C.5 Review Sections 5.3-5.4

Key

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find an exact value. Use the sum or difference formulas

1) sin 75° $\sin(30+45) = \sin 30 \cdot \cos 45 + \cos 30 \cdot \sin 45$

$= \frac{1}{2}\cdot\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4}$

1) $\frac{\sqrt{2}+\sqrt{6}}{4}$

2) cos 15°

$\cos(45-30) = \cos 45 \cdot \cos 30 + \sin 45 \cdot \sin 30 = \frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2}\cdot\frac{1}{2}$

2) $\frac{\sqrt{6}+\sqrt{2}}{4}$

3) $\cos\frac{\pi}{12}$ $\cos\left(\frac{\pi}{3}-\frac{\pi}{4}\right) = \cos\frac{\pi}{3}\cdot\cos\frac{\pi}{4} + \sin\frac{\pi}{3}\cdot\sin\frac{\pi}{4}$

$\frac{1}{2}\cdot\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2}$

3) $\frac{\sqrt{2}+\sqrt{6}}{4}$

Write the expression as the sine, cosine, or tangent of an angle.

4) sin 61° cos 19° - cos 61° sin 19° $\sin(61-19)$

4) $\sin 42°$

5) $\sin\frac{\pi}{3}\cos\frac{\pi}{5} + \cos\frac{\pi}{3}\sin\frac{\pi}{5}$ $\sin\left(\frac{\pi}{3}+\frac{\pi}{5}\right)$

$\frac{5\pi}{15} + \frac{3\pi}{15} = \frac{8\pi}{15}$

5) $\sin\frac{8\pi}{15}$

Prove the identity.

6) $\cos\left(x+\frac{\pi}{2}\right) = -\sin x$

6) ______

$\cos x \cdot \cos\frac{\pi}{2} - \sin x \cdot \sin\frac{\pi}{2}$

$\cos x \cdot 0 - \sin x \cdot 1$

$= -\sin x$ $\blacksquare$

7) cos (x - y) - cos (x + y) = 2 sin x sin y

7) ______

$\cos x\cdot\cos y + \sin x\cdot\sin y - (\cos x\cdot\cos y - \sin x\cdot\sin y)$

$\cancel{\cos x\cdot\cos y} + \sin x\cdot\sin y - \cancel{\cos x\cdot\cos y} + \sin x\cdot\sin y = 2\sin x\cdot\sin y$ $\blacksquare$

Rewrite with only sin x and cos x.

8) sin 2x - cos 2x $2\sin x\cdot\cos x - \cos^2 x + \sin^2 x$

8) ______

Find the exact value by using a half-angle identity.

9) $\sin\frac{\pi}{12}$ $\sin\frac{\pi}{12} = \pm\sqrt{\frac{1-\cos\frac{\pi}{6}}{2}} = \sqrt{\frac{1-\frac{\sqrt{3}}{2}}{2}} = \sqrt{\frac{\frac{2}{2}-\frac{\sqrt{3}}{2}}{2}} = \sqrt{\frac{\frac{2-\sqrt{3}}{2}}{2}} =$

9) $\frac{\sqrt{2-\sqrt{3}}}{\sqrt{4}} = \boxed{\frac{\sqrt{2-\sqrt{3}}}{2}}$

10) $\cos\left(-\frac{\pi}{8}\right)$

10) ______

$\cos\left(-\frac{\pi}{8}\right) = \pm\sqrt{\frac{1+\cos\frac{\pi}{4}}{2}} = \sqrt{\frac{1+\frac{\sqrt{2}}{2}}{2}} = \sqrt{\frac{\frac{2}{2}+\frac{\sqrt{2}}{2}}{2}} = \sqrt{\frac{\frac{2+\sqrt{2}}{2}}{2}} = \frac{\sqrt{2+\sqrt{2}}}{\sqrt{4}} =$

$\boxed{\frac{\sqrt{2+\sqrt{2}}}{2}}$

Prove the identity.

11) sin 4u = 2 sin 2u cos 2u 11) ____________

$\sin(4u) = \sin(2u+2u)$ using sin sum

$\sin 2u \cdot \cos 2u + \cos 2u \cdot \sin 2u$

$= 2\sin 2u \cos 2u$

Find all solutions to the equation in the interval [0, 2 π).

12) sin 2x = -sin x 12) ____________

$2\sin x\cos x + \sin x = 0$

$\sin x(2\cos x + 1) = 0$

$\sin x = 0$ $\boxed{x = 0, \pi}$

$\frac{2\cos x}{2} = -\frac{1}{2}$

$\cos x = -\frac{1}{2}$

$\boxed{x = \frac{2\pi}{3}, \frac{4\pi}{3}}$

13) 2 cos x + sin 2x = 0 13) ____________

$2\cos x + 2\sin x \cdot \cos x = 0$

$2\cos x(1 + \sin x) = 0$

$\cos x = 0$

$x = \frac{\pi}{2}, \frac{3\pi}{2}$

$\sin x = -1$

$x = \frac{3\pi}{2}$