

Trigonometry

You are expected to have the following facts memorized.

$$1. \sin x = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$2. \cos x = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$3. \tan x = \frac{\text{opposite}}{\text{adjacent}}$$

$$4. \tan x = \frac{\sin x}{\cos x} = \frac{1}{\cot x}$$

$$5. \sec x = \frac{1}{\cos x}$$

$$6. \csc x = \frac{1}{\sin x}$$

$$7. \sin^2 x + \cos^2 x = 1$$

$$8. \tan^2 x + 1 = \sec^2 x$$

$$9. 1 + \cot^2 x = \csc^2 x$$

$$10. \sin(2x) = 2 \sin x \cos x$$

$$11. \cos^2 x = \frac{1}{2}(1 + \cos 2x)$$

$$12. \sin^2 x = \frac{1}{2}(1 - \cos 2x)$$

$$13. \cos x = \frac{e^{ix} + e^{-ix}}{2}$$

$$14. \sin x = \frac{e^{ix} - e^{-ix}}{2i}$$

$$15. e^{ix} = \cos x + i \sin x$$

$$16. \cosh x = \frac{e^x + e^{-x}}{2}$$

$$17. \sinh x = \frac{e^x + e^{-x}}{2}$$

$$18. e^x = \cosh x + \sinh x$$

You should also know the the graphs of the trig functions and hyperbolic trig functions, as well as the values of the trig functions for the angles $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{\pi}{4},$ and $\frac{\pi}{3}$.