Math 06 Practice Final, Spring 2013.

The final covers the entire syllabus. Show all your work clearly with a box around the answer. There will be lots of partial credit if I can see what you are doing. Use your calculator if you need it. Do all 20 questions in 1 hour 50 minutes.

Evaluating.

Q1. Find exactly: **(a)** $\sqrt[5]{32}$ **(b)** $\sqrt{50} - \sqrt{72}$ **(c)** $27^{-1/3}$ **(d)** $(1/3)^{-2}$ **(e)**$(-8)^{4/3}$

Q2. Find exactly: **(a)** 8^2 **(b)** $\log_2 8$ **(c)** $\log_8 2$

Algebra.

Q3. Divide and simplify: $\dfrac{6y+18}{4y} \div \dfrac{3y+9}{16y^3}$

Q4. Subtract and simplify: $\dfrac{x^2+2}{x(x+1)} - \dfrac{x-1}{x^2}$

Q5. Simplify: **(a)** $\dfrac{\sqrt{3}+1}{\sqrt{3}-1}$ **(b)** $\sqrt{27x^3y^6}$

Q6. Write each of these as complex numbers in standard form: **(a)** $\dfrac{1+i}{4-i}$ **(b)** $(7+2i)^2$

Q7. Simplify: $\left(\dfrac{2xy^{1/6}}{x^4z^{-3}}\right)^3 \quad x, y, z > 0$

Q8. Simplify: $\dfrac{3 + \dfrac{1}{x^2-1}}{3 - \dfrac{2x}{x+1}}$

Solving.

Q9. Solve $3x^2 + 12x = 12$ by completing the square.

Q10. Solve: $\dfrac{x}{x-3} - 2 = \dfrac{3}{x-3}$

Q11. Solve: $\sqrt{5x+5} = x+1$

Q12. Solve: **(a)** $3^{x+2} = \dfrac{1}{27}$ **(b)** $\log_b \dfrac{3}{7} = -1$ **(c)** $\log_{1/2} 4 = x$

Graphing.

Q13. Graph $y = -x^2 - 5x - 4$ by finding the axis of symmetry, vertex, y intercept and a symmetric point.

Q14. Graph $y = \frac{-1}{2}\sin x$ for $-2\pi \leqslant x \leqslant \pi$ and give its amplitude.

Q15. Graph $3^x + 2$ and find the horizontal asymptote.

Trigonometry.

Q16. The central angle θ of a circle of radius 12 inches determines a sector of area 6 square inches. Give the size of θ in both degrees and radians.

Q17. Find exactly: $\sin\dfrac{\pi}{3} + \cos\dfrac{\pi}{4}\tan\dfrac{3\pi}{4}$

Q18. **(a)** If $\cos\theta = 1/3$ and $\tan\theta < 0$, find $\sin\theta$ and $\sin\theta$ exactly.
(b) Find all solutions to $\cos x = 0.81$ for $0 \leqslant x \leqslant 360°$.

Q19. What is the angle of elevation of the moon, to the nearest degree, if it gives a 5 foot wall a 2 foot shadow?

Q20. Verify the identity:

$$\sec x - \frac{\cos x}{1 + \sin x} = \tan x$$

The above questions are similar to ones that will appear on the actual final, but you should also review homework, midterm and test questions. A further review sheet with answers is available on the class web page.