Practice Problems - Lecture 8

Problem 1. Solve each rational equation:
(a) $\dfrac{4x+3}{4} - \dfrac{2x}{x+1} = x$;
(b) $\dfrac{-2}{x-3} + \dfrac{3}{x+3} = \dfrac{-12}{x^2-9}$;
(c) $\dfrac{2x}{x-2} = 5 + \dfrac{4x^2}{x-2}$;
(d) $\dfrac{4x+3}{x+1} + \dfrac{2}{x} = \dfrac{1}{x^2+x}$.

Problem 2. If Joe can paint a house in 6 hours and Sam can paint the same house in 8 hours, how long does it take them to do it together?

Problem 3. Solve each radical equation:
(a) $x - \sqrt{3x+18} = 0$;
(b) $\sqrt{4x+13} = 2x - 1$;
(c) $\sqrt{2x} - x + 4 = 0$.

Problem 4. Solve each equation with rational exponents:
(a) $x^{5/4} = 32$;
(b) $(3x^2 + 4x)^{1/3} = 4$;
(c) $(x + 100)^{2/3} = 25$.

Problem 5. Solve each equation of quadratic form:
(a) $x^4 + 2x^2 - 15 = 0$;
(b) $7x^{-2} - 10x^{-1} - 8 = 0$.

Problem 6. Solve each absolute value equation:
(a) $|7 - 3x| = 3$;
(b) $\left|\dfrac{2x+3}{3x-4}\right| = 1$;
(c) $|7 + 2x| = 0$;
(d) $|2x - 3| = |5x + 4|$.

Answers:

1. (a) $x = \frac{3}{5}$; (b) $\emptyset$; (c) $x = -2, x = \frac{5}{4}$; (d) $x = -\frac{1}{4}$.

2. $3\frac{3}{7}$ hours.

3. (a) $x = 6$; (b) $x = 3$; (c) $x = 8$.

4. (a) $x = 16$; (b) $x = -\frac{16}{3}, x = 4$; (c) $x = 25, x = -225$.

5. (a) $x = \pm\sqrt{3}, x = \pm i\sqrt{5}$; (b) $x = -\frac{7}{4}, x = \frac{1}{2}$.

6. (a)$x = \frac{4}{3}, x = \frac{10}{3}$; (b) $x = 7, x = \frac{1}{5}$; (c) $x = -\frac{7}{2}$; (d) $x = -\frac{7}{3}, x = -\frac{1}{7}$.