Day 28 CW/HW:

* 5.2 p. 362 # 11-19 odd, 33, 34, 39, 40, 47, 49
* 5.3 p. 373 # 37, 39, 41, 42, 44, 48, 61-67 odd

p. 362

(11) $\sin t \csc t = 1$

$\sin t \cdot \frac{1}{\sin t} =$

$1 = \checkmark$

(13) $\frac{\csc^2 x}{\cot x} = \csc x \sec x$

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

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

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

$\csc x \cdot \sec x = \checkmark$

(15) $\cos^2\beta - \sin^2\beta = 1 - 2\sin^2\beta$

$(1 - \sin^2\beta) - \sin^2\beta =$

$1 - 2\sin^2\beta = \checkmark$

(17) $\tan^2\theta + 6 = \sec^2\theta + 5$

$(\sec^2\theta - 1) + 6 =$

$\sec^2\theta + 5 = \checkmark$

(19) $(1+\sin x)(1-\sin x) = \cos^2 x$

$1 - \sin^2 x =$

$\cos^2 x = \checkmark$

(34) $\sec^6 x(\sec x \tan x) - \sec^4 x(\sec x \tan x) = \sec^5 x \tan^3 x$

$\sec x \tan x(\sec^6 x - \sec^4 x) =$

$\sec x \tan x(\sec^4 x(\sec^2 x - 1)) =$

$\sec^5 x \tan x \cdot \tan^2 x =$

$\sec^5 x \tan^3 x = \checkmark$

(33) $\sin^{\frac{1}{2}}x\cos x - \sin^{5/2}x\cos x = \cos^3 x\sqrt{\sin x}$

$\sin^{\frac{1}{2}}x\cos x - (\sin^{\frac{1}{2}}x)^5\cos x =$

$\cos x \sin^{\frac{1}{2}}x\left(1-(\sin^{\frac{1}{2}}x)^4\right) =$

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

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

$\cos^3 x\sqrt{\sin x} = \checkmark$

(39) $\dfrac{\cos x-\cos y}{\sin x+\sin y} + \dfrac{\sin x-\sin y}{\cos x+\cos y} = 0$

(multiply by $\frac{\cos x+\cos y}{\cos x+\cos y}$ and $\frac{\sin x+\sin y}{\sin x+\sin y}$)

$\dfrac{\cos^2 x-\cos^2 y+\sin^2 x-\sin^2 y}{(\cos x+\cos y)(\sin x+\sin y)} =$

$\dfrac{1-\cos^2 y-\sin^2 y}{(\cos x+\cos y)(\sin x+\sin y)} =$

$\dfrac{\sin^2 y-\sin^2 y}{(\cos x+\cos y)(\sin x+\sin y)} =$

$\dfrac{0}{(\cos x+\cos y)(\sin x+\sin y)} =$

$0 = \checkmark$

(46) $\frac{\tan x + \cot y}{\tan x \cot y} = \tan y + \cot x$

$\frac{\tan x}{\tan x \cot y} \cdot \frac{1}{1} + \frac{\cot y}{\tan x \cot y} \cdot \frac{1}{1} =$

$\frac{1}{\cot y} + \frac{1}{\tan x} =$

$\tan y + \cot x = \checkmark$

(47) $2\sec^2 x - 2\sec^2 x \sin^2 x - \sin^2 x - \cos^2 x = 1$

$2\sec^2 x (1 - \sin^2 x) \quad -1(\sin^2 x + \cos^2 x) =$

$2\sec^2 x (\cos^2 x) \quad -1(1) =$

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

$2 - 1 =$

$1 = \checkmark$

(49) $\frac{\cot x \tan x}{\sin x} = \csc x$

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

$\frac{1}{\sin x} =$

$\csc x = \checkmark$

Trigonometry/Precalculus
5.2 Verifying Trig Identities/Application Review
Day _____ CW/HW

