

DIFFERENTIATION

1. If $y = \sqrt{f(x)\sqrt{f(x)\sqrt{f(x)\dots\dots\dots\infty}}$ then $\frac{dy}{dx} = f^1(x)$

2. If $y = \sqrt{f(x) + \sqrt{f(x) + \dots\dots\infty}}$ then $\frac{dy}{dx} = \frac{f^1(x)}{2y-1}$

3. If $x^m \cdot y^n = (x+y)^{m+n}$ then $\frac{dy}{dx} = \frac{y}{x}$

4. If $x^m \cdot y^n = a^{m+n}$ then $\frac{dy}{dx} = -\frac{my}{nx}$

5. If $\sqrt{1-x^{2n}} + \sqrt{1-y^{2n}} = K(x^n - y^n)$ where $n \in \mathbb{N}$. Then $\frac{dy}{dx} = \left(\frac{x}{y}\right)^{n-1} \sqrt{\frac{1-y^{2n}}{1-x^{2n}}}$

6. If $\sqrt{1-x^{2n}} - \sqrt{1-y^{2n}} = K(x^n + y^n)$ where $n \in \mathbb{N}$. Then $\frac{dy}{dx} = \left(\frac{x}{y}\right)^{n-1} \sqrt{\frac{1-y^{2n}}{1-x^{2n}}}$

7. If $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$ Then $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$

8. If $\sqrt{1-x^2} - \sqrt{1-y^2} = a(x+y)$ Then $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$

9. If $a^x + a^y = a^{x+y}$ then $\frac{dy}{dx} = -a^{y-x}$

If $2^x + 2^y = 2^{x+y}$ then $\frac{dy}{dx} = -2^{y-x}$

If $y = \frac{a^{nx} - a^{-nx}}{a^{nx} + a^{-nx}}$ then $\frac{dy}{dx} = \frac{4n \log a}{(a^{nx} + a^{-nx})^2}$