

Finding Absolute Extrema with Trig. Functions

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For each problem, find all points of absolute minima and maxima on the given interval.

1) $f(x) = 2\csc(x); \left(-\frac{\pi}{4}, \frac{3\pi}{4}\right]$

2) $y = -\tan(x); \left[-\frac{3\pi}{4}, \frac{\pi}{4}\right)$

3) $y = -\tan(x); \left[0, \frac{3\pi}{4}\right)$

4) $f(x) = -2\cot(x); \left(-\frac{\pi}{4}, \frac{3\pi}{4}\right)$

5) $f(x) = -2\tan(x); \left[0, \frac{\pi}{4}\right)$

6) $f(x) = \sec(2x); \left(0, \frac{\pi}{2}\right]$

7) $f(x) = -\csc(x); \left(-\frac{\pi}{2}, \frac{3\pi}{4}\right)$

8) $y = -\cos(x); \left[-\frac{\pi}{2}, \frac{\pi}{2}\right)$

9) $y = \csc(x); \left(-\frac{\pi}{4}, \frac{\pi}{4}\right]$

10) $f(x) = -2\csc(x); \left[-\frac{\pi}{2}, \frac{\pi}{4}\right]$

11) $f(x) = -\csc(2x); \left(-\frac{\pi}{4}, \frac{\pi}{4}\right)$

12) $f(x) = -2\csc(x); \left[-\frac{\pi}{4}, \frac{\pi}{2}\right)$

13) $f(x) = \cot(2x); \left[-\frac{3\pi}{4}, \frac{\pi}{4}\right]$

14) $f(x) = -2\tan(x); \left[-\frac{3\pi}{4}, \frac{3\pi}{4}\right)$

15) $y = \csc(2x); \left(-\frac{3\pi}{4}, \frac{\pi}{4}\right]$

16) $f(x) = -\sec(2x); \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

17) $f(x) = -\cos(2x); \left[-\frac{\pi}{4}, \frac{\pi}{2}\right]$

18) $y = -2\sin(x); \left[-\frac{\pi}{2}, 0\right)$

19) $f(x) = -\tan(2x); \left(-\frac{\pi}{2}, 0\right)$

20) $f(x) = -2\csc(x); \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Answers to Finding Absolute Extrema with Trig. Functions

- 1) No absolute minima. 2) No absolute minima. 3) No absolute minima. 4) No absolute minima.
 No absolute maxima. No absolute maxima. No absolute maxima. No absolute maxima.
- 5) No absolute minima. 6) No absolute minima. 7) No absolute minima.
 Absolute maximum: $(0, 0)$ No absolute maxima. No absolute maxima.
- 8) Absolute minimum: $(0, -1)$ 9) No absolute minima. 10) No absolute minima.
 Absolute maxima: $(-\pi, 1), (\pi, 1), \left(-\frac{\pi}{2}, 0\right)$ No absolute maxima. No absolute maxima.
- 11) No absolute minima. 12) No absolute minima. 13) No absolute minima. 14) No absolute minima.
 No absolute maxima. No absolute maxima. No absolute maxima. No absolute maxima.
- 15) No absolute minima. 16) No absolute minima. 17) Absolute minimum: $(0, -1)$
 No absolute maxima. No absolute maxima. Absolute maxima: $\left(-\frac{\pi}{2}, 1\right), \left(\frac{\pi}{2}, 1\right), \left(\frac{\pi}{2}, 1\right)$
- 18) Absolute minimum: $\left(\frac{\pi}{2}, -2\right)$ 19) No absolute minima. 20) No absolute minima.
 Absolute maxima: $\left(-\frac{\pi}{2}, 2\right), \left(-\frac{\pi}{2}, 2\right)$ No absolute maxima. No absolute maxima.