

6. If $f(m_1) = \frac{m_1 - 1}{m_1 + 1}$, show that

$$\frac{f(m_1) - f(m_2)}{1 + f(m_1)f(m_2)} = \frac{m_1 - m_2}{1 + m_1m_2}.$$

7. If $\phi(x) = a^x$, show that $\phi(y) \cdot \phi(z) = \phi(y + z)$.

8. Given $\phi(x) = \log \frac{1-x}{1+x}$; show that

$$\phi(x) + \phi(y) = \phi\left(\frac{x+y}{1+xy}\right).$$

9. If $f(\phi) = \cos \phi$, show that

$$f(\phi) = f(-\phi) = -f(\pi - \phi) = -f(\pi + \phi).$$

10. If $F(\theta) = \tan \theta$, show that

$$F(2\theta) = \frac{2 F(\theta)}{1 - [F(\theta)]^2}.$$

11. Given $\psi(x) = x^{2n} + x^{2m} + 1$; show that

$$\psi(1) = 3, \quad \psi(0) = 1, \quad \psi(a) = \psi(-a).$$

12. If $f(x) = \frac{2x-3}{x+7}$, find $f(\sqrt{2})$. *Ans.* $-.0204$.