

## WRH-13 Solutions

7.4: 2, 18, 31, 37

7.5: 3, 10

7.6: 2, 11, 24, 25, 32, 41, 56, 61, 67

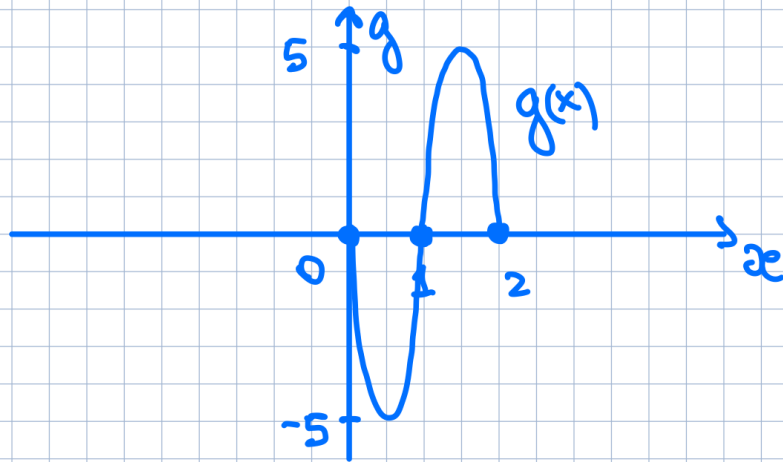
8.1: 1, 8, 11, 15

7.4

2.  $g(x) = -5 \sin(\pi x)$

Amplitude:  $a = |-5| = 5$

Frequency:  $\frac{b}{2\pi} = \frac{\pi}{2\pi} = \frac{1}{2}$



18.  $h(x) = 7 \cos\left(x \cdot \frac{\pi}{2} + \frac{3}{2}\right)$ ,  $b = \frac{\pi}{2}$ ,  $c = \frac{3}{2}$

Amplitude:  $a = |7| = 7$

Period:  $\frac{2\pi}{b} = \frac{2\pi}{\pi/2} = 4$

Phase shift:  $\frac{c}{b} = \frac{3/2}{\pi/2} = \frac{3}{\pi}$  units

31.

$f(x) = 2 - \cos(2\pi x)$

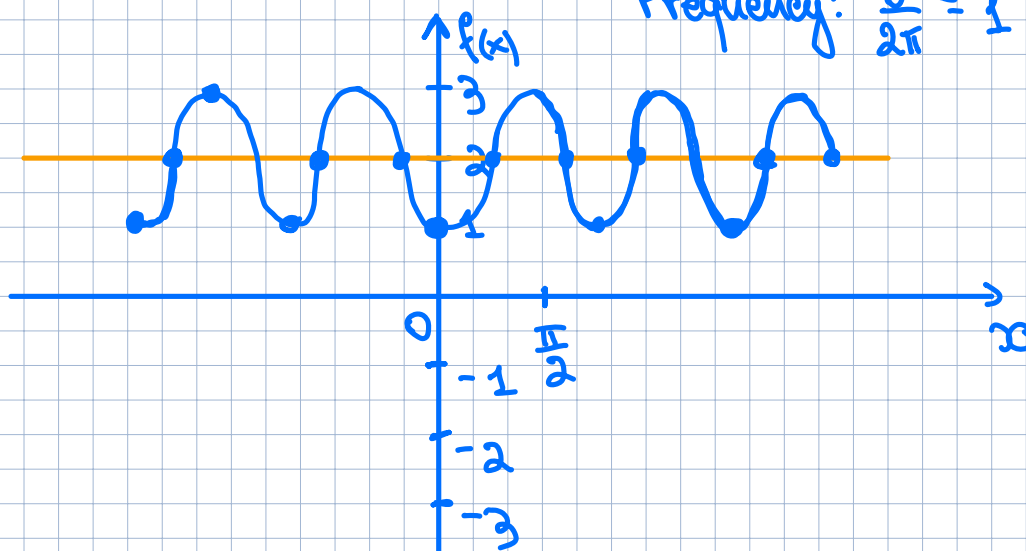
$f(x) = 2 - g(x)$ , where  $g(x) = \cos(2\pi x)$

