Due: On Blackboard, 6pm, Friday, March 15

1. Solve the following problems using the operator method discussed in class and given in the notes:
   (a) Page 537, 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 $\frac{1}{89} = \frac{1}{10^2} + \frac{1}{10^3} + \frac{2}{10^4} + \frac{3}{10^5} + \frac{5}{10^6} + \frac{8}{10^7} + \cdots$.\(^{\text{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 (mathematician who wrote about the 33-Across)
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
29 Cephalopod known for its shell
31 “Now I see!”
32 “Both work for me!”
33 Mathematical sequence related to a pattern found in a 17-, 29-, 42- or 56-Across, informally
40 Sneeze producer
41 Cam button
42 Cochlea locale
45 Honolulu’s ___ Palace
48 “___ man walks into a bar…”
49 No. after a no.
50 Razor brand
51 Sayings of Jesus
52 No longer able to shoot
54 Some waffles
58 Van Gogh subject
59 Link with
60 Sauce that’s made “Old World Style”
61 Singer Bareilles with the 2007 top 10 hit “Love Song”
62 26-Across, e.g.
63 Yemeni port
64 Ship-to-ship communication

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 storers
8 Pumpernickel grain
9 Badminton
10 Merit
11 Like much Schoenberg music
12 Surroundings
13 Mocking looks
14 Pacify
23 Homo sapiens, e.g.
24 Stupidity syllables
25 Speaker of stupid syllables
27 Greek letter associated with the 33-Across
28 Web browser subwindow
29 More pleasant
30 Like oddly conjugated verbs: Abbrev.
32 Razzle-dazzle
34 Unbarred, to a bard
35 “Because I felt like it”
36 “A Clockwork Orange” narrator
37 Glass behind a radio microphone
38 Night of poetry
39 Chem. or biol.
40 They may start as sandbars
43 Knuckle-head move?
44 Pesterned
45 “You’ll enjoy this”
46 Said aloud
47 Old-time crooner
48 Julius
50 N.B.A. player/manager Danny
52 Itsy-bitsy bit
53 Pair
54 Sound of an air kiss
55 Architect
56 Heavy cart
58 Miguel’s Mrs.

ANSWER TO PREVIOUS PUZZLE

For answers, call 1-900-289-CLUE (289-2583), $1.49 a minute; or, with a credit card, 1-800-814-5550.

Online subscriptions: Today’s puzzle and more than 5,000 past puzzles, nytimes.com/crosswords ($39.95 a year).

Annual subscriptions are available for the best of Sunday crosswords from the last 50 years: 1-888-7-ACROSS.

Read about and comment on each puzzle: nytimes.com/wordplay.

Crosswords for young solvers: nytimes.com/learning/xwords.