Mathematics 172

Quiz 8 Name: Key

You must show your work to get full credit.

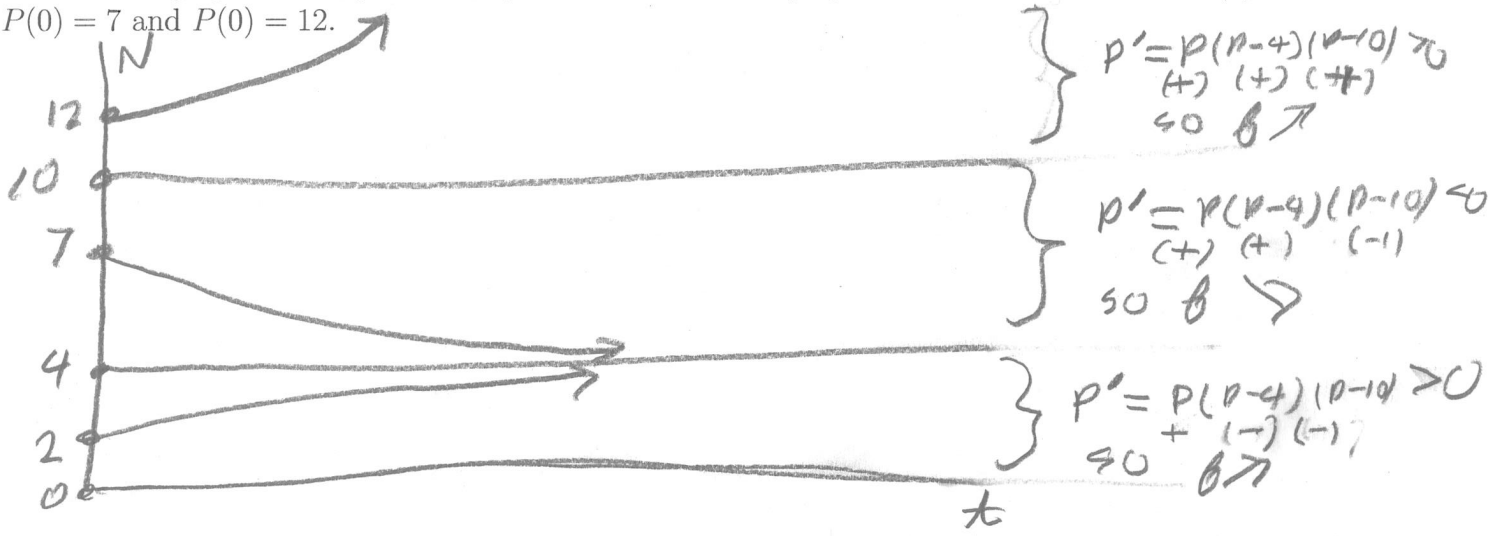
Let $P = P(t)$ satisfy the rate equation

$$\frac{dP}{dt} = P(P-4)(P-10).$$

1. What are the rest points? Rest points are: 0, 4, 10

solve $\frac{dP}{dt} = P(P-4)(P-10) = 0$
to get $P = 0, 4, 10$

2. Make a graph showing the rest points and also the graphs of the solutions with $P(0) = 2$, $P(0) = 7$ and $P(0) = 12$.



3. If $P(0) = 7$ estimate $P(30)$. $P(30) \approx$ 4

starting at $P(0) = 7$ we see that $P(t) \to$ the asymptote $P = 4$

4. If $P(5) = 6$ compute $P'(5)$. $P'(5) =$ −48

$$P'(5) = P(5)(P(5)-4)(P(5)-10)$$
$$= 6(6-4)(6-10)$$
$$= 6(2)(-4)$$
$$= -48$$