Question:
Separation Of Variables

1. Solve the following differential questions for $y(x)$:

   (a) $\frac{dy}{dx} = 2\left(\frac{y}{x}\right)$

   (b) $\frac{dy}{dx} = (1-x)y$

   (c) $\frac{dy}{dx} = \frac{x^2}{y(1+x^3)}$

   (d) $\cos x \frac{dy}{dx} = y^2$

   (e) $\frac{dy}{dx} = xy + x + y + 1$

   (f) $\frac{dy}{dx} = x^2 \sec 2y$

   (g) $\frac{dy}{dx} = \cos^2 y \sin x$

   (h) $\frac{dy}{dx} = \sec y \csc y \tan x$

2. Solve the following initial value problems:

   (a) $\frac{dy}{dx} = \frac{1-2x}{y}$, $y(1) = -2$

   (b) $\frac{dy}{dx} = \frac{2x+\sec^2 x}{2y}$, $y(0) = -5$

   (c) $\frac{dy}{dx} = \cos x e^{y+\sin x}$, $y(0) = 0$

   (d) $\frac{dy}{dx} = \frac{\arcsin x}{y^2\sqrt{1-x^2}}$, $y(0) = 0$