Hands-on Task 4

Problem: $\frac{dP}{dt} = kP$, $k > 0$

As the problem is a separable differential equation we can apply the solution method

$$\int \frac{1}{P}\, dP = \int k\, dt$$

$$\ln|P| = kt$$

$$P(t) = Ce^{kt}$$

We have

$$P(0) = C > 0$$

Our initial problem is $P_0 = C$

Then

$$P(t) = P_0 e^{kt}$$

We need

$$P(t^*) = P_0 e^{kt^*} = 3P_0$$

$$e^{kt^*} = 3$$

$$kt^* = \ln(3)$$

$$t^* = \frac{\ln(3)}{k}$$

STUDENT