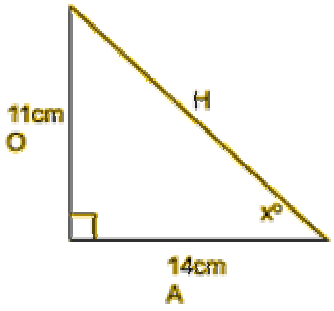
Precalculus Review Notes

Jean Yang, September 29, 2005

Topics you should know

- Trigonometry – angles, graphs, identities
- Complex numbers
- (Conic sections)
- Continuity and limits
- Polynomial functions
- (Parametric equations and polar coordinates)
- Exponential and logarithmic functions
- Sequences and series

SOH-CAH-TOA



$$\sin\theta = \frac{Opposite}{Hypotenuse}$$

$$\cos\theta = \frac{Adjacent}{Hypotenuse}$$

$$\tan\theta = \frac{Opposite}{Adjacent} = \frac{\sin\theta}{\cos\theta}$$

Review of Logarithms

What is a log?

$\log_a c=b \leftrightarrow a^b = c$

- a is the *base*; 2 is the *logarithm*
- if there is no base indicated, the base is 10

Natural logs

$\ln b=a \leftrightarrow e^a = b$

Properties of logs

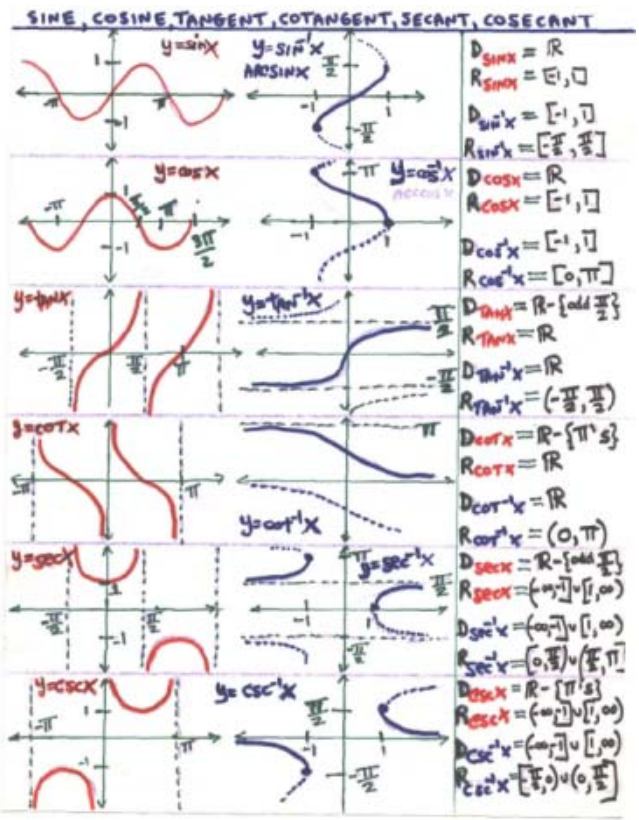
- $\log_r(ab) = \log_r a + \log_r b$
- $\log_r (a/b) = \log_r a - \log_r b$
- $\log_r a^b = b(\log_r a)$

Shifts of graphs

Take a function f(x) and a constant c > 0.

Let's look at the following shifts…

- f(x) – c → vertical shift down
- f(x) + c → vertical shift up
- f(x – c) → horizontal shift right
- f(x + c) → horizontal shift left
- cf(x) → vertical stretch
- (1/c)f(x) → vertical compression
- f(cx) → horizontal compression
- f[(1/c)x] → horizontal stretch



Transformations of sine and cosine

Recall from class the formula

$$y = A\cos(Bx - D) + C$$

A is the *amplitude* (1/2 of the total height).

$2\pi/B$ is the *period*.

C designates the *vertical shift* of the graph.

D designates the *horizontal shift* of the graph.