```matlab
clc
clear
close all
format long g

%display name and assignment details
disp('Zyad Khan - MATLAB Chapter 7 Assignment')

% part a
% Find the model for population
syms t; % t is representing the time (number of days)
population_rate_of_change= -105*exp(-t/30);
population_model = int(population_rate_of_change);

syms c % set c for the constant variable 'C'
population_model_with_c = population_model + c; % create the integral
 with the constant C
initial_value = 3150 ; % initial population of fish
t = 0; % initial value is 0 days
sub_t_in_pop_model = subs(population_model_with_c, t); % substitute
 the initial value for time into the population model with C in order
 to solve for C
const_value = solve(sub_t_in_pop_model == initial_value, c); %solve
 the population model for c at the initial values
population_model_with_c = population_model + const_value ; % solve for
 the population model with the actual value of C using the initial
 data
disp(["The model for the population of the fish in the lake is P(t)= "
 + char(population_model_with_c)]);




% part b
% Find the population of fish after 11 days.
pop_after_11_days = subs(population_model_with_c, 11);
pop_after_11_days_approx = double(pop_after_11_days);
fprintf('The population of trout fish in the lake after 11 days is
 %.0f fish.\n', pop_after_11_days_approx)

% part c
% Find how many days it will take for the entire trout population to
 die
% (less than one)
days_till_pop_is_zero = solve(population_model_with_c == 0.99);
pop_zero_approx = double(days_till_pop_is_zero);
fprintf('It will take %.1f days for the entire trout population to
 die. \n', pop_zero_approx)

% part d
% Graph the population model
fplot(population_model_with_c, [0,pop_zero_approx]);
hold on; grid on
```

```
xlabel('t (in days)')
ylabel('Population (fish)')
title('Trout Population in a Lake over Time')
legend('Population of Fish')
disp('The graphical model for the population of fish will open in a
 new window shortly... ')
```

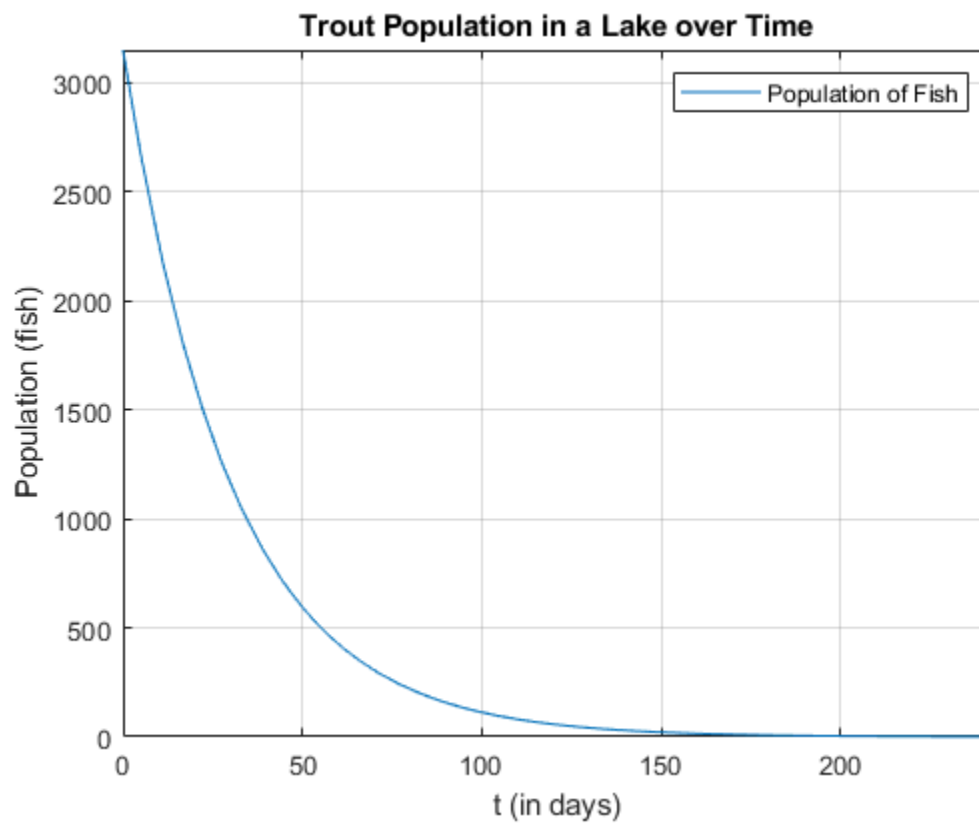*Zyad Khan - MATLAB Chapter 7 Assignment*
The model for the population of the fish in the lake is P(t)=
3150*exp(-t/30)
The population of trout fish in the lake after 11 days is 2183 fish.
It will take 242.0 days for the entire trout population to die.
The graphical model for the population of fish will open in a new
window shortly...

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