1. Solve the following problems using the operator method discussed in class and given in the notes:
   (a) Page 527, exercise 14
   (b) Page 552, exercise 30
   (c) Page 552, exercise 40

   If the roots of the recurrence are not integers, just get the form of the solution in each case for symbolic roots, together with the simultaneous equations that determine the coefficients.

2. Solve the following problems using secondary recurrences together with the operator method discussed in class and given in the notes:
   (a) Page 563, exercise 34
   (b) Derive all three cases of the Master Theorem on page 558 (we did part of this in class).
   (c) In the notes, the recurrence $T(n) = \sqrt{n} \cdot T(\sqrt{n}) + n$ is solved by a recursion tree (page 13 of the notes) and again by the “guess-and-confirm” method in section 1.6.3. Solve it by means of a secondary recurrence (section 1.5.3), together with the operator method.

3. (a) Prove that $1/89 = 1/10^2 + 1/10^3 + 2/10^4 + 3/10^5 + 5/10^6 + 8/10^7 + \cdots$. (Hint: $89 = 10^2 - 10 - 1$).
   (b) What reciprocal plays the same role base 8? Prove it.

Extra Credit—One bug

Solve the crossword puzzle on the back of this page and explain all of the “theme” words.
Crossword

When this puzzle is done, the 11 circled letters can be connected by a curved line to spell a two-word phrase appropriate to this puzzle’s theme.

ACROSS
1 Pipe part
5 Babycakes
9 Paper orders
14 Leonardo of
15 Out of killer
16 Have dinner at home
17 Food with a heart
19 Blue-collar worker
20 Popular online lectures about “Ideas worth spreading”
21 Aly’s love interest in a Woody Allen film
22 Father-and-daughter boxers
23 Pres., e.g.
25 Lingus
26 Midsize Kia
28 Cephalopod known for its shell
31 “I see!”
32 “Both work for me!”
33 Mathematical sequence related to a pattern found in a 17-, 29-, 42-, or 56-Across, informally

DOWN
1 Short row
2 Ring around a rim
3 Cornerstone abbr.
4 Tiki bar staple
5 “The Black ___” (2006 film)
6 They thought C-3PO was a god in “Return of the Jedi”
7 Scroll store
8 Pumpernickel grain
9 Badrige
10 Merit
11 Like much Schoenberg music
12 Surroundings
13 Mocking looks
14 Pacify
15 Homo sapiens, e.g.
24 Stupidity syllables
25 Speaker of stupid syllables
26-SAcross, e.g.
28-SAcross, e.g.

ANSWER TO PREVIOUS PUZZLE

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