Math 140 Practice Exam 4

Write angles in exact radians, no decimals, no degrees.

1(10). For the graph below, find the amplitude, find the period, and find an equation of the form $y = \pm A\sin(Bx)$ or $y = \pm A\cos(Bx)$.

\[ (3,2) \]

2(14). Graph $y = -2\sin(\pi x - \pi)$.

3(9). Graph $y = \tan(-x/2 + \pi)$ over one period. List the x-intercepts and the vertical asymptotes which occur in this period.

4(9). Graph $y = \sec(x + \pi)$. Draw the asymptotes as dotted lines. Be prepared to graph cot and csc.

5(6). Simplify $\sin(x+y)\cos x - \cos(x+y)\sin x$.

6(6). Simplify $\frac{\tan(\pi/5) - \tan(\pi/30)}{1 + \tan(\pi/5)\tan(\pi/30)}$.

7(12). $x = (\sin \theta)/2$, $\frac{\pi}{2} < \theta < \pi$.
   (a) Find $\sin 2\theta$.
   (b) Find $\sin(\theta/2)$
   (c) Find $\tan(\theta/2)$

8(5). Write as a sum or difference of trig functions.
   $\cos(x-1)\sin(x+1)$

9(5). Find all solutions to $\cos \theta + \frac{\sqrt{3}}{2} = 0$.
Two sets of solutions.

10(10). Find all solutions of $2\sin^2 x + 5\cos x = 4$.
Two sets of solutions.

Answers

1. amplitude = 2, period = 6, $y = -2\cos\frac{\pi}{3}x$

2.

3. x-inter: $2\pi$, vert. asymp: $x = \pi, x = 3\pi$.

4.

5. $\sin y$

6. $1/\sqrt{3}$

7. (a) $-4x\sqrt{1 - 4x^2}$
   (b) $\sqrt{\frac{1 + \sqrt{1 - 4x^2}}{2}}$
   (c) $\frac{2x}{\sqrt{1 - \sqrt{1 - 4x^2}}}$

8. $\frac{1}{2}[\sin(2) + \sin(2x)]$

9. $\theta = -5\pi/6 + 2\pi n, \ 5\pi/6 + 2\pi n$

10. $x = \frac{\pi}{3} + 2\pi n, \ x = -\frac{\pi}{3} + 2\pi n$