Exact Equations and Integrating factors

1. Determine with of the following are exact and solve those which are exact. (Taken from Section 2.8 of Simmons' book on differential equations.)

    (a) $y dx + (x + 2/y) dy = 0$.

    (b) $(y - x^2) dx + (x + y^2) dy = 0$.

    (c) $(\cos x \cos^2 y) dx + 2(\sin x \sin y \cos y) dy = 0$.

    (d) $(1 + y) dx + (1 - x) dy = 0$.

2. Solve each of the following equations by finding an integration factor. (Taken from Section 2.9 of Simmons' book on differential equations.)

    (a) $(3x^2 - y^2) dx - (2xy) dy = 0$.

    (b) $y dx + (x + 3x^3 y^4) dy = 0$.

    (c) $(x - y) dx + (x + y) dy = 0$.