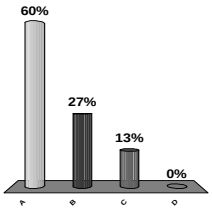
Ordinary Differential Equations

Clicker questions

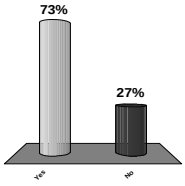
1.1. The problem in the handout...

1. A
2. B
3. C
4. D



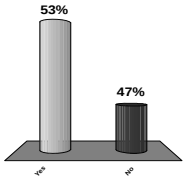
1.2. Is the following differential equation linear?
$y'' - 2y' + y = 0$

1. Yes
2. No



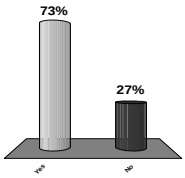
1.3. Are $y_1(x)=e^x$ and $y_2(x)=x\,e^x$ solutions of the following differential equation?
$y'' - 2y' + y = 0$

1. Yes
2. No



1.4. Are $y_1(x)=e^x$ and $y_2(x)=x\,e^x$ linearly independent?

1. Yes
2. No

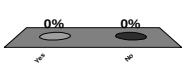


1.5. Does the following initial value problem have a unique solution near x = 0?
$y'' - 2y' + y = 0, \quad y(0) = 1, \quad y'(0) = 0$

1. Yes
2. No

1.6. Does the following initial value problem have a unique solution near x = 0, y = 1, y'=0?
$y'' - 2y' + y = 0, \quad y(0) = 1, \quad y'(0) = 0, \quad y''(0) = 2$

1. Yes
2. No



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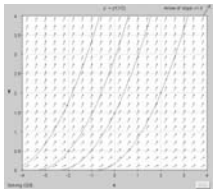
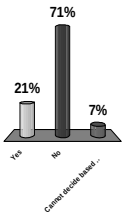
1.7. Does the following initial value problem have a unique solution for all values of y_0? The direction field is provided. $y' = y^{1/2}, \quad y(-1) = 0.$



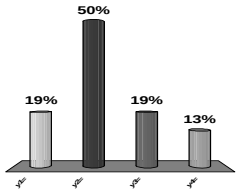
1. Yes
2. No
3. Cannot decide based on what's given



1.8. Which of the following is a particular solution of

$$y'' + 3y' + 2y = e^{-2x} \ ?$$

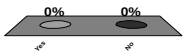
1. y1= e^{-2x}
2. y2= $-xe^{-2x}$
3. y3= $-x^2e^{-2x}$
4. y4= $-e^{-x} + e^{-2x}$



1.9. Does the following initial value problem have a unique solution for all values of x?

$y'' - 2y' + y = 3x, \quad y(0) = 1, \quad y'(0) = 0$

1. Yes
2. No



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