Math 150 Week in Review 1 Problem Set

1. For the following, list of numbers, classify each according to what type(s) of number(s) it is.

   \(-7, 0.46, 0.78\sqrt{4}, \pi^2, \sqrt{81}, \sqrt{8}, 1, \frac{12}{7}\)

   • Natural Numbers:
   • Integers:
   • Rational Numbers:
   • Irrational Numbers:

2. Graph the following sets and write the solution in interval notation.

   (a) \((-12, 3) \cup (-11, 4]\)
   (b) \((\frac{4}{15}, \infty) \cap [\frac{9}{25}, 1]\)

3. Evaluate \(\frac{|-3 - |-2|| - 7|}{\frac{2}{9}}\).

4. Find the distance between the points \(-\frac{5}{21}\) and \(-\frac{11}{18}\).

5. Simplify the following expressions and eliminate any negative exponents. Assume all variables denote positive numbers.

   (a) \(\left(\frac{2x^2y^{-4}}{x^{-3}y^6}\right)^{-4}\left(\frac{3x}{y}\right)^2\)
   (b) \(\left(-32x^3y^{-2}\right)^{-2/5}\left(81x^2y^5\right)^{-3/4}\)

6. Write the following as a single power of \(x\). Assume \(x\) denotes a positive number.

   \(\frac{\sqrt[5]{x^5} \sqrt{x^7}}{\sqrt{x^3}}\)

7. Simplify the following expressions.

   (a) \(\sqrt{18a^{12}b^{10}}\)
   (b) \(\sqrt[3]{24x^{22}} + \sqrt[3]{81x^{16}}\)

8. Expand and simplify

   (a) \((x^3y - xy + y^3)(x^2y^2 - 3x^4)\)
   (b) \((2x + 3)^3 - (6x - 5)^2 + (7x - 4)(7x + 4)\)

9. Factor the following expressions completely.

   (a) \(9x^3 - 36x^2 - 25x + 100\)
   (b) \(16(2x - 1)^2 + 40(2x - 1) + 25\)
   (c) \(2x^{13/5} - 128x^{-2/5}\)

10. Find the domain of the following rational expressions. Write your answer in interval notation.
11. Perform the operation and simplify

(a) \( \frac{3x^2 - 13x - 10}{x^2 - 2x - 15} \cdot \frac{12}{5x^2 - 21x + 4} \)

(b) \( \frac{x}{x^2 - 16} + \frac{3}{x^2 - 8x + 16} - \frac{1}{x + 4} \)

12. Simplify these compound fractions.

(a) \( \frac{1}{x+y} \cdot \frac{1}{x+y} \) 

(b) \( \frac{2(x - 2)^{-3/4} + (x - 2)^{2/3}}{(x - 2)^{5/4}} \)

13. Rationalize the denominators of the following expressions.

(a) \( \frac{7}{\sqrt{x^3}} \)

(b) \( \frac{\sqrt{x}}{\sqrt{x + h} - \sqrt{x}} \)