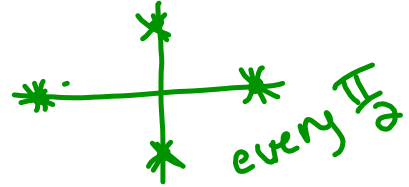


## Chp. 6 Test Solutions

1.  $\cos x \neq 0 \quad \frac{\cos x}{\sin x} \neq 0 \Rightarrow \sin x \neq 0$

(C)



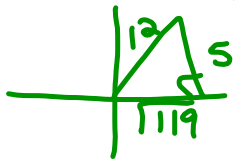
2. (C)  $\cos(135 + 30)$

3.  $\sin \frac{\pi}{2} \cos x - \cos \frac{\pi}{2} \sin x + \sin \frac{\pi}{2} \cos x + \cos \frac{\pi}{2} \sin x$   
 $\cos x + \cos x = 2\cos x$  (A)

4.  $\sec \theta \cot \theta$

$\frac{1}{\cos} \cdot \frac{\cos}{\sin} = \frac{1}{\sin} = \csc \theta$  (B)

5.  $\sin x = \frac{5}{12}$



$\cos 2x \Leftarrow$  double angle

$1 - 2\sin^2 x$

$1 - 2\left(\frac{5}{12}\right)^2$

$1 - 2\left(\frac{25}{144}\right)$

$1 - \frac{50}{144}$

$= \frac{47}{72}$

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

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

$\sin^2 x + \cos^2 x = 1$

$$7. \tan(A+B)$$

$$A = 2\frac{\pi}{3} \quad B = \frac{\pi}{6}$$

$$\tan\left(2\frac{\pi}{3} + \frac{\pi}{6}\right)$$

$$\tan\left(\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{3}$$

$$8. \tan x \cos x = 1$$

$$\frac{\sin x \cdot \cancel{\cos x}}{\cancel{\cos x}} = 1$$

$$\sin x = 1$$

$$x = \frac{\pi}{2} \quad (A)$$

$$9. \sin 2x + \cos x$$

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

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

$$\cos x = 0 \quad \text{or} \quad \sin x = -\frac{1}{2}$$

$$(B)$$

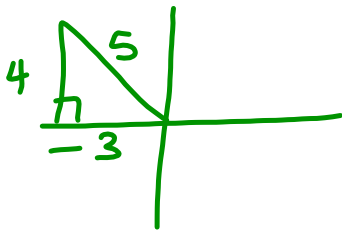
$$10. \frac{\cancel{\sec^2 x} (1 - \cos 2x)}{2 \cancel{\sec^2 x}}$$

$$= \frac{1 - (1 - 2 \sin^2 x)}{2}$$

$$\frac{\cancel{2} \sin^2 x}{\cancel{2}} = \sin^2 x$$

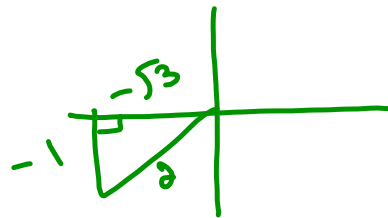
Part 2

$$10. \sin A = \frac{4}{5}$$



$$\cos A = -\frac{3}{5}$$

$$\sin B = -\frac{1}{2}$$



$$\cos B = -\frac{\sqrt{3}}{2}$$

$$\begin{aligned} \sin(A-B) &= \sin A \cos B - \cos A \sin B \\ &= \left(\frac{4}{5}\right)\left(-\frac{\sqrt{3}}{2}\right) - \left(-\frac{3}{5}\right)\left(-\frac{1}{2}\right) \\ &= -\frac{4\sqrt{3}}{10} - \frac{3}{10} \Rightarrow -\frac{4\sqrt{3}-3}{10} \end{aligned}$$

$$11A) \sec^2 x + \csc^2 x = \sec^2 x \csc^2 x$$

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

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

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

$$B) \csc 2\theta - \cot 2\theta = \tan \theta$$
$$\frac{1}{\sin 2\theta} - \frac{\cos 2\theta}{\sin 2\theta}$$

