

5.2 Verifying Trig Identities

ex: $\sin^3 x \cos^4 x = (\cos^4 x - \cos^6 x) \sin x$ $\left(x^4 - x^6 \right)$

$$= \cos^4 x (1 - \cos^2 x) \sin x$$
$$= \cos^4 x (\sin^2 x) \sin x$$
$$\checkmark = \sin^3 x \cos^4 x$$

ex: $\cos^{\frac{1}{2}} x \sin x - \cos^{\frac{5}{2}} x \sin x = \sin^3 x \sqrt{\cos x}$

Find GCF \rightarrow

$$\frac{\cos^{\frac{1}{2}} x \sin x}{\cos^{\frac{1}{2}} x \sin x} - \frac{(\cos^{\frac{1}{2}} x)^4 \sin x}{\cos^{\frac{1}{2}} x \sin x} =$$
$$\sin x \cos^{\frac{1}{2}} x (1 - (\cos^{\frac{1}{2}} x)^4) =$$
$$\sin x \cos^{\frac{1}{2}} x (1 - \cos^2 x) =$$
$$\sin x \cos^{\frac{1}{2}} x (\sin^2 x) =$$
$$\sin^3 x \cos^{\frac{1}{2}} x =$$
$$\sin^3 x \sqrt{\cos x} = \checkmark$$

$(x^{\frac{1}{2}})^4 = x^2$

ex:

$$\frac{(\cos x + \cos y)(\cos x - \cos y)}{(\cos x + \cos y)(\sin x + \sin y)} + \frac{\sin x - \sin y (\sin x + \sin y)}{\cos x + \cos y (\sin x + \sin y)} = 0$$

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

$$\frac{1 - \cos^2 y - \sin^2 y}{(\cos x + \cos y)(\sin x + \sin y)} =$$

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

$$\frac{0}{(\cos x + \cos y)(\sin x + \sin y)} =$$

$$0 = \checkmark$$