s.	
5.	All strings that end in a double letter.	
6.	All strings in which the letter ***b*** is never tripled. This means that no word contains the substring ***bbb.***	
7.	all strings that do not have the substring ***ab.***	
8.	all strings that do not have both the substrings ***bba*** and ***abb.***	
9.	all strings in which the total number of ***a***'s is divisible by three, such as ***aabaabbaba.***	

4. Describe in English phrases the languages associated with the following regular expressions:

1.	(a+b)* a (∧ + bbbb)	
2.	(a(a + bb)*)*	
3.	(a(aa)*b(bb)*)*	
4.	(b(bb)*)* (a(aa)*b(bb)*)*	
5.	((a+b)a)*	