1. Write a regular expression for the language comprising the set of all strings ending in b.

   Solution: .*b

2. Write a regular expression for the language comprising the set of all strings consisting of the letter a followed by any number of repetitions of the string bc, all repeated between 1 and 4 times.

3. Write a regular expression for the language comprising the set of all strings that have both the words grotto and raven in them, in either order.

4. Which of the following regular expressions are ill-formed? Why?

   a+  
   +a  
   (ab|)  
   (ab)|  
   [A-Z]  
   [A-]  
   [-Z]

5. Write a regular expression that will completely match the words telescope, Telescope, telescopes, telescoping, microscope, and microscopy, but not Microscope or telescopeing. Use no more than 30 characters to write your regular expression.

6. Is it possible to write a regular expression of length less than 42 characters which match telescope, microscope, telescoping, and microscopy, but rejects the word telescope and microscopy? If so, write one. If not, explain why. (Note: in case you know what backreferences are, you are NOT allowed to use them in this problem.)

   Solution: yes, it’s possible, e.g., (telescop(e|ing)|microscop(e|y)), which is 32 characters.