

These are some review questions for Exam #2. If you can successfully complete these TYPES of questions, you should be well prepared for the exam.

1. Consider the function $y = x^2 - 8x + 12$
 - (a) Does the parabola open up or down? Is the vertex a min or max?
 - (b) Find the coordinates of the vertex. Write the answer as an ordered pair.
 - (c) Find the y-intercept. Write the answer as an ordered pair.
 - (d) Find the x-intercepts, if any exist. Write the answer(s) as an ordered pair(s).
 - (e) Using the above answers graph the function.
2. The total revenue R earned (in thousands of dollars) from manufacturing handheld video games is given by $R(p) = -25p^2 + 1200p$ where p is the price per unit. Find the revenue earned for the price \$20 per unit. Find the unit price that will yield a maximum revenue.
3. Find all the real zeros of the polynomial $f(x) = x^3 + 6x^2 + 9x$. Determine the multiplicity of each zero and the number of turning points of the graph of the function.
4. Sketch the graph of the function $f(x) = -x^3 + x^2 - 2$ by: applying the leading coefficient test, finding the zeros of the polynomial, and plotting extra points to complete the graph.
5. Find a polynomial with degree 5 that has zeros: $-3, 1, 5, 6$.
6. Use long division to divide $\frac{6x^4 + 10x^3 + 13x^2 - 5x + 2}{2x^2 - 1}$.
7. Use synthetic division to divide $\frac{2x^3 - 19x^2 + 38x + 24}{x - 4}$.
8. Verify that $(x - 4)$ is a factor of the function $f(x) = x^3 + 4x^2 - 25x - 28$ and find the remaining factors of $f(x)$. Write the complete factorization of $f(x)$ and list all zeros.
9. Perform the operations and write the result in standard form.
 - (a) $(10 - 4i) - (3 + i)$
 - (b) $(12 - 5i)(2 + 7i)$
10. Write the quotient $\frac{7+i}{2-5i}$ in standard form.
11. List all possible rational zeros of $f(x) = 3x^3 - 20x^2 + 7x + 30$.
12. Find a polynomial function with real coefficients that has zeros: $2, -3, 1 - 2i$.
13. Use the zero $2 + i$ to find all the zeros of $f(x) = 2x^4 - 3x^3 - 13x^2 + 37x - 15$.
14. Use the rational zero test to find all zeros of the function $f(x) = x^3 - 4x^2 + x - 4$.
15. Use Descartes's rule of signs to determine that possible numbers of positive and negative zeros of $h(x) = -2x^5 + 4x^3 - 2x^2 + 5$.

16. Identify the horizontal and vertical asymptotes of $f(x) = \frac{4}{x+3}$.
17. Consider $h(x) = \frac{4}{(x-1)^2}$
- State the domain of the function
 - Identify all intercepts
 - Find any vertical and horizontal or slant asymptotes
 - Plot some additional solution points as needed
 - Sketch the graph of $f(x)$
18. Repeat the above question for $f(x) = \frac{x^2+1}{x+1}$.
19. Use the graph of $f(x) = 10^x$ to describe the transformation that yields $h(x) = 10^{-x+3}$.
20. Use the One-to-One property to solve
- $\left(\frac{1}{5}\right)^{x+1} = 125$
 - $\log(5x - 23) = \log 17$
21. (a) Write $4^{-3} = \frac{1}{64}$ in logarithmic form.
(b) Write $\log_3 81 = 4$ in exponential form.
22. Find the domain, x-intercept, and vertical asymptote of $y = \log_5(x - 1) + 4$. Use this information to sketch the graph.
23. Use the change of base formula to evaluate $\log_4 9$ twice; once with the common log and once with that natural log.
24. Use properties of logarithms to expand $\ln\left(\frac{x+3}{xy}\right)$ as multiple logarithms.
25. Use properties of logarithms to condense $5 \ln(x - 2) - \ln(x + 2) - 3 \ln x$ into a single logarithm.
26. Solve the following equations algebraically.
- $\log(-x - 4) = 2$
 - $2^x + 13 = 35$
27. The population P of South Carolina (in thousands) from 1990 through 2003 can be modeled by $P = 3499e^{0.0135t}$, where t represents the year, with $t = 0$ corresponding to 1990. According to this model, when will the population reach 4.5 million? Your answer need not be simplified, but you must isolate the variable you are trying to find.
28. A deposit of \$10,000 is made in a savings account for which the interest is compounded continuously. If the balance will double in 5 years, what is the interest rate for this account? Your answer need not be simplified, but you must isolate the variable you are trying to find.