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$$1) \frac{dP}{dt} \sim P$$

$$\frac{dP}{dt} = kP$$

$$dP = kP dt$$

$$\frac{dP}{P} = k dt \quad \int$$

$$\int \frac{dP}{P} = \int k dt$$

$$\ln|P| = kt + C_1$$

$$P = e^{kt + C_1}$$

$$P = e^{kt} \cdot e^{C_1}$$

$$P = C e^{kt}$$

$$t=0 \rightarrow P=500$$

$$t=10 \rightarrow P = 500 + \frac{15}{100} \times 500$$

$$= 500 + 75 = 575$$

$$t=30 \rightarrow P = ?$$

$$\boxed{500 = C}$$

$$575 = 500 e^{10k}$$

$$1.15 = e^{10k}$$

$$\ln(1.15) = 10k$$

$$\frac{\ln(1.15)}{10} = k$$

$$0.0139 = k$$

$$P = 500 e^{0.139t}$$

$$P = 500 e^{0.4179(30)}$$

$$P = 758.7$$

$$(13) \dots P = C e^{kt}$$

$$t=0 \rightarrow P=10$$

$$t=2 \rightarrow P = 10 - \frac{5}{100} \cdot 10$$

$$= 9.5$$

$$t=? \rightarrow P = 5 = \frac{10}{2}$$

(Compl. H)

$$(16) t=0 \rightarrow N_0$$

$$t=12 \rightarrow N = N_0 - \frac{5}{1000} \cdot N_0$$

$$= 0.995 N_0$$