Name
Date
Block

p. 362-363 #11 – 19 odd, 33, 34, 39, 40, 47, 49

Plus Application Problems below

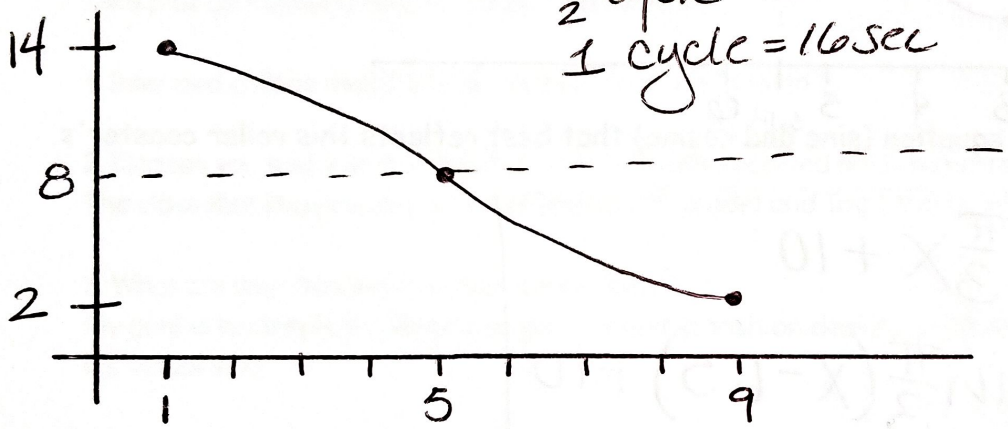
1)

John is floating on a tube in a wave tank. At t = 1second, John reaches a maximun height of 14m above the bottom of the pool. At t = 9seconds, John reaches a minimum height of 2m above the bottom of the pool

a) Sketch a graph below which expresses John's height from the bottom of the pool with respect to time.

$\frac{1}{2}$ cycle = 8 sec
1 cycle = 16 sec

$pb = 2\pi$
$\frac{16b}{16} = \frac{2\pi}{16}$
$b = \frac{\pi}{8}$



b) What is the equation (in terms of sine and cosine), which represents John's motion?

$y = 6\cos\frac{\pi}{8}(x-1)+8$

$y = -6\sin\frac{\pi}{8}(x-5)+8$

c) What is John's height from the bottom of the pool at 21 seconds? $x = 21$ s

$y = 6\cos\left(\frac{\pi}{8}(21-1)\right)+8$

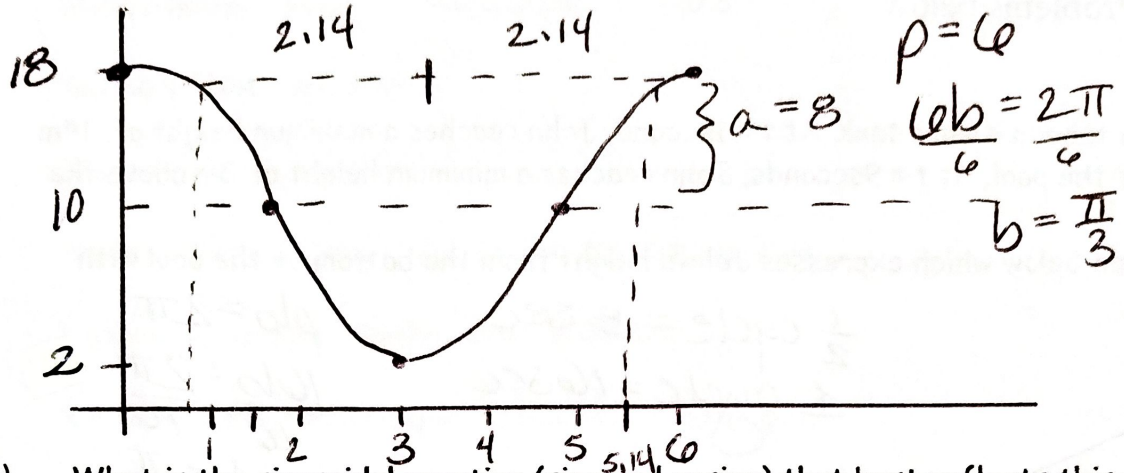
$y = 6\cos\left(\frac{\pi}{8}(20)\right)+8$

$y = 8$ m

2)

In Canada's wonderland there is a roller coaster that is a continuous series of identical hills that are 18m high from the ground. The platform to get on the ride is on top of the first hill. It takes 3 seconds for the coaster to reach the bottom of the hill 2m off the ground

a) Sketch a graph below which expresses the path of the roller coaster.



b) What is the sinusoidal equation (sine and cosine) that best reflects this roller coaster's motion?

$y=8\cos\frac{\pi}{3}x+10$

$y=-8\sin\frac{\pi}{3}(x-1.5)+10$

c) Find the first and second time after the ride begins that the coaster reaches a height of 15 m off the ground.

$15=8\cos\frac{\pi}{3}x+10$

$-10 \qquad -10$

$\frac{5}{8}=\frac{8\cos\frac{\pi}{3}x}{8}$

$\cos^{-1}\frac{5}{8}=\cos^{-1}\cos\frac{\pi}{3}x$

$\frac{3}{\pi}(.896)=\frac{3}{\pi}\left(\frac{\pi}{3}x\right)$

$x=.86\text{sec}$

$3-.86=2.14$

$3+2.14=5.14\text{ sec}$

.86 sec and 5.14 sec