All questions worth 5 points except where noted.
No work = No credit.

1. Draw a Venn diagram with the sets of Natural, Whole, Integers, Rational, Irrational and Real numbers. Include at least 2 examples in each set.

2. Specify the domain of \( \frac{x - 5}{x^3 + 2x^2 - 25x - 50} \).

3. For the set given by \( \{x \mid x \leq 12\} \), write in interval notation and graph the interval.

4. Convert \( 2.75 \times 10^{-6} \) to decimal notation.

5. Convert 89,000,000 to scientific notation.

6. Compute \( \frac{2.5 \times 10^{-8}}{3.2 \times 10^{14}} \) and write the answer in scientific notation.

7. Give an example of a polynomial in one variable of degree 5. What is your leading coefficient? Is the polynomial even or odd?

8. Factor \( y(x) = 8x^2 - 30x + 18 \) using the quadratic formula. What are the roots of the equation?

9. Simplify \( \frac{x}{x^2 - 1} - \frac{3}{x^2 + 4x - 5} \).

10. Simplify \( (-3a^5b^{-4})(5a^{-7}b^3) \).

11. Simplify \( \frac{y - x}{x + y} \).

12. If \( x < -8 \), find \( |x| \)

13. Factor \( a^2b^2 - ab - 6 \)
14. Divide and simplify \( \frac{3x^2 - 12}{x^2 + 4x + 4} \div \frac{x - 2}{x + 2} \)

15. Write the expression with a single exponent \( \sqrt[3]{(a + b)^3} \div \frac{\sqrt{a + b}}{\sqrt[3]{(a + b)^2}} \)

16. Indicate why you cannot solve the problem \( \frac{\sqrt[(a + b)^3]}{\sqrt[(a + b)^2]} + \frac{\sqrt[3]{a + b}}{\sqrt[(a + b)]} \) in the same way as #15.

17. Multiply \((a^n - b^n)^3\) and simplify.

18. Convert \(\sqrt[3]{\frac{m^{32} n^{16}}{3^8}}\) to exponential notation.

19. Compute the following to 3 decimal places:
   a) \(\pi^2\)
   b) \(\left( \frac{12 - 7}{3} \right)^{5 - 2}\)
   c) \(\frac{5 + \sqrt{(-5)^2 - 4(2)(1)}}{2(2)}\)

20. Find the distance between the points on the line \(y(x) = 2x - 4\) for \(x = 1\) and \(x = 4\).