

Math 101/120 Common Final Exam
Sample 3

1. Simplify: $\frac{6x^4y^3(x^{-6}y^9z^{-3})}{(4x^{-2}y^6z^3)^2}$
2. Find the equation of the line through (6,-3) and (3,2). Put your answer in slope intercept form.
3. Simplify: $(3\sqrt{6} - \sqrt{2})^2$
4. If $f(x) = x + 5$ and $g(x) = x^2 + 4x - 6$, find and simplify: $(g \circ f)(x)$
5. In an arithmetic sequence, $a_3 = 0$ and $a_7 = 12$, find S_{10}
6. How many years would it take \$15,000 to increase to \$18,000 compounded continuously at 2.5%? Round your answer to the nearest tenth.
7. If $f(x) = \frac{4x+3}{5x-1}$, find the equation of the inverse. (Write the inverse using $f^{-1}(x)$ notation.)
8. Graph: $y = -x^2 + 4x + 5$
9. Simplify: $\frac{1 + \frac{2}{x} - \frac{8}{x^2}}{1 - \frac{8}{x^3}}$
10. Find all of the solutions: $2x^2 - 7 = 6x$
11. Solve the following system: $x^2 + 2y = 11$
(Do not graph) $x - 2y = -5$
12. The sum of the squares of two consecutive negative odd integers is 202. Find both integers.
13. Solve and graph the solution: $x^2 + 6x > 7$
14. Solve: $\log_6(x + 1) + \log_6(2x + 1) = 2$

15. Find the 12th term in the expansion of $(3x - y)^{13}$ Expand it completely.
16. The length of a rectangle is 1 inch less than 3 times the width. If the perimeter is 38 inches, find the length and width.
17. Solve: $x^{2/3} + x^{1/3} - 6 = 0$
18. Find and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$ for the function $f(x) = x^2 - 2x + 3$
19. Solve: $\sqrt{2x+5} = \sqrt{2x-1}$
20. Graph: $9x^2 + 4y^2 + 36x - 32y + 64 = 0$
21. Divide and write in standard form: $\frac{2+i}{3-2i}$
22. Given the system: $x - 2y + 2z = 0$
 $2x + 3z = -7$ Use Cramer's rule to solve for z only.
 $6x + y + 3z = 6$
 $D =$ $D_z =$ $z =$
23. A hot water faucet fills a sink in 5 minutes, while a cold water faucet fills it in 4 minutes, and a drain empties it in 2 minutes. If the sink is full, and both faucets and the drain are open, how long does it take to empty the sink?
24. Solve for x: $\frac{6}{x^2 - 9} = \frac{1}{x - 3} - \frac{1}{5}$
25. Graph showing at least three points including intercept(s): $y = 3^{x-1}$
26. Solve and write the solution in interval notation: $|3x - 1| - 2 < 6$
27. Lena has \$40,000 invested in two accounts. One paid 4% interest and the other paid 5%. How much did she have in each account, if she earned \$1,720 in interest in one year?