

QUIZ 7 (MATH2301, 2025)

Name: \_\_\_\_\_

UID: \_\_\_\_\_

(1) (6 points) Select either true or false. Let  $\Sigma = \{0, 1\}$ .

(a) The string 010001 matches the regular expression  $(0(0|1))^*$ .

True

False

(b) The string 110 matches the regular expression  $(\epsilon|0)1^*0$

True

False

(c) If  $r_1 = 01^*$  and  $r_2 = (01)^*$ , then  $L(r_1) = L(r_2)$ .

True

False

(d) If  $r_1 = 0(1^*|0^*)0$  and  $r_2 = (01^*0)|(000^*)$  then  $L(r_1) = L(r_2)$ .

True

False

(e) Any DFA must have at least one accept state.

True

False

(f) Any DFA must have at most one accept state.

True

False

(2) (2 points) Write down a regular expression whose language is exactly all those words in  $\Sigma^*$  that contain the string 101 as a (contiguous) substring.

(3) (2 points) Draw a DFA whose language is  $10^*$ .

1. SOLUTIONS

(1) (a) True

(b) True

(c) False

(d) True

(e) False

(f) False

(2)  $(0|1)^*101(0|1)^*$

(3) Here is a DFA.

