

Watch. Practice. Understand. | Lesson 174

The Secret of Proving Trigonometric Identities Sum and Difference

Watch the matching video: <https://www.youtube.com/watch?v=PjbKAXc-Mok>

Practice focus: Sum and difference identities

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Evaluate $\sin 75^\circ$ exactly.

02 Evaluate $\cos 15^\circ$ exactly.

03 Evaluate $\tan 15^\circ$ exactly.

04 Simplify $\sin(x + y) + \sin(x - y)$ by expansion.

Worked answers | Lesson 174

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Practice focus: Sum and difference identities

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01 Evaluate $\sin 75^\circ$ exactly.

$$\sin(45^\circ + 30^\circ) = (\sqrt{2}/2)(\sqrt{3}/2) + (\sqrt{2}/2)(1/2) = (\sqrt{6} + \sqrt{2})/4.$$

02 Evaluate $\cos 15^\circ$ exactly.

$$\cos(45^\circ - 30^\circ) = \cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ = (\sqrt{6} + \sqrt{2})/4.$$

03 Evaluate $\tan 15^\circ$ exactly.

$$\tan(45^\circ - 30^\circ) = (1 - 1/\sqrt{3})/(1 + 1/\sqrt{3}) = 2 - \sqrt{3}.$$

04 Simplify $\sin(x + y) + \sin(x - y)$ by expansion.

Expand both expressions. The $\cos x \sin y$ terms cancel, leaving $2\sin x \cos y$.