

$$4. y = (1-x)^{\frac{m}{m+n}} (1+x)^{\frac{n}{m+n}}$$

$$y' = -\frac{m}{m+n} (1-x)^{-\frac{m}{m+n}} (1+x)^{\frac{n}{m+n}} + \frac{n}{m+n} (1-x)^{\frac{m}{m+n}} (1+x)^{-\frac{n}{m+n}}$$

$$= -\frac{m}{m+n} \left( \frac{1+x}{1-x} \right)^{\frac{n}{m+n}} + \frac{n}{m+n} \left( \frac{1-x}{1+x} \right)^{\frac{m}{m+n}}$$

$$5. y' = \frac{2 \sin^2 x \cos x}{(\sin x^2)^2}$$

$$5. y' = \frac{2 \sin x \cos x \sin x^2 + 2x \cos x^2 \sin^2 x}{(\sin x^2)^2}$$

$$= \frac{\sin 2x \sin x^2 + 2x \cos x^2 \sin^2 x}{(\sin x^2)^2}$$

$$= \frac{\sin 2x}{\sin x^2} + \frac{2x \sin^2 x \tan x^2}{\sin x^2}$$

$$= \frac{\sin 2x + 2x \sin^2 x \tan x^2}{\sin x^2}$$