

## 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.  $\sin^{-1} 3/5 = .64$  rad or 36.9 degrees.
2.  $\pi \cdot -\frac{1}{2} \cos(2t) + \frac{1}{2}$
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.  $x = (1 - e^2)/(1 + e^2) = -0.762$