$a = 1$

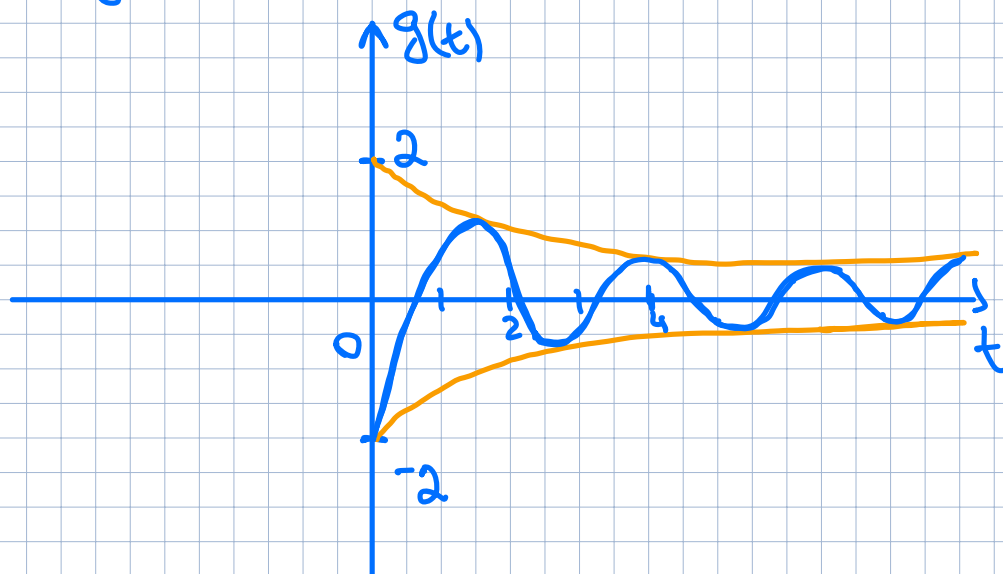
Period:  $\frac{2\pi}{b} = \frac{2\pi}{2\pi} = 1$

Phase Shift: None

Frequency:  $\frac{b}{2\pi} = 1$



37.  $g(t) = -2e^{-t} \cos(5\pi t)$



$$g(t) = f(t) \cdot h(t)$$

$$f(t) = e^{-t}$$

$$h(t) = -2 \cos(5\pi t)$$

Frequency:  $\frac{5\pi}{2\pi} = \frac{5}{2}$

Amplitude:  $a = |-2| = 2$

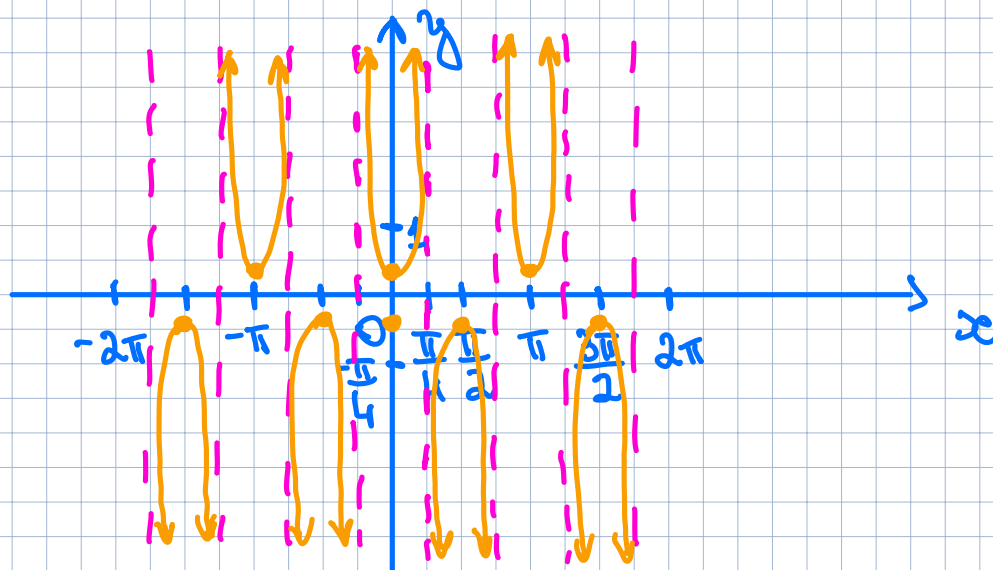
7.5

3.  $g(x) = \frac{1}{3} \sec(2x)$

$$a = |\frac{1}{3}| = \frac{1}{3}$$

$$\text{frequency: } \frac{b}{2\pi} = \frac{2}{2\pi} = \frac{1}{\pi}$$

$$\text{period: } \frac{2\pi}{b} = \frac{2\pi}{2} = \pi$$



$$\sec(x) = \frac{1}{\cos(x)}$$

10.

