p. 387 #15 – 22, 25 – 35 (no 31, 32) ANSWER KEY

15. $\dfrac{1}{\cot^2 x+1}=\dfrac{1}{\csc^2 x}=\sin^2 x$

16. $\dfrac{\sec^2 x-1}{\sec x-1}=\dfrac{(\sec x-1)(\sec x+1)}{\sec x-1}=\sec x+1$

17. $\dfrac{\sin^2\alpha-\cos^2\alpha}{\sin^2\alpha-\sin\alpha\cos\alpha}=\dfrac{(\sin\alpha+\cos\alpha)(\sin\alpha-\cos\alpha)}{\sin\alpha(\sin\alpha-\cos\alpha)}=\dfrac{\sin\alpha+\cos\alpha}{\sin\alpha}=1+\cot\alpha$

18. $\dfrac{\sin^3\beta+\cos^3\beta}{\sin\beta+\cos\beta}=\dfrac{(\sin\beta+\cos\beta)(\sin^2\beta-\sin\beta\cos\beta+\cos^2\beta)}{\sin\beta+\cos\beta}=1-\sin\beta\cos\beta$

19. $\tan^2\theta(\csc^2\theta-1)=\tan^2\theta(\cot^2\theta)$

$=\tan^2\theta\left(\dfrac{1}{\tan^2\theta}\right)=1$

20. $\csc^2 x(1-\cos^2 x)=\csc^2 x(\sin^2 x)=1$

21. $\tan\left(\dfrac{\pi}{2}-x\right)\sec x=\cot x\sec x$

$=\dfrac{\cos x}{\sin x}\cdot\dfrac{1}{\cos x}=\dfrac{1}{\sin x}=\csc x$

22. $\dfrac{\sin(-x)\cot x}{\sin\left(\dfrac{\pi}{2}-x\right)}=\dfrac{(-\sin x)\left(\dfrac{\cos x}{\sin x}\right)}{\cos x}=-1$

For #25 – 36, answers will vary