

Solutions to the FAC Initial Assessment

1. $8\ln(1+i)$ or $\ln(1+i)^8$

2. $\frac{4(1+x)^{-5}}{\ln(1+x)} - \frac{1-(1+x)^{-4}}{(1+x)[\ln(1+x)]^2}$

3. $\Gamma(x) = \int_0^{\infty} t^{x-1} e^{-t} dt$

4. $x = 1.707$ or $x = 0.293$

5. $\frac{a(1-r^n)}{1-r}$

6. $e^y(x+2y) \left\{ (4+x+2y) \ln xy + \frac{x+2y}{y} \right\}$

7. 0.06162

8. $-2 < x < 3$

9. $\frac{1}{8} \ln 3 + \frac{3}{2} = 1.637$

10. $1+x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$

11. $r = \frac{ce^{\frac{1}{4}t^4}}{1-ce^{\frac{1}{4}t^4}}$

12. 1.11

13. $\frac{5}{17}$

14. $\mathbf{a \cdot b} = 0$

15. 5928

16. $\begin{pmatrix} \frac{3}{11} & -\frac{1}{11} \\ -\frac{4}{33} & \frac{5}{33} \end{pmatrix}$ The eigenvalues are 3 and 11.

17. $\lambda = \frac{\sum_{i=1}^n x_i}{n}$

18. $\sin(A+B) = \sin A \cos B + \sin B \cos A$

19. $e^{ix} = \cos x + i \sin x$

20. $\lambda^n \exp \left[-\lambda \sum_{i=1}^n x_i \right]$