- Derivatives of Trigonometric Functions
- Examples and Applications

Derivatives of Sine and Cosine

1. $D_x(\sin x) = \cos x$.
2. $D_x(\cos x) = -\sin x$.

Proof:

Derivatives of Tangent, Cotangent, Secant, and Cosecant

Use the derivatives of sine and cosine with the rules for differentiation from 3.3 to determine the following derivatives.

1. $D_x(\tan x) =$

2. $D_x(\cot x) =$

3. $D_x(\sec x) =$

4. $D_x(\csc x)$

You may use any of the above previous derivatives with the rules for differentiate to determine the following.

1. Find $D_x y$ of $y = \tan^2 x$

2. Find all points on the graph of $y = 9 \sin x \cos x$ where the tangent line is horizontal.

3. Show that the curves $y = \sqrt{2} \sin x$ and $y = \sqrt{2} \cos x$ intersect at right angles at a certain point with $0 < x < \dfrac{\pi}{2}$.

4. Consider a Ferris wheel of radius 30 feet which is rotating counterclockwise with an angular velocity of 2 radians per second. How fast is the seat on the rim rising (in the vertical direction) when it is 15 feet above the horizontal line through the center of the wheel?