
Which of the following is the integrating factor?

- A. $e^{\int Q\,dx}$
- B. $e^{-\int Q\,dx}$
- C. $e^{\int P\,dx}$
- D. $e^{-\int P\,dx}$

The motivation for the integrating factor is so that $e^{\int P\,dx}(y' + Py)$ becomes which of the following?

- A. $e^{-\int P\,dx}\int e^{\int P\,dx} y\,dx$
- B. $\dfrac{d}{dx}\left(e^{\int Q\,dx}y\right)$
- C. $\dfrac{d}{dx}\left(e^{\int P\,dx}y\right)$
- D. $\dfrac{d}{dx}\left(e^{-\int P\,dx}y\right)$

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3. (1 point) The differential equation $\frac{dy}{dx} = 9y$ is a linear differential equation.
Convert the equation to standard form (use the prime notation for the derivative):
_____ = _____
The integrating factor is: _____
After multiplying both sides by the integrating factor and unapplying the product rule we get the new differential equation:
$\frac{d}{dx}\left[\ \text{_____}\ \right]$ = _____
Integrating both sides we get algebraic equation _____ $= C$
Solving for y, the solution to the differential equation is y = _____

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4. (1 point) Solve the differential equation by the method of integrating factors.

$$\frac{dy}{dx} + 2xy = 2x$$

$y =$ _____ Use "C" to represent any constant of integration.