

**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.

$$-7, 0.46, 0.78\overline{94}, \pi^2, \sqrt{81}, \sqrt[4]{8}, 1, \frac{12}{7}$$

- 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)  $(\frac{4}{15}, \infty) \cap [\frac{9}{35}, 1]$

3. Evaluate  $\left| \frac{|-3 - |-2|| - 7|}{\frac{2}{9}} \right|$ .

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)  $\frac{(-32x^3y^{-2})^{-2/5}}{(81x^2y^5)^{-3/4}}$

6. Write the following as a single power of  $x$ . Assume  $x$  denotes a positive number.

$$\frac{\sqrt[6]{x^5} \sqrt[3]{x^7}}{\sqrt[4]{x^3}}$$

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.

(a)  $\frac{x^3 - 3x^2 + 1}{x^4 + 2}$

(b)  $\frac{x^2 - 9}{x^2 - 25}$

$$(c) \frac{\sqrt{x-4}}{x^2-7x+10}$$

$$(d) \frac{\sqrt[3]{x+2}}{4x^2+28x+49}$$

$$(e) \frac{x-5}{\sqrt[6]{x+6}}$$

11. Perform the operation and simplify

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

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

12. Simplify these compound fractions.

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

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

13. Rationalize the denominators of the following expressions.

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

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