**Due date:** _____ **Name:** _____

# Tools for Modeling (Part 2)

**Notes**

ex: Solve: $\frac{2-5\ln x}{x^2} = 0$

ex: Simplify the left side of the equation and then solve.

$$\frac{3(x^2+1)^{2/3}\cdot 2 - 2x\cdot 2(x^2+1)^{-1/3}\cdot 2x}{9(x^2+1)^{4/3}} = 0$$

1. Solve the following equations.
   a) $4x + 5x\ln x = 0$

b) $2 - \frac{8}{x^2} = 0$

c) $2x^{-4/3} - 4x^{-1/3} = 0$

2. Simplify the left side of the equation and then solve.

a) $\frac{(2-x^2)^{1/2}\cdot(-2)-(-2x)\cdot\frac{1}{2}(2-x^2)^{-1/2}\cdot(-2x)}{\left((2-x^2)^{1/2}\right)^2} = 0$

b) $\frac{(x-3)^2 \cdot 4x - 2x^2 \cdot 2(x-3)}{(x-3)^4} = 0$

**Practice at home**

3. Solve the following equations.

a) $\frac{9\ln x - 6x\ln x + x^2 \ln x}{x-1} = 0$

b) $e^{\sin x}\cos x - e^{\sin x}\sin x = 0$

c) $2 - \frac{5}{x} - \frac{3}{x^2} = 0$

d) $\frac{1}{x^2} - 3 = 0$

e) $9x^{-1/3} - x^{-7/3} = 0$

f) $7x^{-5/4} + x^{-1/4} = 0$

4. Simplify the left side of the equation and then solve.

a) $\frac{2x(x-2)^{1/2}-x^2\cdot\frac{1}{2}(x-2)^{-1/2}}{x-2}=0$

b) $\frac{2(x^2+2)^{3/4}-x\cdot 2\cdot\frac{3}{4}(x^2+2)^{-1/4}\cdot 2x}{4(x^2+2)^{3/2}}=0$

c) $\frac{(x+2)^2(2x-3)-2(x+2)(3)}{(x+2)^4}=0$

d) $\frac{2x(x+3)^4-x^2(4)(x+3)^3}{(x+3)^8}=0$