$$g(x) = 1 + \tan\left(\pi x - \frac{\pi}{4}\right)$$

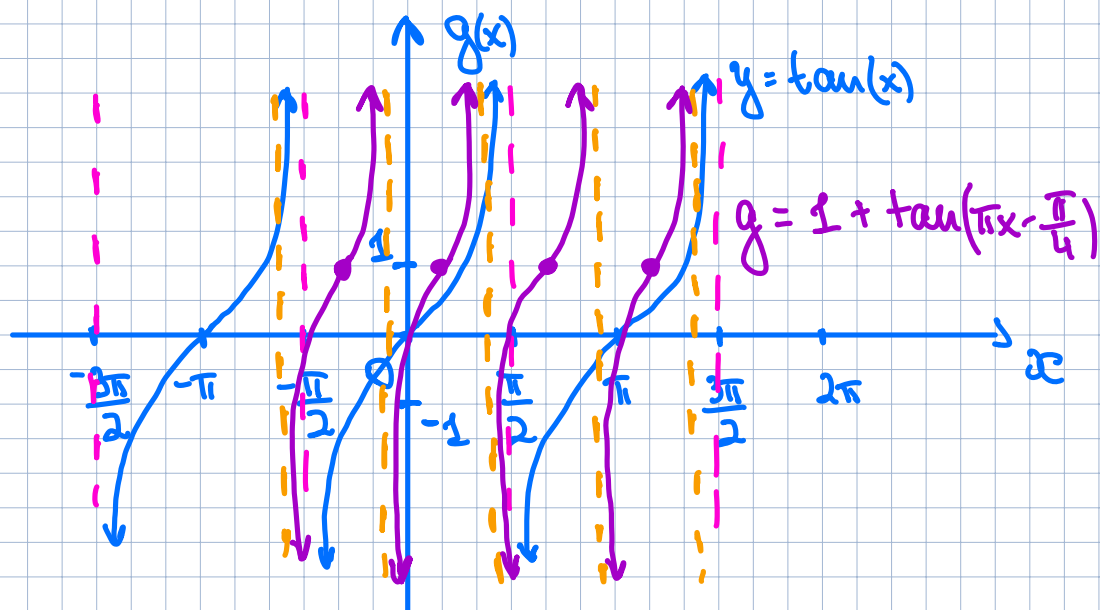
$$g_1(x) = \tan\left(\pi x - \frac{\pi}{4}\right)$$

$$a = |1| = 1$$

$$\text{Period: } \frac{2\pi}{b} = \frac{2\pi}{\pi} = 2$$

Frequency:  $\frac{b}{2\pi} = \frac{1}{2\pi} = \frac{1}{2}$

Phase shift:  $\frac{c}{b} = \frac{\pi}{4 \cdot \pi} = \frac{1}{4}$



Asymptotes:

$$\pi x - \frac{\pi}{4} = \frac{\pi}{2} \quad \text{and} \quad \pi x - \frac{\pi}{4} = -\frac{\pi}{2}$$

