

Tangent Functions Practice Questions

1) Given $f(x) = -2 \tan(3\pi(x - 2)) + 8$ determine:

a) Domain

b) Range

c) Period

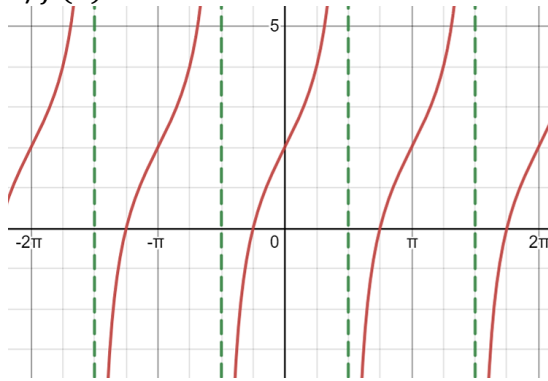
$$\mathbb{R} / \frac{5}{2} + \frac{1}{3}n$$

$$]-\infty, \infty[$$

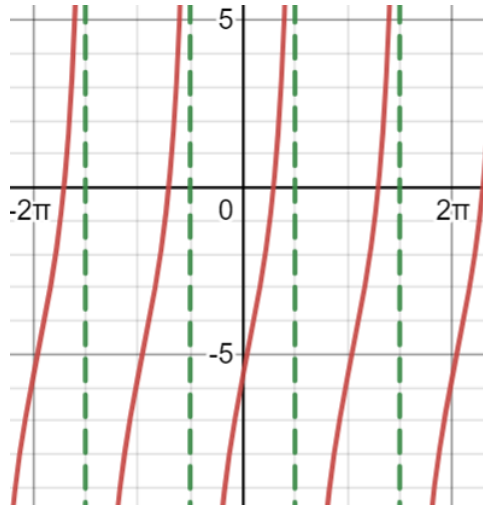
$$\frac{1}{3}$$

2) Sketch the following functions

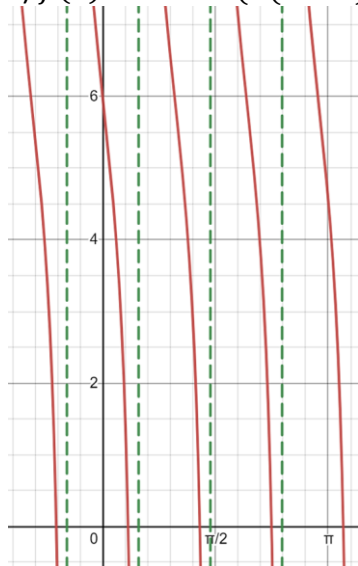
a) $f(x) = 2 \tan x + 2$



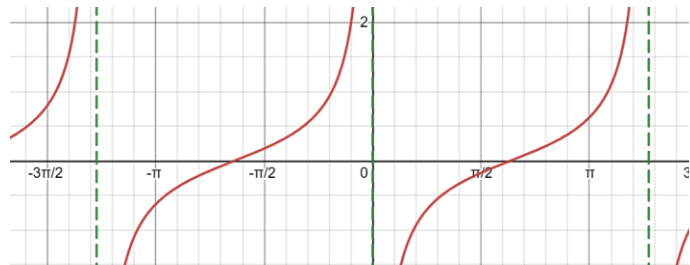
b) $f(x) = 5 \tan(x + 3) - 5$



c) $f(x) = -3 \tan(\pi(x - 3)) + 6$



d) $f(x) = 0.5 \tan\left(\frac{\pi}{4}(x + 2)\right)$



3) Determine the solution set for each of the trigonometric equations below

a) $2 \tan\left(\frac{\pi}{5}x\right) = 2$ if $x \in [-10, 10]$

$$x \in \left\{-\frac{35}{4}, -\frac{15}{4}, \frac{5}{4}, \frac{25}{4}\right\}$$

b) $\sqrt{3} \tan\left(3\pi\left(x + \frac{1}{6}\right)\right) = 1$ if $x \in [0, 5]$

$$x \in \left\{\frac{2}{9}, \frac{5}{9}, \frac{8}{9}, \frac{11}{9}, \frac{14}{9}, \frac{17}{9}, \frac{20}{9}, \frac{23}{9}, \frac{26}{9}, \frac{29}{9}, \frac{32}{9}, \frac{35}{9}, \frac{38}{9}, \frac{41}{9}, \frac{44}{9}\right\}$$

c) $3 \tan\left(\frac{\pi}{4}(x + 1)\right) - \sqrt{3} = 0$

$$x = \frac{11}{3} + 4n$$

d) $\sqrt{3} \tan\left(x - \frac{\pi}{4}\right) = 3$

$$x = \frac{7\pi}{12} + \pi n$$

4) Find the zeros of the functions whose rules are:

