Test 2

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1. Basis: $\emptyset$, $\{\lambda\}$ + $\{a\}$ $\forall a \in \Sigma$
Recursive Step: Let X + Y be regular sets over Σ
The Sets: $X \cup Y$
XY
X^* are regular sets over Σ.
Closure: X is a regular set over Σ only if it can be obtained from the basis elements by a finite number of applications of the recursive step.

2. a. False
b. false
c. True
d. False
e. True
f False
g True
h False
i False
j true

★ 3 $(tr(str)^*s)^+$

4 A quintuple $M = (Q, \Sigma, \delta, q_0, F)$
1. Q is a finite set of steps
2. Σ is a finite set called the alphabet
3. $q_0 \in Q$ a distinguished state known as the start state
4. F a subset of Q called the final state
5. δ a total function from $Q \times \Sigma$ to Q known as the transition function

5 a. $\{\lambda\}$ $\Sigma = \{a, b\}$
b. $L = \{\varepsilon, a, b, ab, ba, aa, bb \dots\}$
$\Sigma = \{a, b\}$
C. True ★

$A^* + B^* + sell + B^* + l + B^* + \ldots$

d. $\Sigma = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$
e. $f = \{q_1, q_3\}$
f. No
g. 0, 5
h. 0, 5
i. 0-.... Only One before it reaches q_1
j. ∞
K $\Sigma = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$
$\mathcal{L}(\Sigma^* (1 \cup 2 \cup 3 \cup 4 \cup 6 \cup 7 \cup 8 \cup 9)^+)$ ends in anything other than 0 or 5

l. $10^3 + 10^2 + 10^1$
$1000 + 100 + 10 = 1110$
$4/5(1000) + 4/5(100) + (4/5)10 =$
$800 + 80 + 8 \boxed{= 888}$

elements elements
$0, 5 = 2 \div 10 = 1/5\ \%$

6 $A = \{e \cup o \cup v \cup s\}^*$

$e + A + sell + A + l + A + (o \cup V)^+ \cup v + A + sell + A + l + A + (e \cup o)^+$
$o + A + sell + A + l + A + (e \cup V)^+$

7 $(love + s(e + e^2 + e^3 + e^4 + e^5) + o + v)^*$