

Trig Test Retch

Key

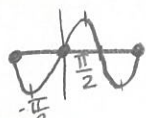
Finding the smallest positive asymptote (Question 3)

<p>1. $f(x) = -2\csc(3x - \frac{\pi}{4}) - 3$</p> <p>$\frac{1}{\sin}$ </p> <p>$3x - \frac{\pi}{4} = 0$</p> <p>$3x = \frac{\pi}{4}$</p> <p>$x = \frac{\pi}{12}$</p>	<p>2. $f(x) = -\tan(2x - \frac{\pi}{6}) + 1$</p> <p>$\frac{\sin}{\cos}$ </p> <p>$2x - \frac{\pi}{6} = \frac{\pi}{2}$</p> <p>$2x = \frac{2\pi}{3}$</p> <p>$x = \frac{\pi}{3}$</p>
<p>3. $f(x) = 8\sec(\frac{x}{3} - \pi) - 7$</p> <p>$\frac{1}{\cos}$ </p> <p>$\frac{x}{3} - \pi = -\frac{\pi}{2}$</p> <p>$\frac{x}{3} = \frac{\pi}{2}$</p> <p>$x = \frac{3\pi}{2}$</p>	<p>4. $f(x) = 4\cot(\frac{1}{2}(x - 3\pi))$</p> <p>$\frac{\cos}{\sin}$ </p> <p>$\frac{1}{2}x - \frac{3\pi}{2} = -\pi$</p> <p>$\frac{1}{2}x = \frac{\pi}{2}$</p> <p>$x = \pi$</p>

Finding the exact value of a trig function (Questions 6-9)

<p>5. $\sec^{-1}(\frac{2\sqrt{3}}{2})$</p> <p>$\frac{1}{\cos}$ </p> <p>$\frac{-6\pi}{6} = -\frac{\pi}{6}$</p> <p>$\sec \frac{\pi}{6} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{2}$</p> <p>$\cos(\frac{\pi}{6}) = \frac{\sqrt{3}}{2}$</p> <p>$\frac{2\sqrt{3}}{2}$</p>	<p>6. $\tan^{-1}(\sqrt{3})$</p> <p>$\frac{\sin}{\cos}$ </p> <p>$(4\pi) \frac{12\pi}{3} + \frac{2\pi}{3}$</p> <p>$\tan(\frac{\pi}{3}) = \sqrt{3}$</p> <p>$\frac{\sin}{\cos} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$</p>
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Evaluate (Questions 11-12)



$\sin[-\frac{\pi}{2}, \frac{\pi}{2}]$ Restrict to I & IV values
 $-1 \leq x \leq 1$

<p>7. $\sec^{-1}(-\frac{1}{2})$</p> <p>$\frac{1}{\cos}$ $\cos^{-1}(-\frac{1}{2})$</p> <p>$\pi - \frac{\pi}{3} = \frac{2\pi}{3}$</p> <p>$\frac{2\pi}{3}$</p>	<p>8. $\csc^{-1}(\sqrt{2})$</p> <p>$\frac{1}{\sin}$ $\sin^{-1}(\frac{\sqrt{2}}{2})$</p> <p>$\frac{\pi}{4}$</p>
<p>9. $\sin^{-1}(\frac{-\sqrt{3}}{2})$</p> <p>$\frac{-\pi}{3}$</p>	<p>10. $\cos^{-1}(\frac{-\sqrt{2}}{2})$</p> <p>$\pi - \frac{\pi}{4} = \frac{3\pi}{4}$</p>

* No function where it maps to multiple values

arc sin $[-\frac{\pi}{2}, \frac{\pi}{2}]$

arc cos $[0, \pi]$

arc sec $[0, \frac{\pi}{2}) \cup (\frac{\pi}{2}, \pi]$

arc csc $[-\frac{\pi}{2}, 0) \cup (0, \frac{\pi}{2}]$

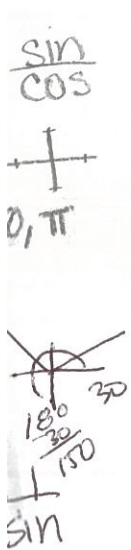
rc
cos

Verify Identities (Questions 14-15)

