What Students Need to Know by Memory in Trigonometry

Following is a list of facts that students in all sections of trigonometry should memorize. During tests students should not be allowed to use notes or cards listing these, but should recall them by memory alone.

1. Definitions:

$$\sin\theta = \frac{y}{r} = \frac{opposite}{hypotenuse}$$

$$\cos\theta = \frac{x}{r} = \frac{adjacent}{hypotenuse}$$

$$\tan\theta = \frac{y}{x} = \frac{opposite}{adjacent}$$

2. The Pythagorean identities:

$$\sin^2\theta + \cos^2\theta = 1$$

$$1 + \tan^2\theta = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$

3. The quotient identities: $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$ $\cot\theta = \dfrac{\cos\theta}{\sin\theta}$

4. The numerical values of the sin, cos, and tan of those angles (whether the angle is given in degrees or radians): $\left\{0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \pi, \frac{3\pi}{2}\right\}$

5. The arc length formula: $s = r\theta$.

6. The double-angle formulas:

$$\sin(2A) = 2\sin A \cdot \cos A$$

$$\cos(2A) = \cos^2 A - \sin^2 A$$

$$\cos(2A) = 2\cos^2 A - 1$$

$$\cos(2A) = 1 - 2\sin^2 A$$

7. The sum and difference formulas:

$$\sin(A \pm B) = \sin A \cdot \cos B \pm \sin B \cdot \cos A$$

$$\cos(A \pm B) = \cos A \cdot \cos B \mp \sin A \cdot \sin B$$

8. The graphs of the six trig functions. (Most important: sine, cosine and tangent.)

9. The Law of Sines: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$.

10. The Law of Cosines: $a^2 = b^2 + c^2 - 2bc\cos A$.