Math 126B and 127: Final Exam Study Guide

Objectives in studying for the final:

I.   **Organize** the HUGE amount of knowledge and skill you've acquired in this course.

II.   Work to **identify** the type of problem and the technique to apply to it.

III.   **Practice** enough with specific problems that you refresh your memory on how to solve them.

Steps in studying for the final exam:

1. Go to the Table of Contents in your textbook. Identify the chapters and the sections you've studied throughout the course.

2. As you read the title of each section, mentally try to recall the concepts and the types of problems you did in that section. Use your old guidelines and old homework to refresh your memory. You're not solving problems at this point, just trying to recall the general ideas.

3. Find problems to redo from each chapter. Make sure there are problems from each of the sections studied. A list of problems is given below, but if your instructor in future classes doesn't provide specific review problems, find some of your own from the reviews at the end of each chapter.

4. Try to solve the problems without looking at your notes or your old homework. If you can't, then solve the problem with help from notes/teacher/friends then MENTALLY review the steps you went through until you can picture how to solve the problem without peeking at notes or getting help.

Review Problems (hand in as part of your homework grade):
page 187: 42, 43, 44, 53, 34, 62, 66, 68, 71
page 276: 13, 14, 15, 18, 23, 24, 31, 37   page 293: 60, 61
page 292: 21 - 29 odd, 57, 59
page 379: 13, 15, 18, 23, 24, 31, 35, 36   page 892: 3
page 456: 1, 6, 7, 8, 10, 14, 19, 20, 21, 23

page 181: 63-70 ALL
page 185: 16 – 20 ALL
page 541: 1 – 12 ALL, 26a, 28 – 36 ALL, 38
page 631: 1 – 3 ALL; 5-14 ALL, 23 – 26 ALL,
page 630: 79
page 631: 15 – 19 ALL
page 730: 3, 9, 13, 15, 19, 21, 25, 29, 31, 37, 39, 45, 47, 51 – 71 odd, 73 – 125 odd (skip #111), 129,131, 133, 137
page 869: 1 – 17 odd; 21 – 35 odd; 97, 99

Formulas to have memorized: All line equation formulas: Standard, Slope-Intercept, Point-Slope; the slope formula; the Quadratic Formula; the formula for the Discriminant; and the formula for the Standard Form of a Quadratic Function (parabola); the Rules of Logarithms; the Binomial Theorem.

As a rule of thumb, any formula you have to use to solve any of the problems in the review you should memorize.

Note: Plan to study over at least two or three days.
Preparing for the final should take you several hours of study.
Take breaks when your brain gets fatigued then get back at it.

Math 127   **Final Review I**

1.   Solve $\dfrac{x}{x-4} - \dfrac{12x}{x^2 + x - 20} = \dfrac{x-1}{x+5}$

2.   Solve using the quadratic formula: $x^2 - 2x = -3$

3.   Solve $x^{-2} - 12x^{-1} + 35 = 0$

4.   Write the first four terms of the sequence $\left\{ (-1)^n \left(\dfrac{1}{2n+3} \right) \right\}$

5.   Write as an expanded sum and evaluate $\displaystyle\sum_{k=2}^{7} (4k - 1)$

6.   Expand $(2x + y)^6$ using the Binomial Theorem.

7.   The safe load, L, of a wooden beam supported at both ends varies directly as the width, w, and the square of the depth, d; and inversely as the length, l.   A beam that is 4 inches wide, 6 inches deep and 144 inches long supports a load of 4800 feet safely. What is the safe load of a beam of the same material that is 6 inches wide, 10 inches deep and 180 inches long?

8.   Kirk can bike 32 miles in the same amount of time that his twin brother Karl can bike 24 miles. If Kirk bikes 2 mph faster than Karl, how fast does each man bike?

9.   Toni needs four hours to complete the yard work. It takes her husband Sonny 6 hours to do the work. How long will it take them together?

10.   Sketch $y = \left(\dfrac{1}{5} \right)^x$

11a.   Write $y^t = m$ in logarithmic form   11b.   Write $\log_{1/2} 64 = -6$ in exponential form

12.   Solve for x: $\log_x \dfrac{1}{9} = -2$

13a.   Expand $\log_3 \left(\dfrac{r \sqrt[3]{b}}{m^5} \right)$ as much as possible.

13b.   Write $6 \log x - \dfrac{1}{2} \log y - \log z$ as a single log

14.   Solve $5 \log x = 9.4$

15.   Solve $\log(x+4) + \log(x - 4) = \log 9$

16a. Solve the following inequality and graph the solution on the number line: $|x + 6| \geq 4$

16b. Solve $2\left|\dfrac{x}{4} - 3\right| + 6 = 10$

17. Let $y = x^2 + 6x + 5$.   a. Find the vertex   b. Find the x-intercepts.
                               c. Define the domain and range   d. Graph the parabola

18. $f(x) = x^2 + 3x - 2, \quad g(x) = 4x - 1$
     a. Find $f + g, \ f - g$ b. find $f(g(x))$ and $g(f(x))$ c. Find the domain of $(f/g)(x)$

19. Simplify $\dfrac{\dfrac{1}{x}}{1 - \dfrac{1}{x-2}}$

20. Simplify $\dfrac{3x - 4}{x^2 - x - 20} - \dfrac{2}{5 - x}$

21a. Find an equation in slope-intercept form for the line passing through the points (-3,4) and (2,1).

