First determine if the given equation is first order linear or a Bernoulli equation, and then solve accordingly.

Problem 1

$xy' + y = x^3$

Problem 2

$y' + ay = b$

Problem 3

$\frac{dr}{d\theta} = (r + e^{-\theta}) \tan(\theta)$

Problem 4

$(1 - x^3)y' - 2(1 + x)y = y^{\frac{5}{2}}$

Problem 5

$xy' - y = x^2 \sin(x)$