<p>11. $\cos^4 x - \sin^4 x = \cos 2x$ $(\cos^2 x - \sin^2 x)(\cos^2 x + \sin^2 x)$ $(\cos^2 x - \sin^2 x)(1)$ $\cos 2x \checkmark$</p>	<p>12. $\tan^2 x \cos^2 x + \cot^2 x \sin^2 x = 1$ $\frac{\sin^2}{\cos^2} (\cos^2) + \frac{\cos^2}{\sin^2} \sin^2 =$ $\sin^2 + \cos^2$ $= 1 \checkmark$</p>
<p>13. $\frac{\csc^2 x - 1}{\csc^2 x} = \cos^2 x$ $\frac{1}{\sin^2 x} - 1 = \frac{1 - \sin^2 x}{\sin^2 x}$ $\frac{1 - \sin^2 x}{\sin^2 x} \cdot \frac{\sin^2 x}{1}$ $\cos^2 x \checkmark$</p>	<p>14. $(\sin x - \tan x)(\cos x - \cot x) = (\sin x - 1)(\cos x - 1)$ $\sin x \cos x - \frac{\cos}{\sin} \cdot \frac{\sin}{\cos}$ $-\frac{\sin}{\cos} \cos + 1$ $\sin x \cos x - \cos - \sin + 1$ $(\sin x - 1)(\cos x - 1) \checkmark$</p>

Find all solutions of the equation -- general and on the interval $[0, 2\pi)$ (Questions 20-21)

<p>15. $\tan^2 3x + \tan 3x = 0$ $\tan 3x (\tan 3x + 1) = 0$ $\tan 3x = 0$ $\tan 3x = -1$ $3x = \frac{\pi}{2}$ $\frac{\pi - \frac{\pi}{4} = \frac{3\pi}{4} \checkmark$ $0 + 2\pi n$ $2\pi - \frac{\pi}{4} = \frac{7\pi}{4}$ $3x = \pi$ $\frac{3\pi}{4} = 3x$ $x = \frac{\pi}{3} + \frac{2\pi n}{3}$ $x = \frac{\pi}{4} + \frac{2\pi n}{3}$ $\frac{7\pi}{4} = 3x$ $x = \frac{7\pi}{12} + \frac{2\pi n}{3}$</p>	<p>16. $\sin 2x - \cos x = 0$ $2\sin x \cos x - \cos x = 0$ $\cos x (2\sin x - 1) = 0$ $\cos x = 0$ $2\sin x = 1$ $\frac{\pi}{2}, \frac{3\pi}{2}$ $\sin x = \frac{1}{2}$ $\frac{\pi}{6} + 2\pi n$ $\frac{5\pi}{6} + 2\pi n$ $\frac{7\pi}{6} + 2\pi n$ $\frac{11\pi}{6} + 2\pi n$</p>	<p>17. $4\cos^2 \frac{x}{2} - 3 = 0$ $\cos^2 \frac{x}{2} = \frac{3}{4}$ $\cos(\frac{x}{2}) = \pm \frac{\sqrt{3}}{2}$ $\frac{x}{2} = \frac{\pi}{6}$ $\frac{x}{2} = \frac{5\pi}{6}$ $x = \frac{\pi}{3} + 4\pi n$ $x = \frac{5\pi}{3} + 4\pi n$ $\frac{x}{2} = \frac{11\pi}{6}$ $\frac{x}{2} = \frac{7\pi}{6}$ $x = \frac{11\pi}{3} + 4\pi n$ $x = \frac{7\pi}{3} + 4\pi n$</p>
<p>18. $\csc^2 x - \csc x - 2 = 0$ $(\csc + 1)(\csc - 2) = 0$ $\csc = -1$ $\csc = 2$ $x = \frac{3\pi}{2} + 2\pi n$ $x = \frac{\pi}{6} + 2\pi n$ $x = \frac{5\pi}{6} + 2\pi n$</p>	<p>19. $\sin^2 \frac{x}{2} + \cos x = 0$ $(\sqrt{\frac{1 - \cos x}{2}})^2 = (-\cos)^2$ $\frac{1 - \cos x}{2} = \cos^2$ $1 - \cos x = 2\cos^2$ $2\cos^2 + \cos x - 1 = 0$ $(2\cos - 1)(\cos + 1)$ $\cos = \frac{1}{2}$ $\cos = -1$ $x = 60^\circ + 2\pi n$ $x = \pi + 2\pi n$ $x = 300^\circ + 2\pi n$</p>	<p>20. $\sec^2 x - 2\tan x = 4$ $(1 + \tan^2) - 2\tan x = 4$ $1 + \tan^2 x - 2\tan x - 4 = 0$ $\tan^2 x - 2\tan x - 3 = 0$ $(\tan + 1)(\tan - 3)$ $\tan = -1$ $\tan = 3$ $\frac{3\pi}{4} + 2\pi n$ $\frac{\sin}{\cos} = 3$ $\frac{7\pi}{4} + 2\pi n$ $\sin = 3\cos$ $\sin^2 = 9\cos^2$ $1 - \cos^2 = 9\cos^2$ $1 = 10\cos^2$ $\cos = \frac{1}{\sqrt{10}}$</p>



$x = 60^\circ + 2\pi n$ $x = \pi + 2\pi n$ $x = 300^\circ + 2\pi n$ $\frac{2\pi - \pi}{4} = \frac{\pi}{4}$ $1 = \cos$