

Math 150 Week-in-Review 1 Problem Set

1. For the following, list of numbers, classify each according to what type of number 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. Write the number $0.3\overline{567}$ as a fraction of integers.

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

(a) $(-12, 3) \cup (-11, 4]$

(b) $\{x \mid x < 2\} \cap \{x \mid -5 \leq x < 3\}$

(c) $(\frac{4}{15}, 2] \cap [\frac{9}{35}, 1]$

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

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

6. Simplify the following expressions and eliminate any negative exponents. (For the parts that use fractional exponents, you may assume all letters denote positive numbers.)

(a) $\left(\frac{2x^2y^{-4}}{x^{-3}y^6}\right)^{-5} \left(\frac{3x}{y}\right)^4$

(b) $\frac{(-32x^3y^{-2})^{-2/5}}{(54x^2y^5)^{-4/3}}$

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

7. Simplify the following expressions. (Assume the letters denote any real numbers.)

(a) $\sqrt[3]{24x^{21}} + \sqrt[3]{81x^{15}}$

(b) $\sqrt{3a^2b^3}\sqrt{6a^5b}$

8. Write the following numbers in scientific notation.

(a) 16,300,000,000

(b) 0.000040056

9. Expand and simplify

(a) $(x^3y - xy + y^3)(x^2y^2 - 3x^4)$

(b) $(2x + 3)^3 - (6x - 5)^2 + (7x - 4)(7x + 4)$

10. Factor the following expressions completely.

(a) $9x^4 - 36x^2 - 25x^2 + 100$

(b) $16(2x - 1)^2 + 40(2x - 1) + 25$

(c) $2x^{13/5} - 128x^{-2/5}$

11. Find the domain of the following rational expressions. Write your answer in interval notation.

(a) $x^3 - 3x^2 + 1$

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

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

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

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

12. Perform the operation and simplify

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

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

13. Simplify these compound fractions.

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

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

14. Rationalize the denominators of the following expressions.

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

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

15. Taken from *Precalculus: Functions and Graphs* by Swokowski/Cole

Solve the following equation for the variable h : $S = 2(lw + hw + hl)$

16. Solve the following equations.

(a) $x^2 - x = 42$

(b) $4x^2 + 24x + 1 = 0$

(c) $\sqrt{52 - 6x} + 6 = x$

(d) $|4x - 10| = 2$

(e) $\frac{2}{x+4} - \frac{x}{x-2} = 3$

(f) $x^6 - 7x^3 - 8 = 0$

(g) $x^{1/2} + 2x^{1/4} - 8 = 0$

17. How many real solutions do the following quadratic equations have?

(a) $-2x^2 + 5x - 7 = 0$

(b) $-3x^2 - 6x + 4 = 0$

18. The path of a projectile is given by the equation: $h = -18t^2 + 60t$ where h is the height in feet after t seconds. How high will the projectile go?