

MATH 124 - Exam 2 Review

1. Find the vertex, intercepts, domain, and range: $f(x) = -(x - 3)^2 + 1$
2. Find the vertex, intercepts, domain, and range: $f(x) = x^2 - 2x - 15$
3. Find the vertex, intercepts, domain, and range: $f(x) = (x - 3)^2 + 2$
4. Find the zeros, y-intercept, sketch a rough graph: $f(x) = x^3 + 4x^2 + 4x$
5. Find the zeros, y-intercept, sketch a rough graph: $f(x) = x^3 + x^2 - 4x - 4$
6. Find the zeros, y-intercept, sketch a rough graph: $f(x) = x^4 - x^2$
7. Suppose that you have \$6000 to invest? Which investment yields the greater return over 4 years: 8.25% compounded quarterly, 8.3% compounded semiannually or 8.2% compounded continuously?
Support your answer.
8. Write in exponential form: $\log_b 27 = 3$
9. Write in logarithmic form: $15^2 = x$
10. Evaluate: $\log_3 \frac{1}{9}$
11. Evaluate: $\log_8 9$
12. Use logarithmic properties to expand and re-write: $\log_b \left(\frac{x^3 y}{z^2} \right)$
13. Use logarithmic properties to condense and re-write: $8 \ln(x + 9) - 4 \ln x$
14. Solve for x : $5^{3x-1} = 25$
15. Solve for x : $4^x = 32$
16. Solve for x : $5^{2-x} = \frac{1}{125}$
17. Solve for x , round to 2 decimal places: $3^x = 32$

18. Solve for x , round to 2 decimal places: $4e^{2x} = 44$
19. Solve for x , round to 2 decimal places: $5^{x-3} = 137$
20. Solve for x : $\log_2(4x + 1) = 5$
21. Solve for x : $\log_6(x + 5) + \log_6 x = 2$
22. If there are initially 1,000 bacteria in a culture, and the number of bacteria doubles each hour, the number of bacteria after t hours can be found using the formula: $N = 1000(2)^t$
- (a) How many bacteria are present in the culture after 10 hours?
- (b) How long will it take for the culture to grow to 30,000 bacteria?
Round to 2 decimal places.
- (c) If the initial number of bacteria is 4500, when will the number of bacteria in the culture reach 50,000? Round to 2 decimal places.
- (d) If after 5 hours the culture contains 4448 bacteria, how many bacteria were present initially?
23. The exponential decay model, $A = A_0e^{-0.000121t}$ describes the amount of carbon-14 present after t years. Skeletons were found in a construction site in San Francisco. The skeletons contained 88% of the expected amount of carbon-14 that would be found in a living person. How old were the skeletons? Round to the nearest number of years.
24. Since 1993, the number of homicides in New York City has been on the decline. The number of homicides can be approximated by the function $f(t) = 1997 - 1576\log(t + 1)$ where t is the number of years since 1993. Use this function to estimate the number of homicides in New York City in 1993 and in 2004.
25. How long will it take for \$5000 to grow to \$8000 at 6% interest compounded annually? Continuously? Round to 2 decimal places.