

Answers to Practice Quiz 1

1. $P(t) = Ae^{5t}$ where A is an arbitrary constant
2. $P(t) = Ae^{\frac{2}{3}t}$ where A is an arbitrary constant
3. $Q(t) = -\frac{4}{3}t + b$ where b is an arbitrary constant
4. $X(t) = Ae^{-\frac{4}{3}t}$ where A is an arbitrary constant
5. $X_n = A \cdot 5^n$ where A is an arbitrary constant
6. $P_n = -5n + a$ where a is an arbitrary constant
7. $Q_n = A(-\frac{2}{3})^n$ where A is an arbitrary constant
8. $P(t) = 2e^{\frac{2}{3}t}$
9. $Q(t) = -\frac{4}{3}t + 7$
10. $X(t) = e^{-\frac{4}{3}t}$
11. $P_n = 3 \cdot (\frac{5}{7})^n$
12. $Q_n = 5 \cdot (-\frac{2}{3})^n$
13. $-\frac{5}{2}$
14. 2 and 1
15. $\frac{1}{4}$ and -1
16. $-\frac{b}{k}$
17. $\frac{3}{4}$
18. -1
19. -5 and 2
20. -1 and $-\frac{1}{3}$

Numerical Calculations

1. $\frac{\ln 2}{0.02} \approx 34.66$
2. $\frac{1}{20} \ln 3.5 \approx 6.26 \times 10^{-2}$
3. $(\frac{2}{7})^{\frac{1}{12}} \approx 9.01 \times 10^{-1}$
4. 117
5. 2,8,128
6. 0,-4,-4.8
7. 13

Stability

1. $P_{eq} = 3$ is unstable; $P_{eq} = 2$ is stable
2. $X_{eq} = -\ln(0.3)$ is stable
3. $Q_{eq} = 4$ is stable; $Q_{eq} = 1$ is unstable
4. $Y_{eq} = 4$ is unstable; $Y_{eq} = 1$ is stable

Logical thinking: Multiple Choice Questions

1. c
2. c
3. c