

These problems are to assist with your studying; they highlight the important concepts throughout Chapters 5 and 6. This material is all relevant but in no way are the exam questions limited to the material you see here.

For numbers 1 through 3, establish each identity.

1.  $\tan \theta \cot \theta - \sin^2 \theta = \cos^2 \theta$

2.  $\frac{1 - \sin \theta}{\sec \theta} = \frac{\cos^3 \theta}{1 + \sin \theta}$

3.  $\frac{\cos(\alpha + \beta)}{\cos \alpha \sin \beta} = \cot \beta - \tan \alpha$

4. Find the exact value of  $\sin 165^\circ$ .

For numbers 5 and 6, use the information given to find the exact values of

(a)  $\sin 2\alpha$     (b)  $\cos(\alpha + \beta)$     (c)  $\sin(\alpha - \beta)$     (d)  $\tan(\alpha + \beta)$     (e)  $\cos 2\beta$     (f)  $\sin\left(\frac{\beta}{2}\right)$     (g)  $\cos\left(\frac{\alpha}{2}\right)$

5.  $\sin \alpha = \frac{4}{5}$ ,  $0 < \alpha < \pi/2$ ,  $\sin \beta = \frac{5}{13}$ ,  $\pi/2 < \beta < \pi$

6.  $\tan \alpha = -2$ ,  $\pi/2 < \alpha < \pi$ ,  $\sec \beta = \frac{8}{3}$ ,  $0 < \beta < \pi/2$

7. Find the exact value of  $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ .

8. Find the exact value of  $\sec\left(\tan^{-1}\frac{\sqrt{3}}{3}\right)$ .

9. Find the exact value of  $\sin\left(\tan^{-1}\frac{3}{4}\right)$ .

10. Find the exact value of  $\sin^{-1}\left(\cos\frac{3\pi}{4}\right)$ .

For problems 11 through 13, solve each equation on the interval  $0 \leq \theta < 2\pi$ .

11.  $\sin 2\theta - \cos \theta - 2\sin \theta + 1 = 0$

12.  $2\sin^2 \theta - 3\sin \theta = -1$

13.  $2\cos^2 \theta + \sin \theta = 1$