Sine of the Times

I. Last Week’s Key Points
   • Change of Base Formula: \( \log_a x = \frac{\ln x}{\ln a} \)

   • In general, to solve an exponential equation:
     1. Isolate the exponential expression on one side.
     2. Take the logarithm of both sides to “bring down the exponent.”
     3. Solve for the variable.

   • In general to solve a logarithmic equation:
     1. Isolate the logarithmic expression on one side.
     2. Write equation in exponential form. Change \( \log_b (\text{argument}) = \text{exponent} \) to \( b^{\text{exponent}} = \text{argument} \)
     3. Solve for the variable.
     4. Check the domain.

   • The amount or population \( P \) at time \( t \) is \( P(t) = P(0)e^{kt} = P(0)e^{kt\ln a} \) where \( P(0) \) is the initial population at time \( t = 0 \). Using exponential and log rules, show \( a^{kt} = e^{kt\ln a} \).

   • The amount of a radioactive substance at time \( t \) is \( A(t) = A(0)e^{kt} \). The half-life of a radioactive substance is how long it takes for half of the substance to decay.

   • There are basically two algebraic methods used for solving a system of equations: substitution and elimination.

II. This Week
   • Angles, radians, degrees, revolutions, acute, obtuse, complement, supplement
   • Circles, radius, diameter, circumference, area, arc, sector, chord, secant line, tangent line
   • Trig functions: sine, cosine, tangent, secant, cosecant, cotangent
   • Pythagorean Theorem: If a right triangle has legs of length \( a \) and \( b \) and hypotenuse of length \( c \), then \( c^2 = a^2 + b^2 \).

   • In a \( 30 – 60 – 90 \) degree triangle \( \left( \frac{\pi}{6}, \frac{\pi}{3}, \frac{\pi}{2} \right) \triangle \), the hypotenuse is twice as long as the length of the leg across from the 30-degree angle (or twice the length of the shortest side!).

   • In a \( 45 – 45 – 90 \) degree triangle \( \left( \frac{\pi}{4}, \frac{\pi}{4}, \frac{\pi}{2} \right) \triangle \), the length of the legs are equal.

   • Graphs of trig functions
   • Trig identities

III. Resources and Tips
   • Have you started studying for your third exam?
   • Are you working the WIR problems?
   • Are you attending the Math 150 help sessions and your instructor’s office hours?
   • Are you keeping up with your online homework, as well as attending all your classes?

IV. Quotes and Jokes

Trigonometry is a sine of the times. ~Author Unknown