EMCF Quiz 1
Due January 19 at 11:59 p.m.

Work the problems, go to the CASA web site, click on EMCF, and mark your answers on the form for this quiz.

1. A minimum quiz average of

   (a) 55%
   (b) 60%
   (c) 65%
   (d) 70%
   (e) 75%
   (f) None of the above.

   is required for a passing grade in this course.

2. A solution to the differential equation

$$y'' - 4y = 0$$

   is given by

   (a) $y(x) = e^{4x}$
   (b) $y(x) = \cos 8x - \sin 8x$
   (c) $y(x) = \sinh 2x$
   (d) $y(x) = \cosh 4x$
   (e) $y(x) = \cos 4x$
   (f) None of the above.

3. y is a solution to the differential equation

$$y'' = 2x + e^{-x}$$

   if and only if

(a) $y = \frac{1}{3}x^3 + e^{-x} + C$

(b) $y = \frac{1}{2}x^3 + e^{-x} + C_1x + C_2$

(c) $y = \frac{1}{3}x^3 + e^{-x} + C_1x + C_2$

(d) $y = \frac{1}{3}x^3 - e^{-x} + C_1x + C_2$

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

(f) None of the above.

4. If

$$y = x^{-4}$$

then y is a solution to

(a) $x^2y'' - 8xy' - 16y = 0$

(b) $x^2y'' - 8xy' + 16y = 0$

(c) $x^2y'' + 8xy' + 12y = 0$

(d) $x^2y'' + 4xy' + 16y = 0$

(e) $x^2y'' + 8xy' - 4y = 0$

(f) None of the above.

5. Suppose that $y = e^{rx}$. The value(s) of r such that y is a solution to

$$y'' + 2y' - 8y = 0$$

is (are)

(a) -2

(b) -4 and 2

(c) -4

(d) -2 and -4

(e) -2 and 4

(f) None of these.

6. Suppose that $y = e^{rx}$. The value(s) of r such that y is a solution to

$$y'' + 6y' + 9y = 0$$

is (are)

(a) 3
(b) -3 and 3
(c) 0 and 3
(d) 1 and 3
(e) -3
(f) None of these.

7. Suppose that $y = x^r$. The value(s) of r such that y is a solution to

$$y'' - \frac{3}{x}y' - \frac{12}{x^2}y = 0$$

is (are)

(a) -2 and 6
(b) 2 and -6
(c) 2
(d) -2 and -6
(e) 6
(f) None of these.

8. Suppose that $y = x^r$. The value(s) of r such that y is a solution to

$$x^2y'' - 7xy' + 16y = 0$$

is (are)

(a) -4
(b) 0 and 4
(c) 4
(d) -2 and -8
(e) -4 and 4
(f) None of these.

9. Give the differential equation that has

$$y^2 = Cx^4 - 3$$

as its general solution.

(a) $y' = \dfrac{y^2+6}{2xy}$

(b) $y' = \dfrac{y^2-6}{xy}$

(c) $y' = \dfrac{4y^2+3}{4xy}$

(d) $y' = \dfrac{2y^2+6}{xy}$

(e) $y' = \dfrac{y^2-4}{xy}$

(f) None of these.

10. Give the differential equation that has

$$y = C_1 x + C_2 x^3$$

as its general solution.

(a) $y' - 3x^2 y = 0$

(b) $x^2 y'' - 3xy' + 3y = 0$

(c) $x^2 y'' - 4xy' + 6y = 0$

(d) $y' - 3x^2 y + 6 = 0$

(e) $y'' - 4y' + 3y = 0$

(f) None of these.

11. Given

$$y = Ce^{6x}$$

is the general solution to the differential equation

$$y' - 6y = 0,$$

find the solution to the initial value problem

$$y' - 6y = 0 \text{ and } y(0) = 5.$$

(a) $y = 5x$

(b) $y = 5e^{6x}$

(c) $y = 5$

(d) $y = -5e^{6x}$

(e) $y = 30e^{6x}$

(f) None of these

12. Given

$$y = C_1 e^{2x} + C_2 e^{-x}$$

is the general solution to the differential equation

$$y'' - y' - 2y = 0,$$

find the solution to the initial value problem

$$y'' - y' - 2y = 0,\ y(0) = 4, \text{ and } y'(0) = 3.$$

(a) $y = \frac{7}{3}e^{2x} + \frac{2}{3}e^{-x}$

(b) $y = \frac{7}{3}e^{2x} + \frac{5}{3}e^{-x}$

(c) $y = 3e^{2x} + 4e^{-x}$

(d) $y = 4e^{2x} + 3e^{-x}$

(e) $y = \frac{1}{3}e^{2x} - \frac{10}{3}e^{-x}$

(f) None of these.

13. $e^{3\ln x} =$

(a) x^3

(b) 3^x

(c) $3x$

(d) xe^3

(e) $\ln(x^3)$

(f) None of these.

14. An object is moving along a coordinatized line with constant acceleration of 3 m/s^2. Suppose that the object is located at the 5 m mark and has a velocity of -4 m/s at time 0. Where is the object located 10 seconds later?

(a) At the 100 m mark.

(b) At the 115 m mark.

(c) At the 105 m mark.

(d) At the 195 m mark.

(e) At the 190 m mark.

(f) None of these.

15. $\int \frac{\ln x}{x} dx =$

(a) $\frac{1}{2}(\ln x)^2 + C$

(b) $\ln(x^2) + C$

(c) $\frac{1}{2}(\ln x^2) + C$

(d) $\ln x^2 + C$

(e) $\ln(\ln x) + C$

(f) None of these