More Trig Problems
Math 130 Kovitz

1. Evaluate using a sum or difference identity
   (a) \( \cos 165^\circ \)
   (b) \( \sin(x + \frac{\pi}{4}) \)
   (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 \( \sin x = \frac{2}{3} \).
   (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 \( \cos 132.843643^\circ \approx -0.68 \), approximate \( \cos 66.4218215^\circ \) without resorting to the use of trig tables or a calculator.

6. Find all solutions with \( 0 \leq x \leq 2\pi \) for \( \sin x = \frac{1}{2} \).

7. (a) Find all solutions with \( 0 \leq x \leq 2\pi \) 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 \( \pi \).
    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 $0^\circ$ and $180^\circ$, that is between 0 and $\pi$ 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 $\angle A$. 

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A \\
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\begin{array}{c}
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\end{array}
\begin{array}{c}
B \\
\end{array}
\begin{array}{c}
C \\
\end{array}
\begin{array}{c}
b = 3 \\
\end{array}
\begin{array}{c}
c = 5 \\
\end{array}
\begin{array}{c}
a = 6 \\
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