SOEN 6011 : SOFTWARE ENGINEERING PROCESSES
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PROBLEM - 1
Function Description

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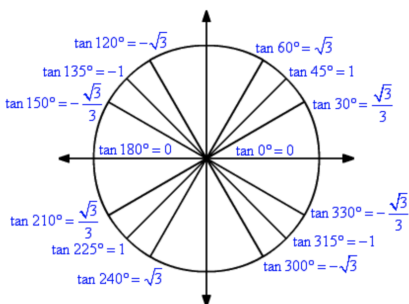# Contents

Description of Function

F2: $tan(x)$

Tangent Function, $tan(x)$

[1] $tan(x)$ is a periodic function which is very important in trigonometry. The simplest way to understand the tangent function is to use the unit circle. For a given angle measure θ draw a unit circle on the coordinate plane and draw the angle centered at the origin, with one side as the positive x -axis. The x -coordinate of the point where the other side of the angle intersects the circle is $cos()$ and the y -coordinate is $sin()$. So, the tangent function is define as below:

$$tan(x) = \frac{sin(x)}{cos(x)}$$

The below graph shows values corresponding to different angles.

[1][2]The tangent function is undefined when $x = \pi / 2 + n\pi$ (where, n is integer) for which, $cos(x) = 0$. However, Tangent function does not have an amplitude. In addition, The graph intercept x-axis at $n\pi$ (where n is integer) and in y-axis at $(0,0)$ point. The period of tangent function is π.

Range

[1][2] The range of $tan(x)$ is all real number $\mathbb{R}$, $(-\infty, +\infty)$.

Domain and Co-domain

[1][2] The domain of tangent function is $x \in \mathbb{R}$, $x \neq \pi / 2 + n\pi$ where, n is an integer. The co-domain of $tan(x)$ is $(-\infty, +\infty)$.

Bibliography

[1] Varsity Tutors.
https://www.varsitytutors.com/hotmath/hotmath_help/topics/tangent-function

[2] varsitytutors.graphing tangent function.
https://www.varsitytutors.com/hotmath/hotmath_help/topics/graphing-tangent-function

Context of Use Model

Users can use the calculator to calculate the result of $sin()$, $cos()$ and $\frac{sin()}{cos()}$ which is $tan()$ of a degree. This degree shall be an integer or decimal, so the digits *0-9* and the decimal point must be available by the user. The user can select the appropriate function they want to use, and they shall be able to press a button to have the answer computed. The calculator should return the result or an error message that indicates why it was unable to do so.

Calculator

Valid input

User

Result or Error Message