1. Solve for t in: $2A_0 = A_0 e^{t(.12)}$

Solution:

$$
\begin{aligned}
2A_0 &= A_0 e^{t(.12)} && \text{(given)}\\
2 &= e^{t(.12)} && \text{(CLM, BI)}\\
\ln(2) &= t(.12) && \text{(def of ln)}\\
\frac{1}{.12}\cdot\ln(2) &= t && \text{(CLM, BI)}\\
5.7762 &\approx t && \text{(calc)}
\end{aligned}
$$

2. Solve for t in: $2A_0 = A_0 e^{t(.06)}$

Solution:

$$
\begin{aligned}
2A_0 &= A_0 e^{t(.06)} && \text{(given)}\\
2 &= e^{t(.06)} && \text{(CLM, BI)}\\
\ln(2) &= t(.06) && \text{(def of ln)}\\
\frac{1}{.06}\cdot\ln(2) &= t && \text{(CLM, BI)}\\
11.5525 &\approx t && \text{(calc)}
\end{aligned}
$$

3. Solve for t in: $2A_0 = A_0 e^{t(.11)}$

Solution:

$$
\begin{aligned}
2A_0 &= A_0 e^{t(.11)} && \text{(given)}\\
2 &= e^{t(.11)} && \text{(CLM, BI)}\\
\ln(2) &= t(.11) && \text{(def of ln)}\\
\frac{1}{.11}\cdot\ln(2) &= t && \text{(CLM, BI)}\\
6.3013 &\approx t && \text{(calc)}
\end{aligned}
$$

4. Solve for t in: $2A_0 = A_0e^{t(.03)}$

Solution:

$$2A_0 = A_0e^{t(.03)} \quad \text{(given)}$$
$$2 = e^{t(.03)} \quad \text{(CLM, BI)}$$
$$\ln\left(2\right) = t(.03) \quad \text{(def of ln)}$$
$$\frac{1}{.03} \cdot \ln\left(2\right) = t \quad \text{(CLM, BI)}$$
$$23.1049 \approx t \quad \text{(calc)}$$

5. Solve for t in: $4A_0 = A_0e^{t(.12)}$

Solution:

$$4A_0 = A_0e^{t(.12)} \quad \text{(given)}$$
$$4 = e^{t(.12)} \quad \text{(CLM, BI)}$$
$$\ln\left(4\right) = t(.12) \quad \text{(def of ln)}$$
$$\frac{1}{.12} \cdot \ln\left(4\right) = t \quad \text{(CLM, BI)}$$
$$11.5525 \approx t \quad \text{(calc)}$$

6. Solve for t in: $6A_0 = A_0e^{t(.06)}$

Solution:

$$6A_0 = A_0e^{t(.06)} \quad \text{(given)}$$
$$6 = e^{t(.06)} \quad \text{(CLM, BI)}$$
$$\ln\left(6\right) = t(.06) \quad \text{(def of ln)}$$
$$\frac{1}{.06} \cdot \ln\left(6\right) = t \quad \text{(CLM, BI)}$$
$$29.8627 \approx t \quad \text{(calc)}$$

7. Solve for t in: $10A_0 = A_0e^{t(.11)}$

Solution:

$$\begin{aligned} 10A_0 &= A_0e^{t(.11)} && \text{(given)} \\ 10 &= e^{t(.11)} && \text{(CLM, BI)} \\ \ln(10) &= t(.11) && \text{(def of ln)} \\ \frac{1}{.11}\cdot\ln(10) &= t && \text{(CLM, BI)} \\ 20.9326 &\approx t && \text{(calc)} \end{aligned}$$

8. Solve for t in: $7A_0 = A_0e^{t(.03)}$

Solution:

$$\begin{aligned} 7A_0 &= A_0e^{t(.03)} && \text{(given)} \\ 7 &= e^{t(.03)} && \text{(CLM, BI)} \\ \ln(7) &= t(.03) && \text{(def of ln)} \\ \frac{1}{.03}\cdot\ln(7) &= t && \text{(CLM, BI)} \\ 64.8637 &\approx t && \text{(calc)} \end{aligned}$$

9. Solve for t in: $\frac{1}{2}A_0 = A_0e^{t(-.12)}$

Solution:

$$\begin{aligned} \frac{1}{2}A_0 &= A_0e^{t(-.12)} && \text{(given)} \\ \frac{1}{2} &= e^{t(-.12)} && \text{(CLM, BI)} \\ \ln\left(\frac{1}{2}\right) &= t(-.12) && \text{(def of ln)} \\ \frac{1}{-.12}\cdot\ln\left(\frac{1}{2}\right) &= t && \text{(CLM, BI)} \\ 5.7762 &\approx t && \text{(calc)} \end{aligned}$$

