Section 5.4 – Review of Sum and Difference Formulas

$$\sin(\theta+\beta)=\sin\theta\cos\beta+\cos\theta\sin\beta$$

$$\sin(\theta-\beta)=\sin\theta\cos\beta-\cos\theta\sin\beta$$

$$\cos(\theta+\beta)=\cos\theta\cos\beta-\sin\theta\sin\beta$$

$$\cos(\theta-\beta)=\cos\theta\cos\beta+\sin\theta\sin\beta$$

$$\tan(\theta+\beta)=\frac{\tan\theta+\tan\beta}{1-\tan\theta\tan\beta}$$

$$\tan(\theta-\beta)=\frac{\tan\theta-\tan\beta}{1+\tan\theta\tan\beta}$$

Find the EXACT value of the following using sum and difference formulas:

1) $\sin(15°)$

2) $\tan(75°)$

3) $\cos(195°)$

4) $\sin\left(\frac{11\pi}{12}\right)$

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5) $\tan\left(\frac{23\pi}{12}\right)$

6) $\cos\left(\frac{19\pi}{12}\right)$

Write as sine, cosine, or tangent of an angle. After writing as a single function, find the value (if possible without a calculator).

7) $\dfrac{\tan 35° + \tan 10°}{1 - \tan 35° \tan 10°}$

8) $\dfrac{\tan 68° - \tan 115°}{1 + \tan 68° \tan 115°}$

9) $\sin(72)\cos(12) - \cos(72)\sin(12)$

10) $\cos 15° \cos 120° - \sin 15° \sin 120°$

11) $\dfrac{\tan(100) + \tan(20)}{1 - \tan(100)\tan(20)}$

12) $\sin 90° \cos 45° - \cos 90° \sin 45°$

13) $\cos(94°)\cos(18°) + \sin(94°)\sin(18°)$

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14) Find the EXACT value of the trig function given that

$$\sin u = \frac{-8}{17} \quad \cos v = \frac{4}{5} \text{ and both angles are in Quadrant IV}$$

a) $\tan(u - v)$

b) $\cos(u + v)$

15) Find the **exact value** of the trig function given that

$$\sin u = \frac{-3}{5} \text{ and } \cos v = \frac{-5}{13} \text{ where both u and v are in Quadrant III.}$$

a) $\sin(u - v)$

b) $\cos(u - v)$

c) $\tan(u + v)$

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16) Solve the following equations in the domain $[0, 2\pi)$

a) $2(\sin 2x \cos x + \cos 2x \sin x) = \sqrt{2}$

b) $2\cos 2x \cos 3x - 2\sin 2x \sin 3x = 1$