TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

Express each of the following as sums or differences:

2 $2\sin 4\theta \cos 2\theta$

3 $2\cos 3A \cos 5A$

4 $\cos 4A \sin 2A$

5 $\sin(\theta+\alpha)\cos(\theta-\alpha)$

6 $2\cos(45° + A)\sin(45° - A)$

7 $\cos(2\theta+\alpha)\cos(2\theta-\alpha)$

TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

14 $\cos 75° \cos 45°$

15 $2\sin(\theta+\phi)\cos(\theta-\phi)$

16 $\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$

17 $\sin 100° \sin 130°$

18 $2\sin 3\theta \cos\theta$

19 $\cos(\theta+2\phi)\sin(2\theta+\phi)$

TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

Express the following as products:

23 $\sin 3x - \sin x$

24 $\sin(x+\alpha) - \sin x$

25 $\cos(x+h) - \cos x$

26 $\sin(\theta+\alpha) + \sin(\theta-\alpha)$

27 $\cos\left(\frac{\theta+\alpha}{2}\right) + \cos\left(\frac{\theta-\alpha}{2}\right)$

28 $\cos(A+B+C) - \cos(A-B+C)$

TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

36 $\sin(2A + 2B) - \sin(2A - 2B)$ **37** $\sin 165° - \sin 105°$ **38** $\sin\theta - \cos\phi$

39 $\cos 75° - \cos 45°$ **40** $\sin 50° + \cos 20°$ **41** $\sin(A - B) - \sin A$

TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

Prove the following results.

43 $\dfrac{\sin 5\theta - \sin 3\theta}{\cos 5\theta + \cos 3\theta} = \tan\theta$

44 $\dfrac{\sin x + \sin y}{\cos x + \cos y} = \tan\left(\dfrac{x+y}{2}\right)$

45 $\dfrac{\cos x - \cos 3x}{\sin x - \sin 3x} = -\tan 2x$

46 $\dfrac{\sin 2A - \sin 2B}{\sin 2A + \sin 2B} = \dfrac{\tan(A-B)}{\tan(A+B)}$

TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

Prove the following results.

54 $2\cos 37.5° \sin 7.5° = \dfrac{\sqrt{2}-1}{2}$

55 $\sin 25° \sin 35° - \sin 20° \sin 10° = \dfrac{\sqrt{3}-1}{4}$

56 $\sin 10° + \cos 40° = \sin 70°$

57 $\dfrac{\sin 48° + \sin 12°}{\cos 48° + \cos 12°} = \dfrac{\sqrt{3}}{3}$

TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

Prove the following results.

60 $\dfrac{\sin\theta+\sin 7\theta}{\sin 3\theta+\sin 5\theta}=2\cos 2\theta-1$

61 $\dfrac{\sin(\theta+\phi)-\sin(\theta-\phi)}{\cos(\theta+\phi)-\cos(\theta-\phi)}=-\cot\theta$

TRIGONOMETRIC PRODUCTS AS SUMS OR DIFFERENCES

Prove the following results.

65 If $\alpha+\beta+\gamma=\pi$, show that $\sin 2\alpha+\sin 2\beta+\sin 2\gamma=4\sin\alpha\sin\beta\sin\gamma$.