a) $f(x) = 3 \tan \frac{\pi}{6} x$

$$x = 6n$$

b) $f(x) = \tan(x - 1) - 1$

$$x = 1.7854 + \pi n$$

5) Determine the solution set for each of the trigonometric inequalities below

a) $4 \tan(4x) - 3 > -5$ if $x \in [-\pi, \pi]$

$$x = \left[-\pi, -\frac{7\pi}{8} \right] \cup \left[-2.4721, -\frac{5\pi}{8} \right] \cup \left[-1.6867, -\frac{3\pi}{8} \right] \cup \left[-0.9013, -\frac{\pi}{8} \right] \cup \left[-0.1159, \frac{\pi}{8} \right] \\ \cup \left[0.6695, \frac{3\pi}{8} \right] \cup \left[1.4549, \frac{5\pi}{8} \right] \cup \left[2.2403, \frac{7\pi}{8} \right] \cup \left[3.0256, \pi \right]$$

b) $6 \tan(x + \pi) - 3\sqrt{3} < 0$ if $x \in [-3\pi, 3\pi]$

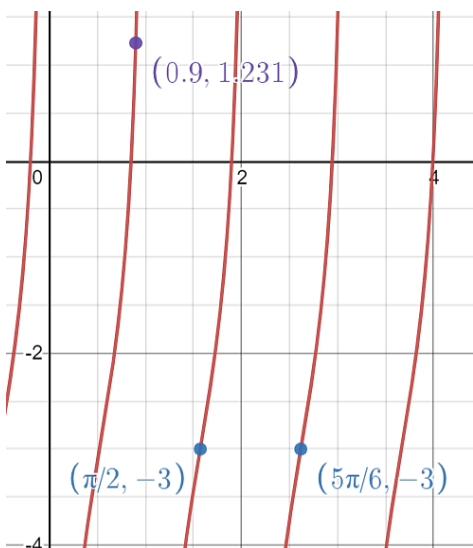
$$x = [-3\pi, -8.7111[\cup] -\frac{5\pi}{2}, -5.5695[\cup] -\frac{3\pi}{2}, -2.428[\cup] -\frac{\pi}{2}, 0.7137[\cup] \frac{\pi}{2}, 3.8553[\\ \cup] \frac{3\pi}{2}, 6.9969[\cup] \frac{5\pi}{2}, 3\pi]$$

5) During its ascension, a rocket's altitude A (in m) varies according to the rule $A = 1000 \tan\left(\frac{\pi}{60}x\right)$ where x is the time elapsed (in s) since launching. At an altitude of 1000 m, the rocket's engine is extinguished, and a parachute is deployed, allowing the rocket to slowly return to the ground. At what moment is the parachute deployed?

The parachute is deployed at 15 second.

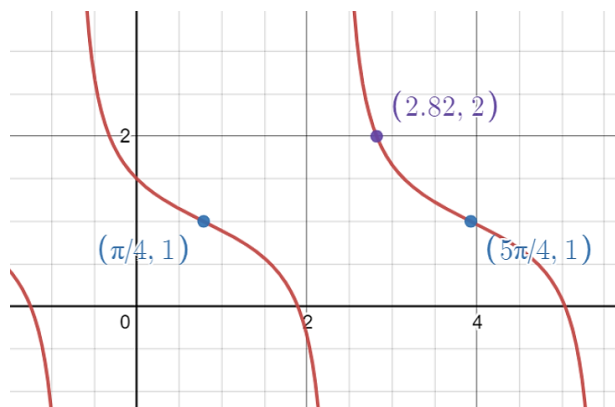
6) Determine the rule of each of the functions below.

a)



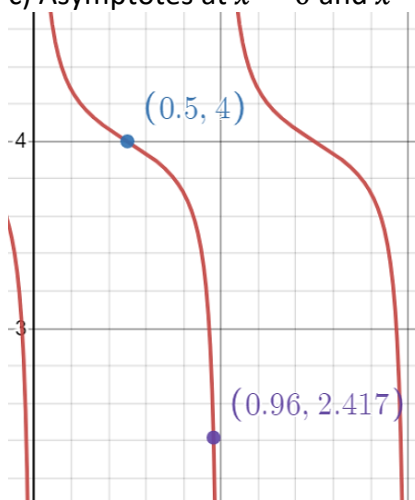
$$f(x) = 2 \tan\left(3\left(x - \frac{\pi}{2}\right)\right) - 3$$

b)



$$f(x) = -\frac{1}{2} \tan\left(x - \frac{\pi}{4}\right) + 1$$

c) Asymptotes at $x = 0$ and $x = 1$



$$f(x) = -0.2 \tan(\pi(x - 0.5)) + 4$$

d) A function has asymptotes at $x = -4$ and $x = -2$, an inflection point at $(-3, -2)$, and passes through the point $(-2.5, -4)$

$$f(x) = -2 \tan\left(\frac{\pi}{2}(x + 3)\right) - 2$$