

Trigonometric Functions

7.7 Graphs of the Tangent, Cotangent, Cosecant and Secant Functions

1. y-intercept: 0
2. No y-intercept.
3. y-intercept: 1
4. No y-intercept.
5. $\sec x = 1$ for $x = -2, 0, 2$; $\sec x = -1$ for $x = -\frac{\pi}{2}, \frac{\pi}{2}$
6. $\csc x = 1$ when $x = -\frac{3}{2}, \frac{3}{2}$; $\csc x = -1$ when $x = -\frac{\pi}{2}, \frac{\pi}{2}$
7. $y = \sec x$ has vertical asymptotes for $x = -\frac{3}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3}{2}$
8. $y = \csc x$ has vertical asymptotes for $x = -2, -\frac{\pi}{2}, 0, \frac{\pi}{2}, 2$
9. $y = \tan x$ has vertical asymptotes for $x = -\frac{3}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3}{2}$
10. $y = \cot x$ has vertical asymptotes for $x = -2, -\frac{\pi}{2}, 0, \frac{\pi}{2}, 2$

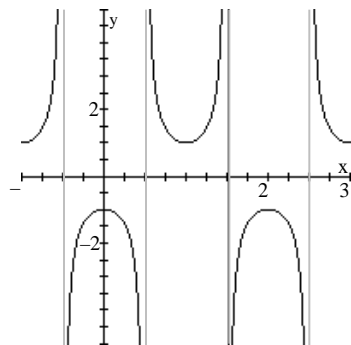
11. B

12. D

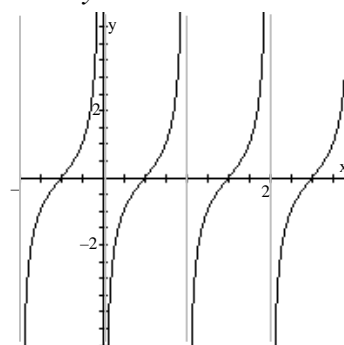
13. A

14. C

15. $y = -\sec x$

