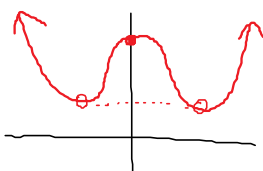


6.5 Exploring Graphs of the Reciprocal Trigonometric Functions

| | |
|---|--|
| <p>A Cosecant Function The cosecant function is the reciprocal of the sine function.</p> $\text{csc}(x) = \frac{1}{\sin(x)}$ | <p>Ex 1. In the following figure is represented graphically the sine function. Graph the cosecant function $\text{csc}(x) = \frac{1}{\sin(x)}$ on the same grid.</p> |
| | |
| <p>Ex 2. List the characteristics of the cosecant function.</p> <p>a) Domain $x \neq k\pi$</p> <p>b) Range $(-\infty, -1] \cup [1, \infty)$</p> <p>c) Symmetry in the origin</p> <p>d) Even/Odd/Neither</p> | <p>e) Vertical Asymptote(s) $x = k\pi$</p> <p>f) Horizontal Asymptote(s) none</p> <p>g) Zero(s) none</p> <p>i) Minimum/maximum point(s) none</p> <p>j) Period $= 2\pi$</p> |
| <p>B Secant Function The secant function is the reciprocal of the cosine function:</p> $\text{sec}(x) = \frac{1}{\cos(x)}$ | <p>Ex 3. In the following figure is represented graphically the cosine function. Graph the secant function $\text{sec}(x) = \frac{1}{\cos(x)}$ on the same grid.</p> |
| | |

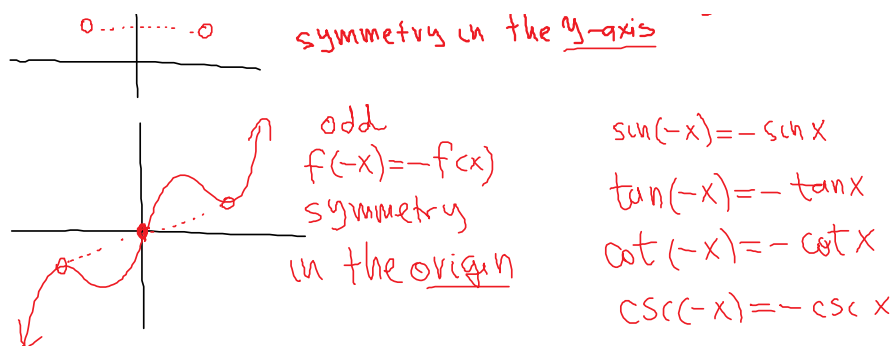
| | |
|---|---|
| <p>Ex 4. List the characteristics of the secant function.</p> <p>a) Domain $x \neq \frac{\pi}{2} + k\pi$</p> <p>b) Range $(-\infty, -1] \cup [1, \infty)$</p> <p>c) Symmetry <i>in the y-axis</i></p> <p>d) <u>Even</u>/Odd/Neither</p> | <p>e) Vertical Asymptote(s) $x = \frac{\pi}{2} + k\pi$</p> <p>f) Horizontal Asymptote(s) <i>none</i></p> <p>g) Zero(s) <i>none</i></p> <p>i) <u>Minimum</u>/maximum point(s) <i>none</i></p> <p>j) Period $= 2\pi$ (<i>undefined</i>)</p> |
| <p>C Cotangent Function</p> <p>The cotangent function is the reciprocal of the tangent function:</p> $\cot(x) = \frac{1}{\tan(x)} = \frac{\cos(x)}{\sin(x)}$ | <p>Ex 5. In the following figure is represented graphically the tangent function. Graph the cotangent function</p> $\cot(x) = \frac{1}{\tan(x)} = \frac{\cos(x)}{\sin(x)}$ on the same grid. |
| | |
| <p>Ex 6. List the characteristics of the cotangent function.</p> <p>a) Domain $x \neq k\pi$</p> <p>b) Range $\mathbb{R} = (-\infty, \infty)$</p> <p>c) Symmetry <i>in the origin</i></p> <p>d) Even/<u>Odd</u>/Neither</p> | <p>e) Vertical Asymptote(s) $x = k\pi$</p> <p>f) Horizontal Asymptote(s) <i>none</i></p> <p>g) Zero(s) $\frac{\pi}{2} + k\pi$</p> <p>i) Minimum/maximum point(s) <i>none</i></p> <p>j) Period $T = \pi$</p> |
| <p>Ex 7. Write $\sec(x)$ as a transformation of the function $\csc(x)$.</p> | <p>Ex 8. Write $\cot(x)$ as a transformation of the function $\tan(x)$.</p> |

Reading: Nelson Textbook, Pages 350-352
 Homework: Nelson Textbook, Page 353: #4, 5, 6, 7



even
 $f(-x) = f(x)$
 symmetry *in the y-axis*

$\cos(-x) = \cos(x)$
 $\sec(-x) = \sec(x)$



Note All trig. functions are periodic
 (have cycles)

$$f(x + \tau) = f(x)$$

$$\sin(x + 2\pi) = \sin x$$

$$\tan(x + \pi) = \tan x$$