$$\frac{1 - \cos 2\theta}{\sin 2\theta}$$

$$\frac{1 - (1 - 2\sin^2\theta)}{2\sin\theta\cos\theta}$$

$$\frac{\cancel{2}\sin^2\theta}{\cancel{2}\sin\theta\cos\theta}$$

$$\frac{\sin\theta}{\cos\theta} = \frac{\sin\theta}{\cos\theta}$$

$$\begin{aligned}
 c) \quad \frac{1}{1+\sin x} &= \frac{\sec x - \sin x \sec x}{\cos x} \\
 &= \frac{\sec x (1 - \sin x)}{\cos x} \\
 &= \frac{\frac{1}{\cos} (1 - \sin x)}{\cos x} \Rightarrow \frac{\frac{1 - \sin x}{\cos x}}{\cos x}
 \end{aligned}$$

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

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

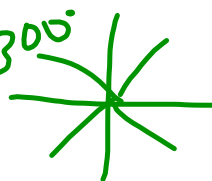
$$\frac{1}{1+\sin x} = \frac{1 - \sin x}{\cancel{(1 - \sin x)}(1 + \sin x)}$$

12.  $3\cos^2x = \sin^2x$

$$\left. \begin{aligned} 3(1 - \sin^2x) - \sin^2x &= 0 \\ 3 - 3\sin^2x - \sin^2x &= 0 \\ -4\sin^2x &= -3 \\ \sin^2x &= \frac{3}{4} \\ \sin x &= \pm \frac{\sqrt{3}}{2} \end{aligned} \right\}$$

$$\begin{aligned} 3\cos^2x &= 1 - \cos^2x \\ 4\cos^2x &= 1 \\ \cos^2x &= \frac{1}{4} \\ \cos x &= \pm \frac{1}{2} \end{aligned}$$

$x = 60, 120, 240, 300$



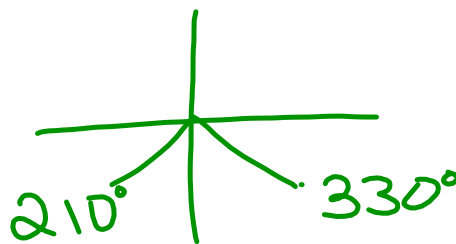
13)  $\sin 3x \cos x - \cos 3x \sin x = -0.5$   
 \*  $\sin(A-B)$  identity

$$\begin{aligned} \sin(3x - x) &= -0.5 \\ \sin(2x) &= -0.5 \end{aligned}$$

let  $m = 2x$

$$\sin m = -0.5$$

$$\sin^{-1}(0.5) = 30^\circ$$



$m = 210^\circ$  or

$m = 330^\circ$

$2x = 210^\circ$

$2x = 330^\circ$

$x = 105^\circ$

$x = 165^\circ$

$+ 180 = 285^\circ$

$+ 180 = 345^\circ$

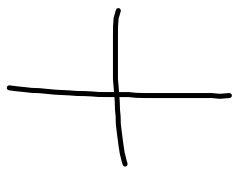
$\frac{7\pi}{12}, \frac{19\pi}{12}$

$\frac{11\pi}{12}, \frac{23\pi}{12}$

## Recap Exponentials

- 1) Growth or Decay?  
Domain & Range  
y-intercept

a)  $y = 5(2)^x$



growth  
D:  $x \in \mathbb{R}$   
R:  $y | y > 0$   
y-int: (0, 5)

b)  $y = 8\left(\frac{1}{3}\right)^x$

decay  
D:  $x \in \mathbb{R}$   
R:  $y | y > 0$   
y-int: (0, 8)

### Mapping of Exponentials

$$f(x) = 2^x \Rightarrow f(x) = 3(2)^{x-6} - 1$$

$$(x, y) \rightarrow (x+6, 3y-1)$$

x	y
-2	1/4
-1	1/2
0	1
2	4

x	y
4	-1/4
5	1/2
6	2
7	5
8	11