The Quadratic Formula
If $a \neq 0$, then the solutions to the equation $ax^2 + bx + c = 0$ are given by the formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$ 

Exact Trigonometric Values

<table>
<thead>
<tr>
<th>Function \ $\theta$</th>
<th>0</th>
<th>$\pi/6$</th>
<th>$\pi/4$</th>
<th>$\pi/3$</th>
<th>$\pi/2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sin \theta$</td>
<td>0</td>
<td>1/2</td>
<td>$\sqrt{2}/2$</td>
<td>$\sqrt{3}/2$</td>
<td>1</td>
</tr>
<tr>
<td>$\cos \theta$</td>
<td>1</td>
<td>$\sqrt{3}/2$</td>
<td>$\sqrt{2}/2$</td>
<td>1/2</td>
<td>0</td>
</tr>
<tr>
<td>$\tan \theta$</td>
<td>0</td>
<td>$\sqrt{3}/3$</td>
<td>1</td>
<td>$\sqrt{3}$</td>
<td>undefined</td>
</tr>
</tbody>
</table>

Sum and Difference Formulas

\[
\begin{align*}
\sin(\alpha + \beta) &= \sin(\alpha) \cos(\beta) + \cos(\alpha) \sin(\beta) \\
\sin(\alpha - \beta) &= \sin(\alpha) \cos(\beta) - \cos(\alpha) \sin(\beta) \\
\cos(\alpha + \beta) &= \cos(\alpha) \cos(\beta) - \sin(\alpha) \sin(\beta) \\
\cos(\alpha - \beta) &= \cos(\alpha) \cos(\beta) + \sin(\alpha) \sin(\beta)
\end{align*}
\]

Obscure Trigonometric Functions

\[
\begin{align*}
cot \theta &= \cos \theta / \sin \theta, \quad (\cot x)' = -\csc^2 x \\
csc \theta &= 1 / \sin \theta, \quad (\csc x)' = -\csc x \cot x
\end{align*}
\]

Exponential Growth and Compounding

A quantity is said to undergo exponential growth if the amount $P(t)$ at time $t$ is given by a function of the form $P_0 e^{kt}$ for some constants $P_0$ and $k$. (If $k < 0$, the term exponential decay is used.)

An amount of money $P_0$ invested at an annual interest rate of $r$ compounded $n$ times a year will have grown to

$$P_0 \left(1 + \frac{r}{n}\right)^{nt}$$

after $t$ years. If the compounding is continuous, the amount is $P_0 e^{rt}$.

Areas, Volumes, Etc

- Circumference of a circle, $2\pi r$.
- Area of a circle, $\pi r^2$.
- Area of a triangle, $bh/2$.
- Area of a sphere, $4\pi r^2$.
- Volume of a sphere, $4\pi r^3/3$.
- Volume of a cylinder with circular base, $\pi r^2 h$.
- Volume of a cone with circular base, $\pi r^2 h/3$. 