More Trig Problems

Math 130 *Kovitz*

1. Evaluate using a sum or difference identity
   (a) $\cos 165^\circ$
   (b) $\sin(x + \frac{\pi}{3})$
   (c) $\sin(x + 3.01)$
2. Simplify $\sin 37^\circ \cos 8^\circ + \cos 37^\circ \sin 8^\circ$.
3. Express $\cos(x + 2) - \cos(x - 2)$ in terms of $\sin x$ and/or $\cos x$, and simplify.
4. Assume that x satisfies $\frac{\pi}{2} < x < \pi$ and that $\sin x = \frac{3}{5}$.
   (a) Find $\sin 2x$.
   (b) Find $\cos 2x$.
   (c) Find $\sin \frac{1}{2}x$.
   (d) Find $\cos \frac{1}{2}x$.
   (e) Sketch x, $2x$, and $\frac{1}{2}x$ on the unit circle.
5. Given that $\cos 132.843643^\circ \approx -.68$, approximate $\cos 66.4218215^\circ$ without resorting to the use of trig tables or a calculator.
6. Find all solutions with $0 \le x \le 2\pi$ for $\sin x = \frac{1}{2}$.
7. (a) Find all solutions with $0 \le x \le 2\pi$ for $\sin 2x = \cos x$.
   (b) Graph $\sin 2x$ and $\cos x$ on the same axes and indicate on your sketch the points corresponding to the solutions in part (a).
8. (a) Graph $y = \arccos x$. Plot five points, labeling them with their coordinates, both in decimal form and in terms of radicals and π. For example: $(.866025403,\ .523598) = (\frac{\sqrt{3}}{2},\ \frac{\pi}{6})$.
   (b) Plot the points where
      i. $x = 0$
      ii. $x = -\frac{1}{2}$
      iii. $x = \frac{\sqrt{3}}{2}$
      iv. $x = -.530511337$
      v. $x = .367013401$
      vi. $y = .367013401$
   (c) By drawing on the same axes the line $y = -x$, determine how many points on the previous graph, $y = \arccos x$, have $-x = y$ (that is: how many x have $-x = \arccos x$).
9. Simplify
   (a) $\cos(\arccos(-.74))$
   (b) $\arcsin(\sin 2.4))$

10. Find an angle between 0° and 180°, that is between 0 and π radians, whose cosine is equal to (giving the angle in both radians and degrees):

    (a) .322265695

    (b) $-.833885822$

    (c) $-.275637355$

    (d) $-.416146837$

11. A triangle has sides of lengths 5, 16, and 19 feet. Find the angle in radian measure between the two shorter sides.

12. A triangle has sides of lengths 4, 9, and 11 feet. Find the angle in radian measure between the two shorter sides.

13. Use the Law of Cosines to find side c if side $a = 15$, side $b = 7$, and angle $C = 1.047197551$ radians.

14. Find $\angle A$.