10. Solve for t in: $\frac{3}{5}A_0 = A_0e^{t(-.06)}$

Solution:

$$\frac{3}{5}A_0 = A_0e^{t(-.06)} \quad \text{(given)}$$
$$\frac{3}{5} = e^{t(-.06)} \quad \text{(CLM, BI)}$$
$$\ln\left(\frac{3}{5}\right) = t(-.06) \quad \text{(def of ln)}$$
$$\frac{1}{-.06}\cdot\ln\left(\frac{3}{5}\right) = t \quad \text{(CLM, BI)}$$
$$8.5138 \approx t \quad \text{(calc)}$$

11. Solve for t in: $\frac{3}{4}A_0 = A_0e^{t(-.03)}$

Solution:

$$\frac{3}{4}A_0 = A_0e^{t(-.03)} \quad \text{(given)}$$
$$\frac{3}{4} = e^{t(-.03)} \quad \text{(CLM, BI)}$$
$$\ln\left(\frac{3}{4}\right) = t(-.03) \quad \text{(def of ln)}$$
$$\frac{1}{-.03}\cdot\ln\left(\frac{3}{4}\right) = t \quad \text{(CLM, BI)}$$
$$9.5894 \approx t \quad \text{(calc)}$$

12. Solve for k in: $\frac{1}{2}A_0 = A_0e^{k\cdot 5}$

Solution:

$$\frac{1}{2}A_0 = A_0 e^{k\cdot 5} \qquad \text{(given)}$$
$$\frac{1}{2} = e^{k\cdot 5} \qquad \text{(CLM, BI)}$$
$$\ln\left(\frac{1}{2}\right) = k\cdot 5 \qquad \text{(def of ln)}$$
$$\frac{1}{5}\cdot\ln\left(\frac{1}{2}\right) = k \qquad \text{(CLM, BI)}$$
$$-0.1386 \approx k \qquad \text{(calc)}$$

---

13. Solve for k in: $\frac{2}{3}A_0 = A_0e^{k\cdot 10}$

Solution:

$$\frac{2}{3}A_0 = A_0 e^{k\cdot 10} \qquad \text{(given)}$$
$$\frac{2}{3} = e^{k\cdot 10} \qquad \text{(CLM, BI)}$$
$$\ln\left(\frac{2}{3}\right) = k\cdot 10 \qquad \text{(def of ln)}$$
$$\frac{1}{10}\cdot\ln\left(\frac{2}{3}\right) = k \qquad \text{(CLM, BI)}$$
$$-0.0405 \approx k \qquad \text{(calc)}$$

---

14. Solve for k in: $\frac{1}{3}A_0 = A_0e^{k\cdot 10}$

Solution:

$$\frac{1}{3}A_0 = A_0 e^{k\cdot 10} \qquad \text{(given)}$$
$$\frac{1}{3} = e^{k\cdot 10} \qquad \text{(CLM, BI)}$$
$$\ln\left(\frac{1}{3}\right) = k\cdot 10 \qquad \text{(def of ln)}$$
$$\frac{1}{10}\cdot\ln\left(\frac{1}{3}\right) = k \qquad \text{(CLM, BI)}$$
$$-0.1099 \approx k \qquad \text{(calc)}$$

15. Solve for k in: $\frac{3}{2}A_0 = A_0 e^{k\cdot 10}$

Solution:

$$\frac{3}{2}A_0 = A_0 e^{k\cdot 10} \quad \text{(given)}$$
$$\frac{3}{2} = e^{k\cdot 10} \quad \text{(CLM, BI)}$$
$$\ln\left(\frac{3}{2}\right) = k \cdot 10 \quad \text{(def of ln)}$$
$$\frac{1}{10} \cdot \ln\left(\frac{3}{2}\right) = k \quad \text{(CLM, BI)}$$
$$0.0405 \approx k \quad \text{(calc)}$$

16. Solve for k in: $\frac{3}{2}A_0 = A_0 e^{k\cdot 7}$

Solution:

$$\frac{3}{2}A_0 = A_0 e^{k\cdot 7} \quad \text{(given)}$$
$$\frac{3}{2} = e^{k\cdot 7} \quad \text{(CLM, BI)}$$
$$\ln\left(\frac{3}{2}\right) = k \cdot 7 \quad \text{(def of ln)}$$
$$\frac{1}{7} \cdot \ln\left(\frac{3}{2}\right) = k \quad \text{(CLM, BI)}$$
$$0.0579 \approx k \quad \text{(calc)}$$

17. Solve for k in: $\frac{1}{10}A_0 = A_0 e^{k\cdot 7}$

Solution:

$$\frac{1}{10}A_0 = A_0 e^{k\cdot 7} \qquad \text{(given)}$$
$$\frac{1}{10} = e^{k\cdot 7} \qquad \text{(CLM, BI)}$$
$$\ln\left(\frac{1}{10}\right) = k\cdot 7 \qquad \text{(def of ln)}$$
$$\frac{1}{7}\cdot\ln\left(\frac{1}{10}\right) = k \qquad \text{(CLM, BI)}$$
$$-0.3289 \approx k \qquad \text{(calc)}$$

