Trig Test Review

Solving Equations

Find all solutions in the range $[0, 2\pi)$

1. $4\sin^2(x) = 9$
2. $\cos^3(x) = \cos(x)$
3. $3\sec^2(x) - 4 = 0$
4. $3\tan^2(x) - 9 = 0$
5. $\sin^2(x) - 3\sin(x) + 2 = 0$
6. $2\sin^2(x) + \sin(x) = 1$

Find all solutions in the range $[0, 2\pi)$

1. $2\sin(3x) = -1$
2. $\cos^2(2x) = 1$
3. $\sec^2(6x) = 4$

Find all solutions in the range $[0, 2pi)$ using a calculator

1. $3\sin(x) + 5 = 4$
2. $\sin^2(x) = \frac{3}{8}$
3. $\tan(x) = \pi^2$
4. $\cot(x) = -100$

Graph at least one period of the following. For each, identify amplitude, phase shift, period and vertical displacement. Also state domain (or domain restrictions) and range. ("Amplitude" only makes sense for sine and cosine but for other graphs just say what "A" is). Make a table for each.

1. $y = 3 + \cos(2x)$
2. $y = \cos(x + \frac{\pi}{4})$
3. $y = 2 - \sin(x + \frac{\pi}{2})$
4. $y = \tan(x/2) + 1$
5. $y = 3\tan(x) - 1$
6. $y = -2\sec(x) + 1$
7. $y = 2 - \sin(2(x - \pi))$

Write a trig function whose graph has the following properties

1. A sine with amplitude 3, phase shift $-\pi$, period π and vertical displacement 4.
2. A tangent with $A = -2$, phase shift 1 and period 1.
3. A cosine with amplitude 1/2, phase shift -0.3 and period 2.29
4. The fundamental frequency of the note middle C, played on a flute, as a sine wave.

Solve the following triangles (find all missing pieces unless specified)). Draw a clearly labeled picture for each.

1. $a = 12.3, b = 19.4, C = 38°$
2. $a = 20, b = 30, c = 40$
3. $A = 43.2°, a = 50, b = 60$
4. Two radar stations are tracking the same plane. The angle of elevation from Station A to the plane is 67°, the angle of elevation to the plane from Station B is 82°. Station A is 3.2 miles from Station B. Find the distances from each station to the plane. What is the altitude of the plane?
5. Two ships leave a harbor at the same time. One ship travels at a bearing of N12°E (this means 14 degrees north of due east) at 14 mph. The other ship travels on a bearing of S75°E at 10 mph. How far apart will the ships be after three hours?
6. Closed to tourists since 1990, the Leaning Tower of Pisa in Italy leans at an angle of about 84.7°. The figure shows that 171 feet from the base of the tower, the angle of elevation to the top is 50°. If a bird is sitting on the very top of the tower, how high is the bird?
7. You are sailing a boat and need to get to an island that is 50 miles to the West of your current location. But there are rough seas along the direct route. To avoid this, you take a path at a bearing of 245 for 30 miles. How far away are you from the island and at what bearing must you now sail to get to the island?