Answer on Question #63001 – Math – Differential Equations

Question

d/dr (dB/dr)=B/constant square. It gave us B=r^p e^-r/constant. The power of "p" is -1/2. HOW. SHOW THAT IT IS -1\2

Solution

Given the differential equation

$$\frac{d^2B}{dr^2} - \frac{B}{C^2} = 0,$$

search its solution in the following form:

$$B = e^{\lambda r}.$$

The characteristic equation is

$$\lambda^2 - \frac{1}{C^2} = 0,$$

$$\lambda = \pm\frac{1}{C}.$$

The solution of the differential equation is

$$B = c_1 e^{\frac{r}{C}} + c_2 e^{-\frac{r}{C}},$$

where c_1, c_2 are arbitrary real constants.

The solution $B = r^p e^{-\frac{r}{C}}$ would be when

$$p = 0.$$