This print-out should have 5 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

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001   10.0 points

If $y = y_0(x)$ is the solution of the differential equation

$$y\frac{dy}{dx} = 4x(64 + y^2),$$

which satisfies $y(0) = 0$, find the value of $y_0(1)$.

1. $y_0(1) = 8\left(e^4 + 1\right)^{1/2}$

2. $y_0(1) = 10\left(e^4 - 1\right)^{1/2}$

3. $y_0(1) = 8e^2$

4. $y_0(1) = 8\left(e^4 - 1\right)^{1/2}$

5. $y_0(1) = 9\left(e^4 - 1\right)^{1/2}$

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002   10.0 points

If y_0 satisfies the equations

$$(x^2 + 9)\frac{dy}{dx} = xy, \quad y(0) = 5,$$

determine the value of $y_0(6)$.

1. $y_0(6) = 10^{1/2}\, 5$

2. $y_0(6) = 25$

3. $y_0(6) = 30$

4. $y_0(6) = 6 \cdot 5^{1/2}$

5. $y_0(6) = 5^{1/2}\, 5$

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003   10.0 points

If y_0 satisfies the equations

$$4\frac{dy}{dx} + \frac{2}{x\,y^3} = 0, \quad y(1) = 2,$$

for $x, y > 0$, find the value of $y_0(e)$.

1. $y_0(e) = 14^{1/4}$

2. $y_0(e) = 10^{1/3}$

3. $y_0(e) = 12^{1/4}$

4. $y_0(e) = 6^{1/3}$

5. $y_0(e) = 18^{1/4}$

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004   10.0 points

If $y = y_0(x)$ is the solution of the differential equation

$$\sqrt{9 - x^2}\,\frac{dy}{dx} + 3xy = 0$$

which satisfies $y(3) = 6$, find the value of $y_0(0)$.

1. $y_0(0) = -6e^9$

2. $y_0(0) = 6e^9$

3. $y_0(0) = -6e^{-9}$

4. $y_0(0) = 6e^{12}$

5. $y_0(0) = 6e^{-9}$

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005   10.0 points

Find the amount A in an account after 5 years when

$$\frac{dA}{dt} = 0.07A, \quad A(0) = \$100.$$

1. $A(5) = \$100e^{3.5}$

2. $A(5) = \$100e^{-0.35}$

3. $A(5) = \$100e^{-3.5}$

4. $A(5) = \$100e^{0.35}$

5. $A(5) = \$100e^{35}$