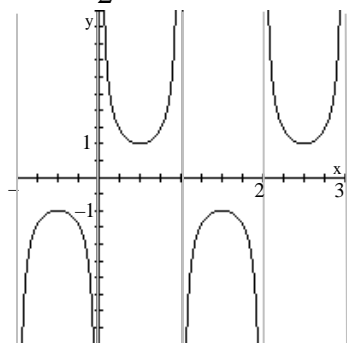


16. $y = -\cot x$

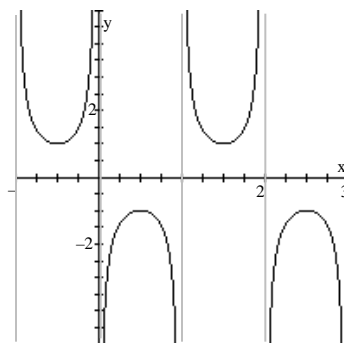


Section 7.7 Graphs of the Tangent, Cotangent, Cosecant and Secant Functions

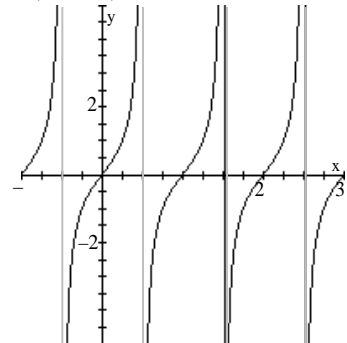
17. $y = \sec x - \frac{1}{2}$



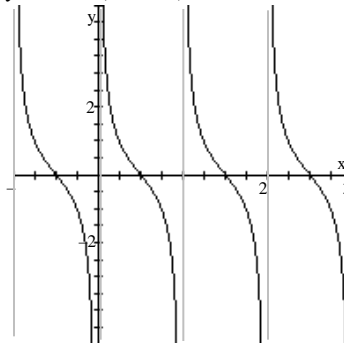
18. $y = \csc(x - \frac{\pi}{2})$



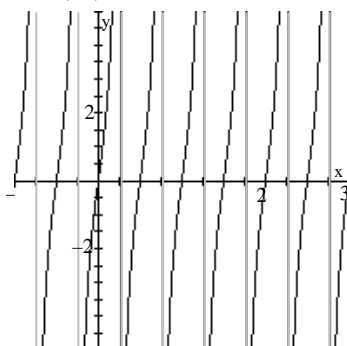
19. $y = \tan(x - \frac{\pi}{2})$



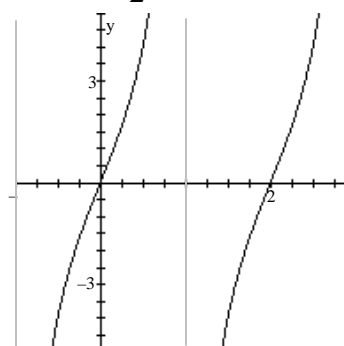
20. $y = \cot(x - \frac{\pi}{2})$



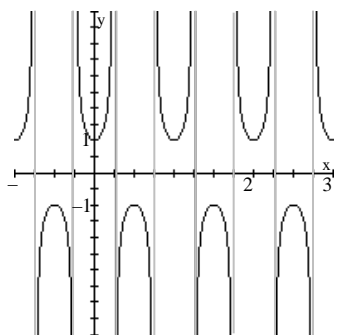
21. $y = 3\tan(2x)$



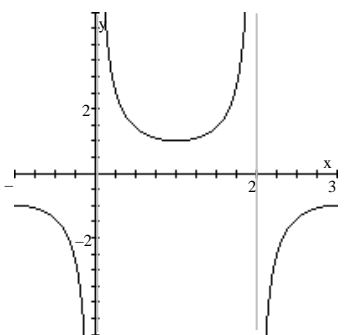
22. $y = 4\tan\frac{1}{2}x$



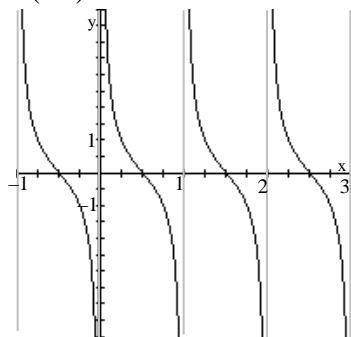
23. $y = \sec(2x)$



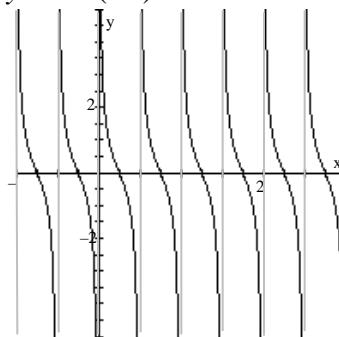
24. $y = \csc\frac{1}{2}x$



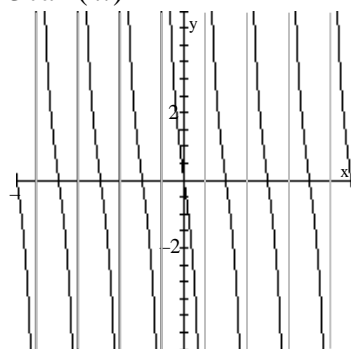
25. $y = \cot(x)$



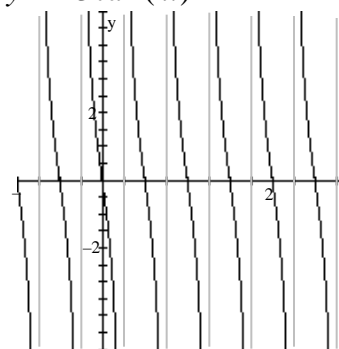
26. $y = \cot(2x)$



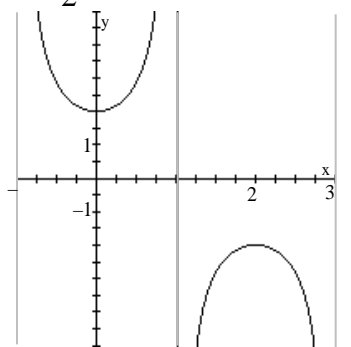