---

18. Solve

$$\log_5(x+1) = 2$$

Solution:

$$\log_5(x+1) = 2 \qquad \text{(given)}$$
$$x+1 = 5^2 \qquad \text{(def B of logs)}$$
$$x = 5^2 - 1 \qquad \text{(algebra)}$$

---

19. Solve

$$\log_5(x+1) = -2$$

Solution:

$$\log_5(x+1) = -2 \qquad \text{(given)}$$
$$x+1 = 5^{-2} \qquad \text{(def B of logs)}$$
$$x = 5^{-2} - 1 \qquad \text{(algebra)}$$

---

20. Solve

$$\ln(x+1) = 2$$

Solution:

$$\ln(x+1) = 2 \qquad \text{(given)}$$
$$x+1 = e^2 \qquad \text{(def B of logs)}$$
$$x = e^2 - 1 \qquad \text{(algebra)}$$

---

21. Solve

$$3^{2x+1} = 5$$

Solution:

$$3^{2x+1} = 5 \qquad \text{(given)}$$
$$\log_3(5) = 2x+1 \qquad \text{(def B of logs)}$$
$$-1 + \log_3(5) = 2x \qquad \text{(algebra)}$$
$$\frac{-1+\log_3(5)}{2} = x \qquad \text{(algebra)}$$

alternatively.....

$$3^{2x+1} = 5 \qquad \text{(given)}$$
$$\log\left(3^{2x+1}\right) = \log(5) \qquad \text{(slap a log on each side)}$$
$$(2x+1)\log(3) = \log(5) \qquad \text{(BID)}$$
$$2x\log(3) + 1\cdot\log(3) = \log(5) \qquad \text{(DL)}$$
$$2x\log(3) = -1\cdot\log(3) + \log(5) \qquad \text{(algebra)}$$
$$x = \frac{-\log(3)+\log(5)}{2\log(3)} \qquad \text{(algebra)}$$

yet another alternative..

$$3^{2x+1} = 5 \qquad \text{(given)}$$
$$3^{2x+1} = 3^{\log_3 5} \qquad \text{(inverse functions log property)}$$
$$2x+1 = \log_3 5 \qquad \text{(expo functions are 1-1, } (3^a = 3^b \text{ means } a = b))$$
$$x = \frac{\log_3(5)-1}{2} \qquad \text{(algebra)}$$

---

22. Solve

$$3^{5x+1} = 3^{x-1}$$

23. Solve

$$3^{5x+1} = 9^{x-1}$$

24. Solve

$$3 = 5e^{3x+4}$$

25. Solve

$$3 = 2e^{2x-4}$$

26. Solve

$$2 \cdot 3^{5x+1} = 9^{x-1}$$

27. Solve

$$2 \cdot 3^{5x+1} = 7 \cdot 9^{x-1}$$

Solution:

$$
\begin{aligned}
2 \cdot 3^{5x+1} &= 7 \cdot 9^{x-1} && \text{(given)} \\
\ln\left(2 \cdot 3^{5x+1}\right) &= \ln\left(7 \cdot 9^{x-1}\right) && \text{(ln is well defined.. btw any log base would work)} \\
\ln(2) + \ln\left(3^{5x+1}\right) &= \ln(7) + \ln\left(9^{x-1}\right) && \text{(LP=SL)} \\
\ln(2) + (5x+1)\ln(3) &= \ln(7) + (x-1)\ln(9) && \text{(BID)} \\
\ln(2) + 5x\ln(3) + 1\ln(3) &= \ln(7) + x\ln(9) - 1\ln(9) && \text{(DL)} \\
5x\ln(3) - x\ln(9) &= -\ln(3) - \ln(2) + \ln(7) - \ln(9) && \text{(algebra)} \\
x(5\ln(3) - \ln(9)) &= -\ln(3) - \ln(2) + \ln(7) - \ln(9) && \text{(algebra)} \\
x &= \frac{-\ln(3) - \ln(2) + \ln(7) - \ln(9)}{5\ln(3) - \ln(9)} && \text{(algebra)}
\end{aligned}
$$

28. Solve

$$\log_2 x - \log_2 3 - \log_2(x-2) = -1$$

29. Solve

$$\log_2 x = \log_2 3 + \log_2(x-2)$$

30. Solve (if possible)

$$\log_2 x - \log_4 3 - \log_4(x-2) = 2$$

31. Solve (if possible)

$$5^x = -1$$

Solution: no real solutions..

32. Solve (if possible)

$$.25^x - 5 \cdot .5^x + 6 = 0$$

33. Solve (if possible)

$$16^x - 7 \cdot 4^x + 12 = 0$$

Solution: hint..

$$(4^x+?)\,(4^x+?) = 0$$

34. Solve (if possible)

$$16^{x-1} - 5^x = 0$$