Practice Test , Unit 5 Assessment

Unit 1 – 3

1. Given $f(x)=2x+1$, $g(x)=\dfrac{1}{x^2-1}$,

(a) Find $g\circ f(x)$

(b) if $h(x)=g\circ f(x)$, what is the implied domain for h(x)?

(c) Graph $h(x)$, identify possible asymptotes, x-intercepts, and y-intercepts.

(d) Solve $g\circ f(x)=\dfrac{1}{8}$

2. Solve $\begin{cases}\log_2(x+2)^2+\log_2(y+1)=1\\ \log_2\left(\dfrac{x+2}{y^2+2y+1}\right)=3\end{cases}$

Unit 4-5

3. Given $\sin x=\dfrac{4}{5},\dfrac{\pi}{2}<x<\pi$, $\cos y=-\dfrac{5}{13},\pi<y<\dfrac{3\pi}{2}$, and $\begin{cases}k\sin(x+y)-m\cos(x-y)=\dfrac{74}{65}\\ k\sin(x-y)+m\cos(x+y)=\dfrac{98}{65}\end{cases}$

(a) Find m and k.

(b) Find $\sec\left(\dfrac{y}{2}\right)$

(c) Find $\dfrac{\sin y}{\cos x}$

4. Evaluate $\csc\left[\arctan\left(-\dfrac{15}{8}\right)+\arcsin\left(\dfrac{5}{6}\right)\right]$

5. Rewrite the following trigonometric expression to algebraic expression. All angles in the following expressions are in the first quadrant.

$$\tan\left(\arccos x+\arctan\frac{1}{x}\right)$$

6. Verify trigonometric identity: $\tan\dfrac{x}{2}=\csc x-\cot x$

7. Solve the trigonometric equation: $3\sec^3 x+3\sec^2 x-4\sec x-4=0$

8. Given $x \in [0, 2\pi)$, solve the trigonometric equations: $\sin\left(\frac{x}{2}\right) + \cos x = 1$

9. (Angles of depression)

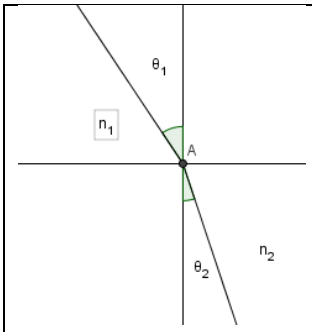
A tourist standing on the top of a light house saw ship A on the sea with angle of depression of 4° and ship B with angle of depression of 7°. On a plaque in the light house it read that it was 350 feet tall.

a) which ship is further away from the tourist?

b) How far apart were these two ships?

c) If at time of the sighting of the ships, A and B were starting to move towards the shore, and A was moving at speed of 10 ft/sec, what should the speed of B so that two ships can arrive at the shore at the same time?

10. (Snell's Law)



Snell's law of refraction says that the angle of incident θ_1 and the angle of refraction θ_2 has the following relationship

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

where n are the refractive index of the medium where the light travel.
in vacuum (air) n = 1
in water, n = $\frac{4}{3}$

A person is 5.5 feet tall standing in a river with water reached his knee (about 2 feet deep) saw a trout appeared to be 6 feet away from where he stood. Use the Snell's law to estimate actually how far away was the trout from where he stood?