27. $y = -3\tan(4x)$



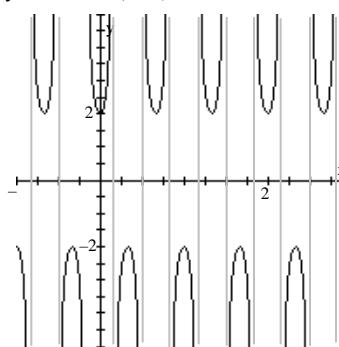
28. $y = -3\tan(2x)$



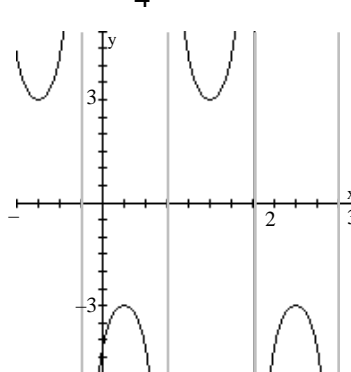
29. $y = 2\sec\left(\frac{1}{2}x\right)$



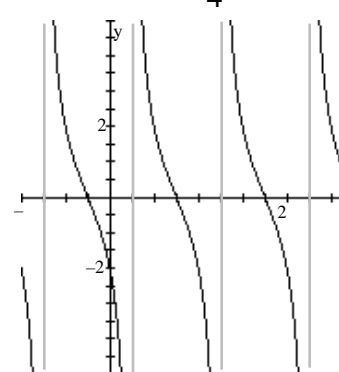
30. $y = 2\sec(3x)$



31. $y = -3\csc x + 4$

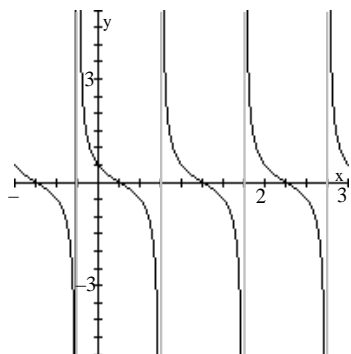


32. $y = -2\tan x + 4$

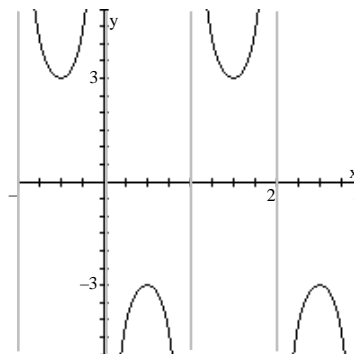


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33. $y = \frac{1}{2} \cot x + \frac{\pi}{4}$

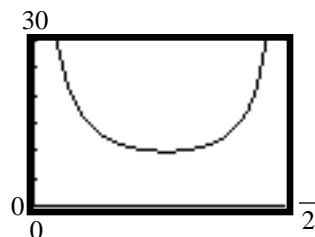


34. $y = 3 \sec x + \frac{\pi}{2}$



35. (a) $L = \frac{3}{\cos \theta} + \frac{4}{\sin \theta} = 3 \sec \theta + 4 \csc \theta$

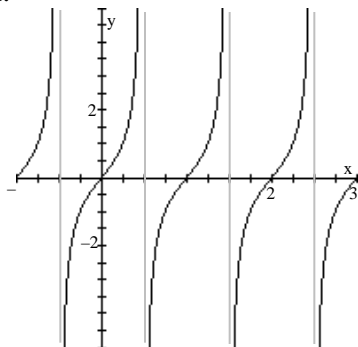
(b) Graph:



(c) Use MINIMUM to find the least value: L is least when $\theta = 0.83$.

(d) $L = \frac{3}{\cos(0.83)} + \frac{4}{\sin(0.83)} \approx 9.86$ feet

36. Graph:



The two functions are equal to each other.