21b. Find an equation for the line perpendicular to $2x + 3y = 12$ and passing through (-4,-2).

22. Find the value of the following without a calculator

     a. $25^{-3/2}$ b. $1000^{4/3}$ c. $\left(\dfrac{49}{16}\right)^{-1/2}$

22 Simplify the following. Leave your answer in rational exponent form

     d. $8x^{2/3}x^{1/2}$ e. $\left(4x^{-2}y^{10}\right)^{-1/2}$ f. $\dfrac{a^{1/2}a^{-3/4}}{a^{-1/2}}$

23. Solve the following system of linear inequalities graphically $3x + 4y \geq -7$
                                                                  $y < 2x + 1$

24. Solve the following $x - 2y - z = -3$
                                     $3x + y + 5z = -4$
                                     $-x + 4y - 2z = 15$

25. Sally has 23 coins including nickels, dimes and quarters. She has two more dimes than quarters, and the total value of the coins is \$2.50. How many of each coin does she have. (**Just set up a system of 3 equations in three variables.**)

Final Review #1 Key

Check your answer. If you answered incorrectly, you should do the problems in bold, and possibly more from that section.

1. $x = -2$ **(P 423 #37, 39, 41, 43)**

2. $x = 1 \pm i\sqrt{2}$ **(P 567 #13, 23)**

3. $x = \dfrac{1}{7}; x = \dfrac{1}{5}$ **(P 584 #3, 13, 17)**

4. $\dfrac{1}{5}, \dfrac{1}{7}, -\dfrac{1}{9}, \dfrac{1}{11}$ **(P 824 #3, 15, 19, 21)**

5. $7 + 11 + 15 + 19 + 23 + 27 = 102$ **(P 830: 13, 23)**

6. $64x^6 + 192x^5y + 240x^4y^2 + 160x^3\,y^3 + 60x^2y^4 + 12xy^5 + y^6$ **(P 863 #31, 35)**

7. $L = \dfrac{kwd^2}{l} \rightarrow L = 16{,}000$ lbs.   **(P 443 #25, 27, 29, 31)**

8.   Kirk bikes 8 mph and Karl bikes 6 mph.   **(P 433: #21, 23, 25)**

9.   It will take them 2.4 hours.   **(P 433 #17, 23)**

10.   See solution to 8.3, #3 in the text.   **(P 679, #1, 6, 11)**

11a. $\log_v m = t$ 11b. $\left(\dfrac{1}{2}\right)^{-6} = 64$ **(P 688, 1, 5, 31)**

12. $x = 3$ **(P 707: #5, 9, 11, 37, 43)**

13a $\log_3 x + \dfrac{1}{3}\log_3 b - 5\log_3 m$ 13b. $\log\left(\dfrac{x^6\sqrt{y}}{z}\right)$ **(P 698: #19, 29, 33, 45)**

14. $x = 75.85776$ **(P 715: #27, 47, 57, 67, 75)**

15. $x = 5$ **(See #14)**

16a.   See Text 1.7, #83   16b. $x = 4$ or $x = 20$ **(P 86: 83, 87)**

17.   See Text 7.5, #29   **(P 600, #13, 27, 31)**

18a. $(f+g)(x) = x^2 + 7x - 3$ $(f-g)(x) = x^2 - x - 1$ **(P 647: 15,35)**

18b. $f(g(x)) = 16x^2 + 4x - 4$ c. $x \neq \frac{1}{4}$ **(P 664: 5, 25, 31)**

19. $\dfrac{x-2}{x(x-3)}$ **(P 405: # 11, 19, 35, 45)**

20. $\dfrac{5x+4}{(x-5)(x+4)}$ **(See #19)**

21a. $y = -\dfrac{3}{5}x + \dfrac{11}{5}$ 21b. $y = \dfrac{3}{2}x + 4$ **(P 141: 7, 25, 36, 41)**

22.   a. $\dfrac{1}{125}$ b. 10,000   c. $\dfrac{4}{7}$ d. $8x^{7/6}$ e. $\dfrac{x}{2y^5}$ f. $a^{1/4}$ **(P 486: 1,12,17,20,47,61)**

23.   See Text, 3.7, #13   **(P 261: 7, 11, 19)**

24.   (1, 3, -2)   **(P 220: #3, 11)**

25. n = # nickels; d = # dimes; q = # quarters
       $n + d + q = 23$; $.05n + .10d + .25q = 2.50$; $d = q + 2$ **(P 221: 21, 23, 27)**