

Problem 1 List the variables in the algebraic expression: $\frac{2x^2}{w-2\pi}$

Problem 2 Evaluate $5^2 - 6 \times 4$

Problem 3 Evaluate $z = \frac{3x-1}{2y+2}$ where $x = 3$ and $y = 1$.

Problem 4

- a) Compute $\{9, -9, 3\} \cap \{3, 4\}$
- b) Compute $\{9, -9, 3\} \setminus \{3, 4\}$

Problem 5

- Evaluate $|-2|$
- Evaluate $|6.8|$
- Evaluate $|0|$

Problem 6

- Expand $(5x - 7)(x + 1)$
- Expand $(3x - y + z)(x + 1)$

Problem 7 Simplify the following so no negative exponents are present and no variable appears more than once:

- $\frac{(5x)^{-2}}{(2x)^{-3}}$
- $\frac{x^2 \cdot y}{x \cdot y^2}$
- $\frac{(2x^2)^{-2}}{y^{-4}}$

Problem 8 Convert the following to scientific notation and approximate to **3 significant digits**

- 5,347,800,000,000
- 678.344,2
- 0.000,000,000,005,911,127,8

Problem 9 Simplify the following so no negative exponents are present and no variable appears more than once:

- $\frac{x^2 \cdot \sqrt{x} \cdot y}{x^{-1/2} \cdot y^{3/2}}$
- $(8x)^{-1/3} \cdot \frac{2}{y^{-1/2}}$
- $(9x^2)^{1/4}$

Problem 10 Identify whether each of the following are equivalent to polynomials, and then express the polynomials in standard form:

- $1 - x^2 + 7x^3 - x^2 + 7$
- $x(7 - 1/x)$
- $\frac{x-5}{x}$
- $xy + 7$
- $\sqrt{x+11}$

Problem 11 Factorize the following:

- $x^3 - 6x^2 - 7x$
- $6xy - 9x^2 + 12x$
- $x^4 - 2x^2 + 1$
- $x^3 - 3x^2 - 4x + 12$

Problem 12 Simplify the following:

- $\frac{x^2+5x+6}{x^2+3x+2}$
- $\frac{x^2-x-6}{x^2-2x-3}$

Problem 13 The gravitational field g generated on the Earth's surface is given by $g = \frac{GM}{R^2}$ where $G = 6.674 \times 10^{-11} \text{m}^3/(\text{kg} \cdot \text{s}^2)$ is the “Gravitational constant”, M is the mass of the Earth, and $R = 6.371 \times 10^6 \text{m}$ is the Earth's radius. With the knowledge that $g = 9.807 \times 10^0 \text{m/s}^2$, compute, while keeping track of 4 significant digits, the mass of the Earth M .