

Due Thursday, Feb. 23 at the beginning of class.

1. Find the general solution of the equation

(a) $y'' + 5y' + 6y = 0$

(b) $y'' + 8y' + 16y = 0$

(c) $6y'' + y' - 2y = 0$

(d) $y'' - 10y' + 26y = 0$

(e) $y'' - 4y' + 7y = 0$

(f) $y'' - 6y' + 10y = 0$

(g) $4y'' - 4y' + y = 0$

(h) $y'' - y' - 11y = 0$

2. Solve the initial value problem.

(a) $y'' + 2y' - 8y = 0, y(0) = 3, y'(0) = -12$

(b) $y'' - 4y' - 5y = 0, y(-1) = 3, y'(-1) = 9$

(c) $y'' + 2y' + y = 0, y(0) = 1, y'(0) = -3$

(d) $y'' - 4y' + 4y = 0, y(1) = y'(1) = 1$

(e) $y'' + 2y' + 2y = 0, y(0) = 2, y'(0) = 1$

(f) $y'' + 9y = 0, y\left(\frac{\pi}{6}\right) = y'\left(\frac{\pi}{6}\right) = 1$

3. Use reduction of order to find a second solution of the equation.

(a) $x^2y'' - 2xy' - 4y = 0, x > 0, y_1(x) = x^{-1}$.

(b) $(x - 1)y'' - xy' + y = 0, x > 1, y_1(x) = e^x$.

(c) $x^2y'' + xy' + \left(x^2 - \frac{1}{4}\right)y = 0, x > 0, y_1(x) = \sqrt{x} \sin x$.