H. Algebra II Semester II Review
Part 9 – Trigonometric Identities and Logarithm Rules

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9.a Applying Angle Sum/Difference and Double Angle Identities for Evaluation

Evaluate the following trigonometric functiions without using a calculator.

1. $\sin\left(\frac{13\pi}{12}\right)$
2. $\cos\left(\frac{5\pi}{8}\right)$

Review the angle sum/difference and double angle identities for sine and cosine

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9.b Evaluation of Related Angles using Double Angle Identities

Given that $\tan\theta = -\frac{1}{4}$ **and** $\frac{\pi}{2} < \theta < \pi$**, evaluate the each trigonometric function without using a calculator.**

1. $\sin\theta$
2. $\cos\theta$
3. $\sin 2\theta$
4. $\cos 2\theta$
5. $\tan 2\theta$

Use the double angle sine and cosine identities. Recall that sine and cosine have a range of -1 to 1 and should never exceed those values.

9.c Properties of Logarithms

Expand each expression using properties of logarithms.

1. $\log\left(x\cdot\sqrt[3]{1-x}\right)$
2. $\log_5\left(\frac{x^2}{y\cdot z^3}\right)$
3. $\ln\left(\frac{4x^3}{y^2(x-1)^5}\right)$

Condense each expression using properties of logarithms.

4. $3\log 2 + 2\log x - \frac{1}{2}\log(x+4)$
5. $2\log_5(x-1) - \log_5(x^2-1)$
6. $\ln(a-b) + \ln(a+b) - 2\ln(c) - \ln(d)$

The properties of logarithms are produced from the properties of exponents and have similarities.