

4. A population of fish was modeled by the following differential equation where P has units of millions of fish, and P' has units of millions of fish per year.

$$P' = .45P - 18$$

Assuming the the population started at 85 million fish and that time is measured from this starting value.

- (a) Use the information provided to approximate the population of the fish at the indicated values of t .

t	P
0	85
1	
2	
3	

- (b) Use the information provided to approximate the population of the fish at the indicated values of t .

t	P
0	85
0.5	
1	
1.5	
2	
2.5	
3	

- (c) Show that $P = 40 + Ce^{0.45t}$ is a solution to the differential equation.

- (d) Find the value of C in part (c)

- (e) Which method, part (a) or part (b), gave a better approximation to the population of fish three years after the start?

5. Is $y = x^3 + 2x + 7$ is a solution to the differential equation $3y - xy' = 4x + 18$?

6. Is $y = 2e^{5x} + 3x$ a solution to the differential equation $y'' - 4y' + 12 = 5y - 15x$?

7. Find the value of k so that $y = x^4 + kx$ is a solution to the differential equation $4y - xy' = 30x$

8. Find the values of c and k such that $y = ce^{kx}$ is a solution to the differential equation $5y' = 3y$.