1. Solve the following equations:

(a) $3x + 4 = 5x - 1$

(b) $5(x - 2) - 3(x + 1) = -7$

(c) $2\sqrt{x} + 5 + 1 = 7$

(d) $\frac{3}{2x} + \frac{1}{x} = 1$

(e) $2\sqrt{x} + 5 = 3\sqrt{x}$

(f) $3x^2 - 10 = 17$

(g) $x^4 - 6 = 10$

(h) $x^{1/3} = 4$
2. Solve the following equations:

(a) \( x^2 - x - 12 = 0 \)  
(b) \( x^2 + 7x - 12 = 0 \)

(c) \( (2x - 3)(x + 4) = 0 \)  
(d) \( x^2 = 7x - 10 \)

3. Simplify:

(a) \( x (x^2 y^3)^2 \)  
(b) \( \sqrt[3]{x^3 y^6} \)

(c) \( \sqrt[4]{\frac{x^3 y^2}{xy^{-4}}} \)  
(d) \( \frac{x^{3/2}}{x^{1/2}} \)
4. Evaluate:
\[ \frac{1}{2} + \frac{3}{5} = \frac{7}{10} \]

5. Simplify by adding the fractions:

(a) \[ \frac{1}{x} + \frac{1}{y} \]

(b) \[ \frac{1}{x-1} + \frac{2}{x-2} \]
6. Find all solutions to the following system of equations:

\begin{align*}
3x - y &= 8 \\
2x - 2y &= 4
\end{align*}

7. Find all solutions to the following system of equations:

\begin{align*}
x + y &= 7 \\
x^2 - 2y &= 1
\end{align*}
8. Tom is 4 years older than Beth. The sum of their ages is 18. How old is Beth?

9. Susan is one year older than Mike. The product of their ages is 42. How old is Mike?

10. The mass of one oxygen molecule is $5.3 \times 10^{-23}$ grams. Find the mass of 20,000 molecules of oxygen. Express your answer in scientific notation.
11. Women born in 1960 have a life expectancy of 73.1 years; women born in 2004 have a life expectancy of 80.4 years. For the following questions, assume that life expectancy is linearly related to year of birth.

(a) Find an equation for the life expectancy of a woman born in year $x$.

(b) What would you predict for the life expectancy of a woman born in 2009?