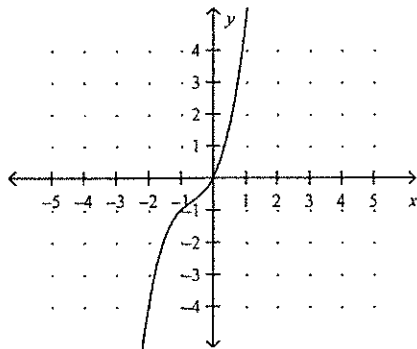


Precalculus Semester 1 Exam review**Short Answer**

- For the function $f(x) = \sqrt{x-10}$, find
 - $f(13)$.
 - $f(-a)$.
- Select the correct description of the sequence:
 $\{-2, -3, -4, -5, -6, \dots\}$
- Find the sum of $\sum_{k=1}^{27} (7k - 5)$.
- Determine whether the sequence is arithmetic, geometric, or neither.
 $-6, -0.6, 4.8, 10.2, 15.6, \dots$
- Find the common ratio for geometric sequence $5\left(\frac{1}{3}\right)^{n-1}$.
- Use the x -intercept method to find all real solutions of the equation.
 $x^3 - 9x^2 + 11x + 21 = 0$
- Determine the nature of the roots: $3x^2 - 6x + 3 = 0$
- Solve the equation.
 $6x = 3x^2 + 1$
- Find all real solutions of the equation $\sqrt[3]{4x+1} + 9 = 8$.
- Find all real solutions of the equation $0 = \frac{x^2 + 1x - 20}{x - 4}$.
- Which of the following represents $3 < x \leq 11$?
- Solve the inequality and express your answer in interval notation.
 $-2 \leq 3x - 5 \leq 7$
- Find all local maxima and minima and points of inflection of the function.
 $f(x) = -x^3 - 3x^2 + 24x - 6$
- Determine the x -intercepts of the quadratic function $f(x) = \frac{6}{7}\left(x - \frac{8}{9}\right)\left(x + \frac{7}{5}\right)$ and determine if its graph opens up or down.
- Determine the x -intercepts and the vertex of the graph of the quadratic function
 $f(x) = x^2 + 8x + 15$.
- What is the function $f(x) = x^2 + 12x + 45$ in transformation form?
- Given $f(x) = 2x^2$ and $g(x) = 1-5x$, find $(g \circ f)(x)$ and its domain.

18. Find the inverse of the function $f(x) = \frac{20x - 13}{9}$.
19. For the function $f(x) = 5x^2 - 3x$, find
 a. the difference quotient.
 b. the average rate of change over the interval 2 to 2.5.
20. Which is the quotient and remainder found when dividing $-6x^3 - 9x^2 - 7x - 9$ by $2x + 1$?
21. Determine the maximum number of zeros of the polynomial function $2x^3 - 3x - 3$.
22. Perform the indicated operation and write the result in the form $a + bi$.
 $-8i(-6i + 2) + 7(-2 + 6i)$
23. Perform the indicated operation and write the result in the form $a + bi$.
 i^{96}
24. Find the complex conjugate of $5 - 8i$.
25. Solve the equation and express each solution in $a + bi$ form.
 $x^4 - 8x^2 - 48 = 0$
26. Find all the complex zeros of the polynomial function $f(x) = x^2 + 6x + 13$.
27. Use a calculator to evaluate $4^{\sqrt{5}}$ to the nearest ten thousandth.
28. Which is the rationalized form of the expression $\frac{\sqrt{x}}{\sqrt{x} - \sqrt{13}}$?
29. If \$4000 is invested at an interest rate of 7%, compounded continuously, determine the balance in the account after 3 years. Use the formula $A = Pe^{rt}$.
30. Write an exponential function to model the situation. Then predict the value of the function after 5 years (to the nearest whole number).
 A population of 360 animals that decreases at an annual rate of 16%.
31. Use your knowledge of polynomial functions to match one of the functions to the graph below.



32. Find the value of $\ln 23$.

33. Find the exact value of $\ln \sqrt[5]{e}$.
34. Solve for x . Round to the nearest hundredth.
 $10^x = 38$
35. Which is $4 \log x + 5 \log(x + 4)$ written as a single logarithm?
36. Which is the solution to $8^x = 7^{x+5}$?
37. The number of bacteria present in a culture after t minutes is given as $B = 100e^{kt}$, where k is a constant. If there are 5984 bacteria present after 3 minutes, find k .
38. The half-life of a radioactive element is 141 days, but your sample will not be useful to you after 90% of the radioactive nuclei originally present have disintegrated. Using the half-life function $M(x) = c(0.5)^{\frac{x}{k}}$, about how many days you can use the sample?
39. Find the k th partial sum of the arithmetic sequence $\{u_n\}$ with a common difference d .
 $k = 14, u_1 = -2, d = 6$
40. The population of a Midwestern suburb is growing geometrically. The chart shows its population from 1992 to 1995. Use $n = 1$ to represent 1992.

Year	1992	1993	1994	1995
Population	5900	6313	6755	7228

- a. Find an explicit formula for P_n .
- b. Find a recursive formula for P_n .
41. Find all real solutions of the equation $\left| \frac{5}{6}x + 8 \right| + 7 = 8$.
42. Determine the domain of the function.
 $h(x) = \frac{7x}{x(x^2 - 9)}$
43. Write $\sqrt{19xy^3}$ in an exponential form.
44. A population of bacteria is exposed to kanamycin, a toxin that inhibits protein synthesis. After t hours of treatment with kanamycin, the population is $10^{9-t} + 10^4$. How many bacteria are left after 5 hours? After 7 hours? What happens after a very long time?
45. Cheryl invests \$380 at 7% compounded continuously.
- a. Write an exponential function to model the situation.
- b. At what time will the total reach \$800?
46. Find the value of $\log 0.00001$.
47. Given $\log 8 = 0.903$ and $\log 7 = 0.845$, find $\log \frac{8}{7}$.
48. Solve $\ln x = 2 + \ln(x - 4)$. Give the exact answer then use a calculator to find an approximate answer.
49. Use the intersect method to solve the equation.
 $x^2 - 1 = -x^2 + 7$

