Alternate 3

Directions: Answer the questions below. Then log into CourseWare at http://www.casa.uh.edu and submit your answers using the EMCF entitled **Alternate03**.

1. A linear second-order differential equation of the form $y'' + py' + qy = f$ is said to be homogeneous if and only if $f = 0$.
   a. True
   b. False
2. The term f in a linear second-order differential equation of the form $y'' + py' + qy = f$ is called a forcing term.
   a. True
   b. False
3. The Wronskian of two solutions of $y'' + py' + qy = f$ is always nonzero.
   a. True
   b. False
4. If f, q and p are continuous functions, and b, m and x_0 are real numbers, then the initial value problem $y'' + py' + qy = f$, $y(x_0) = b$, $y'(x_0) = m$ has a unique solution.
   a. True
   b. False
5. If f, q and p are continuous functions, then the initial value problem $y'' + py' + qy = f$ always has two linearly independent solutions.
   a. True
   b. False
6. The reduced form of the linear second-order differential equation $y'' + py' + qy = f$ is $y'' + py' + qy = 0$.
   a. True
   b. False
7. If y_1 and y_2 are any pair of solutions to $y'' + py' + qy = 0$ then the general solution has the form $y = c_1 y_1 + c_2 y_2$ where c_1 and c_2 are arbitrary constants.
   a. True
   b. False

8. The Wronskian of $\cos(x)$ and $-\sin(x)$ is -1.
   a. True
   b. False
9. The Wronskian of any 2 solutions to $y''+2y'+\sin(x)y=0$ has to have the form Ce^{-2x} for some constant *C*.
   a. True
   b. False
10. The Wronskian of any 2 solutions to $y''+\cos(x)y'+\sin(x)y=0$ has to have the form $Ce^{\sin(x)}$ for some constant *C*.
    a. True
    b. False
11. The key to finding solutions to $y''+ay'+by=0$ where *a* and *b* are constants is to look for roots of the characteristic polynomial.
    a. True
    b. False
12. Suppose a and b are constants. The characteristic equation for $y''+ay'+by=0$ is $r^2+ar+b=0$.
    a. True
    b. False
13. Suppose a and b are constants. If the characteristic equation for $y''+ay'+by=0$ is $(r-r_1)(r-r_2)=0$ for some distinct real numbers r_1 and r_2, then the general solution always has the form $y=c_1e^{r_1x}+c_2e^{r_2x}$ for some constants c_1 and c_2.
    a. True
    b. False
14. Suppose a and b are constants. The general solution to $y''+ay'+by=0$ has different forms depending upon whether the characteristic equation has distinct real roots, a repeated real root, or complex roots.
    a. True
    b. False
15. The general solution to $y''+py'+qy=f$ has the form $y=c_1y_1+c_2y_2+z$ where y_1 and y_2 are linearly independent solutions to the reduced equation, c_1 and c_2 are arbitrary constants, and *z* is a particular solution to $y''+py'+qy=f$.
    a. True
    b. False
16. If f, q and p are continuous functions, then *variation of parameters* can always be used to find a particular solution to $y''+py'+qy=f$.
    a. True
    b. False

17. A fundamental set of solutions to $y''+py'+qy=0$ is given by any pair of solutions to the differential equation.
    a. True
    b. False
18. If a and b are real numbers, then the method of undetermined coefficients can always be used to find a particular solution to $y''+ay'+by=f$.
    a. True
    b. False
19. Suppose q and p are continuous functions. The method of *reduction of order* can be used to find a second linearly independent solution to $y''+py'+qy=0$ provided one nontrivial solution is known.
    a. True
    b. False
20. There will be at least one problem on the midterm exam that asks students to use reduction or order.
    a. True
    b. False