

STATE OF NEW YORK  
MAT 104: Sample Final Exam

**General Instructions:** Answer each question in the blue book provided. Partial credit will be given, so show all your work. Calculators are NOT Permitted.

**Scoring:** All problems are worth 4 points each.

1. Solve for x:  $7 - 3x \geq 31$
2. Write an equation of the line through (3, -4) and perpendicular to the line  $6x + 2y = 9$ .
3. Multiply and combine like terms:  $(x^2 - 4x + 7)(x + 3)$ .
4. Combine and simplify, using positive exponents only:  $(-4a^{-2}b^3)^{-3}(8ab)^2$
5. Write .00000000405 in scientific notation.
6. Factor completely:  $24x^4 - 54x^8$ .
7. Solve for x. Leave your answer in radical form:  $x^2 - 4x = 3$ .
8. Combine into a single fraction:  $\frac{x+6}{x^2+x-20} - \frac{3}{x-4}$
9. Divide and simplify your answer:  $\frac{x^2+x-6}{10x^2} \div \frac{x^2-9}{2x^8}$
10. Simplify:  $\frac{\frac{1}{x^2} + \frac{5}{x} + 6}{2x+1}$ .
11. Solve for x:  $125^x = 25^{(x+2)}$
12. If  $f(x) = 3x - x^2$ , find the value of  $f(-3)$ .
13. Find the vertex of the parabola  $y = 4x + x^2$ .
14. A ladder 18 feet long leans against a wall. The foot of the ladder makes an angle of  $65^\circ$  with the ground. How far up the wall will the ladder reach? ( $\sin 65^\circ = .91$ ,  $\cos 65^\circ = .42$  and  $\tan 65^\circ = 2.14$ )
15. Simplify:  $\frac{\log_4 8}{\log 1000}$ .