Math 3F HW #4

Answers must be submitted via Moodle before 9:30AM on Tuesday October 3rd, 2017.

Good luck!

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the differential equation.

1) \( y'' - 6y' + 8y = 0 \)
   A) \( y = e^{2x}(C_1 \cos 4x + C_2 \sin 4x) \)
   B) \( y = C_1 e^{2x} + C_2 e^{4x} \)
   C) \( y = e^{4x}(C_1 \cos 2x + C_2 \sin 2x) \)
   D) \( y = C_1 e^{-2x} + C_2 e^{-4x} \)

2) \( 3y'' + 5y' - 28y = 0 \)
   A) \( y = C_1 e^{-4x} + C_2 e^{(-7/3)x} \)
   B) \( y = C_1 e^{-4x} + C_2 e^{7x} \)
   C) \( y = C_1 e^{4x} + C_2 e^{(-7/3)x} \)
   D) \( y = C_1 e^{-4x} + C_2 e^{(7/3)x} \)

3) \( y'' - 12y' + 36y = 0 \)
   A) \( y = (C_1 + C_2)x e^{-6x} \)
   B) \( y = C_1 e^{6x} + C_2 e^{-6x} \)
   C) \( y = (C_1 + C_2) \cos 6x \)
   D) \( y = (C_1 + C_2) e^{6x} \)

4) \( 25y'' - 40y' + 16y = 0 \)
   A) \( y = C e^{(4/5)x} \)
   B) \( y = C_1 e^{(4/5)x} + C_2 e^{(-4/5)x} \)
   C) \( y = (C_1 + C_2) e^{(4/5)x} \)
   D) \( y = (C_1 + C_2) e^{(-4/5)x} \)

5) \( 5y'' + 3y' + 5y = 0 \)
   A) \( y = e^{(3/10)x} \left\{ C_1 \sin \frac{\sqrt{91}}{10} x + C_2 \cos \frac{\sqrt{91}}{10} x \right\} \)
   B) \( y = e^{(-3/10)x} \left\{ C_1 \sin \frac{\sqrt{91}}{10} x + C_2 \cos \frac{\sqrt{91}}{10} x \right\} \)
   C) \( y = e^{\sqrt{91}/10x} \left\{ C_1 \sin \frac{3}{10} x + C_2 \cos \frac{3}{10} x \right\} \)
   D) \( y = C_1 e^{(-3/10)x} + C_2 e^{\sqrt{91}/10x} \)

6) \( y'' - 4y' + 29y = 0 \)
   A) \( y = C_1 e^{2x} + C_2 e^{5x} \)
   B) \( y = e^{-2x}(C_1 \cos 5x + C_2 \sin 5x) \)
   C) \( y = e^{2x}(C_1 \cos 5x + C_2 \sin 5x) \)
   D) \( y = e^{x}(C_1 \cos 2x + C_2 \sin 5x) \)

Find the particular solution to the given differential equation that satisfies the given conditions.

7) \( y'' + 4y = 0 \), \( y = 3 \) at \( x = 0 \) and \( y = 5 \) at \( x = \pi/4 \)
   A) \( y = 5 \sin 2x + 3 \cos 2x \)
   B) \( y = 3 \sin 2x + 5 \cos 2x \)
   C) \( y = e^{x}(5 \sin 2x + 3 \cos 2x) \)
   D) \( y = (3 + 5x) e^{2x} \)