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WED

5.4 | Product to Sum & Sum to Product Formulas

→ see Formula Sheet

ex 1) Express the products as a sum/diff:

$$a) \sin \underbrace{5x}_\alpha \sin \underbrace{2x}_\beta = \frac{1}{2} [\cos(5x-2x) - \cos(5x+2x)]$$

$$\frac{1}{2} [\cos 3x - \cos 7x]$$

$$b) \sin 3x \cos 7x = \frac{1}{2} [\sin(3x+7x) + \sin(3x-7x)]$$

$$\frac{1}{2} (\sin 10x + \sin -4x)$$

↑ odd

$$\frac{1}{2} [\sin 10x - \sin 4x]$$

even-odd

$$\cos(-x) = \cos x$$

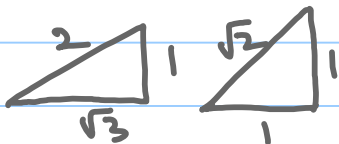
$$\sin(-x) = -\sin x$$

ex 2) Express sum/diff to products:

$$a) \sin 7x + \sin 3x = 2 \sin \frac{7x+3x}{2} \cos \frac{7x-3x}{2}$$

$$= 2 \sin 5x \cos 2x$$

$$b) \cos 75^\circ + \cos 15^\circ = 2 \cos \frac{75+15}{2} \cos \frac{75-15}{2}$$



$$= 2 \cos 45^\circ \cos 30^\circ$$

$$2 \cdot \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} = \frac{\sqrt{6}}{2}$$

p. 623, # 5-12, 18-30 even, 31