$$\pi x = \frac{\pi}{2} + \frac{\pi}{4}$$

$$\pi x = \frac{3\pi}{4}$$

$$x = \frac{3}{4}$$

$$\pi x = -\frac{\pi}{2} + \frac{\pi}{4}$$

$$\pi x = -\frac{\pi}{4}$$

$$x = -\frac{1}{4}$$



7.6

$$2. \quad \cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$$

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

$$x = \frac{\pi}{4}$$

$$11. \quad \operatorname{arcsec}(2) = ?$$

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

$$2 = \sec(x) = \frac{1}{\cos(x)}$$

$$x = \frac{\pi}{3}$$

$$\operatorname{arcsec}(2) = \frac{\pi}{3}$$

$$24. \quad \cot^{-1}(-\sqrt{3}) = ?$$

$$-\sqrt{3} = \cot(x) = \frac{\cos(x)}{\sin(x)}$$

$$x = -\frac{\pi}{6}$$

$$25. \quad \sin^{-1}(-0.2) = ?$$

$$-0.2 = \sin(x)$$

$$-\frac{1}{5} = \sin(x)$$

$$x = -0.2014$$

$$32. \quad \sec^{-1}(-0.5) = ?$$

$$\sec^{-1}(-0.5) = \cos^{-1}\left(\frac{1}{-0.5}\right) = \cos^{-1}(-2)$$

$$-2 = \cos(x)$$

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Since  $-1 \leq \cos(x) \leq 1$

$$41. \quad \cos(\cos^{-1}(-0.8)) = ?$$

$$-0.8 \in \text{dom}(\cos^{-1}(x))$$

$$\text{Then } \cos(\cos^{-1}(-0.8)) = -0.8$$

$$56. \quad \sec\left(\arcsin\left(-\frac{1}{2}\right)\right) =$$

$$\arcsin\left(-\frac{1}{2}\right) = x$$

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

$$x = -\frac{\pi}{6}$$

$$\sec\left(-\frac{\pi}{6}\right) = \sec\left(\frac{\pi}{6}\right) = \frac{1}{\cos\left(\frac{\pi}{6}\right)} = \boxed{\frac{2}{\sqrt{3}}}$$

$$61. \quad \sec\left(\arccos\left(-\frac{\sqrt{2}}{2}\right)\right) = ?$$

$$\arccos\left(-\frac{\sqrt{2}}{2}\right) = x$$

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

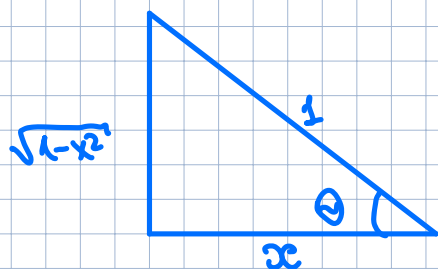
$$x = \frac{3\pi}{4}$$

$$\sec\left(\frac{3\pi}{4}\right) = \frac{1}{\cos\left(\frac{3\pi}{4}\right)} = \frac{1}{\cos\left(\pi - \frac{\pi}{4}\right)} = \boxed{-\sqrt{2}}$$

$$67. \quad \tan(\cos^{-1} x) = ?$$

$$\cos^{-1} x = \theta \Rightarrow x = \cos \theta$$

$$\tan \theta = \frac{\sqrt{1-x^2}}{x}$$



Thus,

$$\tan(\cos^{-1} x) = \boxed{\frac{\sqrt{1-x^2}}{x}}$$



8.1.

$$1. \tan x \cdot \csc x = \frac{\sin x}{\cos x} \cdot \frac{1}{\sin x} = \frac{1}{\cos x} = \sec x$$

$$8. \sin t (\csc t - \sin t) = \sin t \cdot \frac{1}{\sin t} - \sin^2 t = \\ = 1 - \sin^2 t = \cos^2 t$$

$$11. \frac{1 - \tan^2 x}{\cot^2 x - 1} = \frac{1 - \frac{\sin^2 x}{\cos^2 x}}{\frac{\cos^2 x}{\sin^2 x} - 1} = \frac{(\cancel{\cos^2 x} - \sin^2 x) \sin^2 x}{\cos^2 x (\cancel{\cos^2 x} - \sin^2 x)} = \\ = \frac{\sin^2 x}{\cos^2 x} = \tan^2 x$$

15.

$$0 \leq \theta \leq \frac{\pi}{2}$$

$$\sqrt{9 - x^2}, \quad \cos \theta = \frac{x}{3}$$

$$\cos \theta = \frac{x}{3} \Rightarrow x = 3 \cos \theta$$

$$\sqrt{9 - x^2} = \sqrt{9 - (3 \cos \theta)^2} = 3 \sqrt{1 - \cos^2 \theta} =$$

$$= 3 \sqrt{\sin^2 \theta} = 3 |\sin \theta| = 3 \sin \theta \quad \text{Since}$$

$$0 \leq \theta \leq \frac{\pi}{2}$$