# STUDENT REVISION SERIES

# Numerical Methods for DE's

### Question: 1.

Let  $\frac{dy}{dx} = \sqrt{x^3 + 1}$  and  $(x_0, y_0) = (3,0)$ . Using Euler's Method with a step size of 0.1, the value of  $y_2$  correct to two decimal places, is:

A. 1.07 B. 1.08 C. 0.53 D. 1.67 E. 1.68

### Question: 2.

Let  $\frac{dy}{dx} = y \cos(x)$ , where  $y(2) = y_0 = 3$ . Using Euler's method with a step size of 0.1, the value of  $y(1.7) = y_3$  correct to 3 decimal places is:

A. 2.569 B. 2.730 C. 3.226 D. 3.299 E. 3.342

#### **Question: 3.**



The direction (slope) field of a first-order differential equation is shown above. The differential equation could be

a. 
$$\frac{dy}{dx} = y\sin(3x)$$

b. 
$$\frac{dy}{dx} = -y\cos(3x)$$

c. 
$$\frac{dy}{dx} = y^2 \sin(x)$$

d. 
$$\frac{dy}{dx} = -y^2 \cos(x)$$

e. 
$$\frac{dy}{dx} = x \sin(y^2)$$

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#### **Question: 4.**



The direction (slope) field for the differential equation  $\frac{dy}{dx} = 2y - x$  is shown above. A solution of this differential equation that includes (-2, 0) could also include:

- a. (-0.9,0.1)
- b. (-1.8, 0.43)
- c. (-3.1,0.5)
- d. (−2.5,−1)
- e. (-2.8, 2.09)

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## Answers







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d1.	🗹 y1	$\checkmark$ y1 '= y1 <sup>2</sup> · sin(x)						
	(x₀,y1₀	): (	(	<b>,</b> <y></y>	) 🍳	2		:≡
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