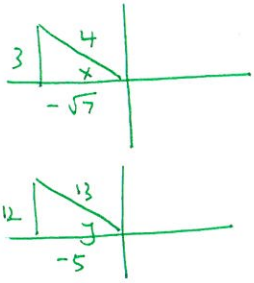
Pre-Calculus **Review Ch.5 Part 1** **Name:** Key
(No notes)

1. If $\sin x = \frac{3}{4}$ and $\cos y = -\frac{5}{13}$ where both x and y are in quadrant II, find $\sin(x+y)$.



$$\sin(x+y) = \sin x\cos y + \sin y\cos x$$
$$= \frac{3}{4}\cdot\frac{-5}{13} + \frac{12}{13}\cdot\frac{-\sqrt{7}}{4}$$
$$= \frac{-15}{52} + \frac{-12\sqrt{7}}{52}$$
$$= \boxed{\frac{-15-12\sqrt{7}}{52}}$$

2. Evaluate $\sin\frac{5\pi}{12}$.

$$\sin\left(\frac{\pi}{4}+\frac{\pi}{6}\right) = \sin\frac{\pi}{4}\cos\frac{\pi}{6} + \sin\frac{\pi}{6}\cos\frac{\pi}{4}$$
$$= \frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2} + \frac{1}{2}\cdot\frac{\sqrt{2}}{2}$$
$$= \boxed{\frac{\sqrt{6}+\sqrt{2}}{4}}$$

Simplify.

3. $\frac{\sec^4 x - \tan^4 x}{\sec^2 x + \tan^2 x}$

$$\frac{(\sec^2 x - \tan^2 x)(\sec^2 x + \tan^2 x)}{\sec^2 x + \tan^2 x}$$
$$\sec^2 x - \tan^2 x$$
$$\boxed{1}$$

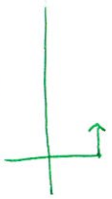
4. $\frac{\cos\alpha}{\sin\alpha} + \frac{\sin\alpha}{\cos\alpha}$ → or $\cot\alpha + \tan\alpha$ ☺

$$\frac{\cos^2\alpha}{\sin\alpha\cos\alpha} + \frac{\sin^2\alpha}{\sin\alpha\cos\alpha}$$
$$\frac{\cos^2\alpha + \sin^2\alpha}{\sin\alpha\cos\alpha}$$
$$\frac{1}{\sin\alpha\cos\alpha}$$
$$\boxed{\csc\alpha\sec\alpha}$$

Verify.

5. $\sec^2 x\tan^2 x + \sec^2 x = \sec^4 x$

$$\sec^2 x(\tan^2 x + 1)$$
$$\sec^2 x \cdot \sec^2 x$$
$$\sec^4 x$$



6. $\frac{\csc x + \sec x}{\sin x + \cos x} = \cot x + \tan x$

$$\frac{\frac{1}{\sin x} + \frac{1}{\cos x}}{\sin x + \cos x}$$
$$\frac{\frac{\cos x + \sin x}{\sin x\cos x}}{\sin x + \cos x}$$
$$\frac{\cos x + \sin x}{\sin x\cos x}\cdot\frac{1}{\sin x + \cos x}$$
$$\frac{1}{\sin x\cos x}$$

$$\frac{\frac{\cos x}{\sin x} + \frac{\sin x}{\cos x}}{}$$
$$\frac{\cos^2 x + \sin^2 x}{\sin x\cos x}$$
$$\frac{1}{\sin x\cos x}$$

Solve. Write answers over the interval $[0,2\pi)$.

7. $\tan^2 x + \tan x = 0$

$\tan x(\tan x + 1) = 0$

$\tan x = 0 \qquad \tan x + 1 = 0$

$\tan x = -1$

$x = 0, \pi \qquad x = \frac{3\pi}{4}, \frac{7\pi}{4}$

8. $\csc^2 x - \csc x - 2 = 0$

$(\csc x - 2)(\csc x + 1) = 0$

$\csc x - 2 = 0 \qquad \csc x + 1 = 0$

$\csc x = 2 \qquad \csc x = -1$

$\sin x = \frac{1}{2} \qquad \sin x = -1$

$x = \frac{\pi}{6}, \frac{5\pi}{6} \qquad x = \frac{3\pi}{2}$

Solve. Write <u>all</u> answers in general form.

9. $4\cos^2 x - 3 = 0$

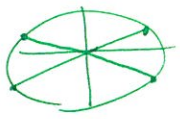
$\cos^2 x = \frac{3}{4}$

$\cos x = \pm\frac{\sqrt{3}}{2}$

$x = \frac{\pi}{6} + 2\pi n, \frac{5\pi}{6} + 2\pi n$

$\frac{7\pi}{6} + 2\pi n, \frac{11\pi}{6} + 2\pi n$

$x = \frac{\pi}{6} + \pi n, \frac{5\pi}{6} + \pi n$



10. $2\cos(3x) - \sqrt{3} = 0$

$\cos(3x) = \frac{\sqrt{3}}{2}$

$3x = \frac{\pi}{6} + 2\pi n \qquad 3x = \frac{11\pi}{6} + 2\pi n$

$x = \frac{\pi}{18} + \frac{2\pi}{3}n, \frac{11\pi}{18} + \frac{2\pi}{3}n$