

LAB QUIZ 4

1.

■ Solve the differential equation: $2ydy = (xy^2 + 4x) dx$, $y(0) = 1$.

A) $2 \arctan\left(\frac{y}{2}\right) = x^2 + 1$

B) $\arctan\left(\frac{y}{2}\right) = x^2 + \frac{\pi}{4}$

C) $2 \ln(y^2 + 4) = x^2 + 2 \ln(5)$

D) $\ln(y^2 + 4) = x^2 + \ln(5)$

E) $\frac{1}{2} \ln(y^2 + 4) = x^2 + \ln(5)$

2.

Radio-active substances change at a rate proportional to the amount present. What is the half-life of a radio-active substance if it takes 10 years for 28% of the substance to decay?

- A. $-10\ln(2)/\ln(0.72)$
- B. $10\ln(2)/\ln(0.72)$
- C. $10\ln(0.72)/\ln(2)$
- D. $10\ln(1/2)/\ln(0.28)$
- E. $-10\ln(2)/\ln(0.28)$

3.

Determine the value of the integral:

$$\int_{e^2}^{\infty} \frac{1}{x \ln^2 x} dx$$

- A) 2
- B) 1/2
- C) 1
- D) $(\ln 2)/3$
- E) $\ln 2$
- F) None

4.

In 1985, there were 285 cell phone subscribers in the small town of Centerville. The number of subscribers increased by 75% per year after 1985. How many cell phone subscribers were in Centerville in 1994?

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- about 76,776
- about 25,070
- about 43,872
- about 46,000

5.

Consider the three integrals

$$\text{I. } \int_{-1}^1 \frac{dx}{x^2} . \quad \text{II. } \int_0^1 \frac{dx}{\sqrt{x}} . \quad \text{III. } \int_{-1}^1 \frac{dx}{1+x} .$$

One of the following statements is true. Which one?

- (a) They are all convergent.
- (b) They are all divergent.
- (c) I is convergent; II and III are divergent.
- (d) II and III are convergent; I is divergent.
- (e) II is convergent; I and III are divergent.

