Math 5: Music and Sound. Basic math practise

Also look at the math reviews on the course Resources page

1. Find the smallest angle in a right triangle with sides 3,4,5. Give answer in degrees and in radians.

2. What is period of the function \((\sin t)^2\)? (Sketch it) Find a trig identity that writes this signal as a pure tone plus a constant.

3. What is frequency of the signal \(\sin(300t + 5)\)?

4. Find the set of all \(x\) satisfying a) \(\cos(x) = 0\), b) \(\sin(x - 2) = -1\)

5. Simplify \(\log((2^3)^{-5})\) to the form \(a\log b\) then evaluate.

6. Find all angles that have the same \(\sin\) as 30 degrees.

7. Find a) \(e^{\log 10}\), b) \(e^{-\log 10}\), c) \(\log_{10} 0.001\)

8. Expand \((1 + x)^3\)

9. Solve for \(x\) in \(\log(1 - x) - \log(1 + x) = 2\) [Hint: combine the logs first]
Answers
1. $\sin^{-1} \frac{3}{5} = .64$ rad or 36.9 degrees.
2. \( \pi. \ -\frac{1}{2} \cos(2t) + \frac{1}{2} \)
3. \( \omega = 300 \) so \( f = 300/(2\pi) = 47.75 \) Hz
4. a) \( \pi/2 + n\pi \) for any integer \( n \), b) \( x = 3\pi/2 + 2 + 2\pi n \).
5. \(-15 \log 2 = -10.40 \)
6. 30 and 150 degrees (and plus 360n degrees for integer \( n \), if you want)
7. a) 10, b) 1/10, c) -3
8. \( 1 + 3x + 3x^2 + x^3 \)
9. \( x = (1 - e^2)/(1 + e^2) = -0.762 \)