Problem 1. Evaluate the expressions

i $(7^{1/2})^4$

ii $\left(\dfrac{9^2 \cdot 9^{-1}}{9^{-4}}\right)^2$

iii $\sqrt{\dfrac{1}{2^6}}$

iv $\dfrac{16^{5/8} \cdot 16^{1/2}}{16^{7/8}}$

v $8^{-4/3}$

Problem 2. Simplify each expression and write with only positive exponents.

i) $\left(\dfrac{x^3}{-27y^{-6}}\right)^{-2/3}$

ii) $(x^2y^{-3})(x^{-5}y^3)$

iii) $\left(\dfrac{(r^n)^4}{r^{5-2n}}\right)$

iv) $\sqrt[6]{64x^8y^3}$

v) $\sqrt[3]{27r^6} \cdot \sqrt[3]{s^2t^4}$

Problem 3. Perform the indicated operations and (or) simplify each each expression

i) $(5y^2 - 2y + 1) - (y^2 - 3y - 7)$

ii) $3x^2 - \{x^2 + 1 - x[x - (2x - 1)]\} + 2$

iii) $(x + 2y)^2$

iv) $(x^2 - 1)(3x^2) + (x^2 + 3)(4x)$

v) $(3x + 2)(2 - 3x)$

Problem 4. Find the greatest common factor from each expression

i) $4x^5 - 12x^4 - 6x^3$

ii) $e^{-x} - xe^{-x}$

iii) $\dfrac{1}{2}\left(\dfrac{2}{3}u^{3/2} - 2u^{1/2}\right)$

Problem 5. Find the real roots of each equation by factoring.

i) $x^2 + x - 12 = 0$

ii) $x^2 - 1 = 0$

iii) $3x^2 - x - 4 = 0$

iv) $4t^2 + 2t - 2 = 0$

Problem 6. Find the intervals of x which satisfy the following inequalities.

i) $-1 \leq x - 3 \leq 4$

ii) $(x + 3)(x - 5) \leq 0$

iii) $\dfrac{2x - 3}{x + 1} > 4$

iv) $(3x - 4)(2x + 2) \leq 0$

Problem 7. Evaluate

i) $4 + |-4|$

ii) $|-12 + 4| + 1$

iii) $\dfrac{|4 - 8|}{|16 - 12|} > 4$

iv) $|\sqrt{2} - 1| + |3 - \sqrt{2}|$

v) $|\pi - 6| - 3$

Problem 8. i) Find the equation of the line passing through the points $(-1, -3)$ and $(3, 2)$

ii) Find the equation of the line passing through the points $(-2, 5)$ and $(1, -4)$

iii) Find the y intercept of the line passing through the points $(-2, 5)$ and $(1, -4)$

iv) Find the equation of the line perpendicular to the previous problem passing through the point $(-2, 5)$

v) Determine if the lines AB and CD are parallel if $A(2, 3), B(2, -2)$ and $C(-2, 4), D(-2, 5)$.