

DO NOW

- Using a graphing calculator, graph the 3 basic trigonometric functions
- Then: sketch each graph, identify any maximum values, minimum values, any values that are not included in the graph and how often the graph repeats.

1. $y = \sin(x)$

2. $y = \cos(x)$

3. $y = \tan(x)$

LEARNING GOALS

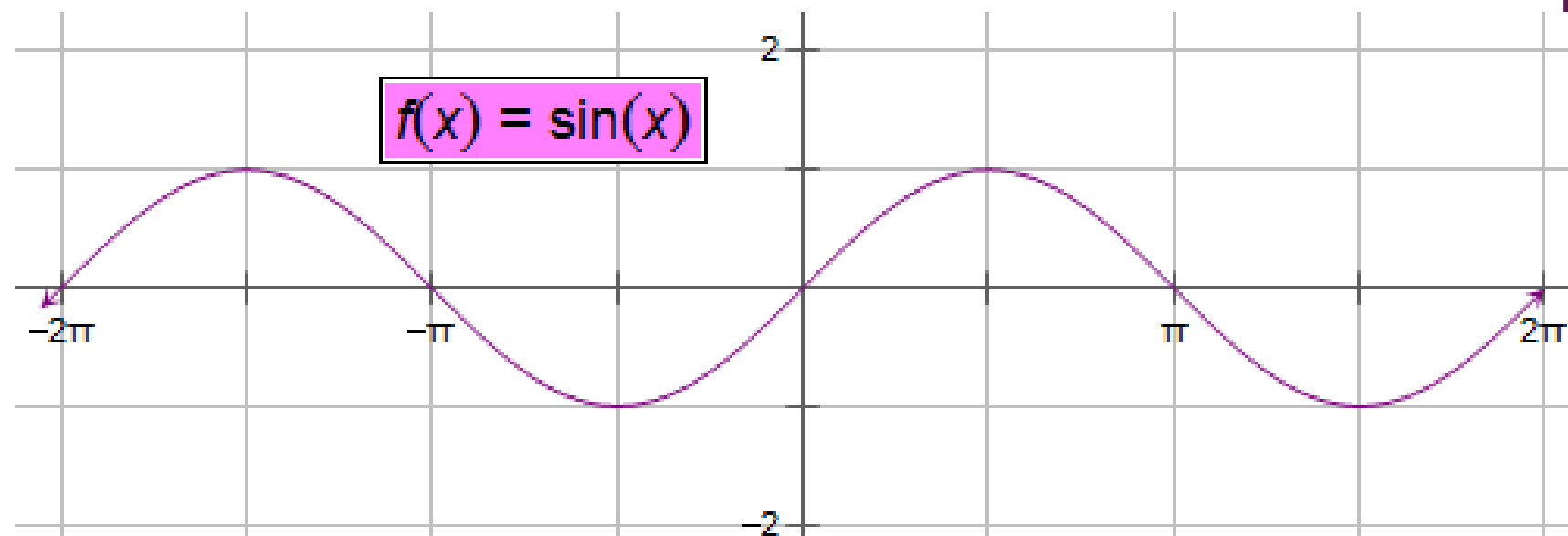
◉ SWBAT:

- Analyze the amplitude, period, and any asymptotes of a trigonometric function given an equation of the function.

CLASS AGENDA

- ◉ Calculator Activity
- ◉ Identify the Period
- ◉ Identify the Amplitude
- ◉ Break
- ◉ Identify the Asymptotes
- ◉ Evaluate functions
- ◉ Closure

$$Y = \sin(X)$$



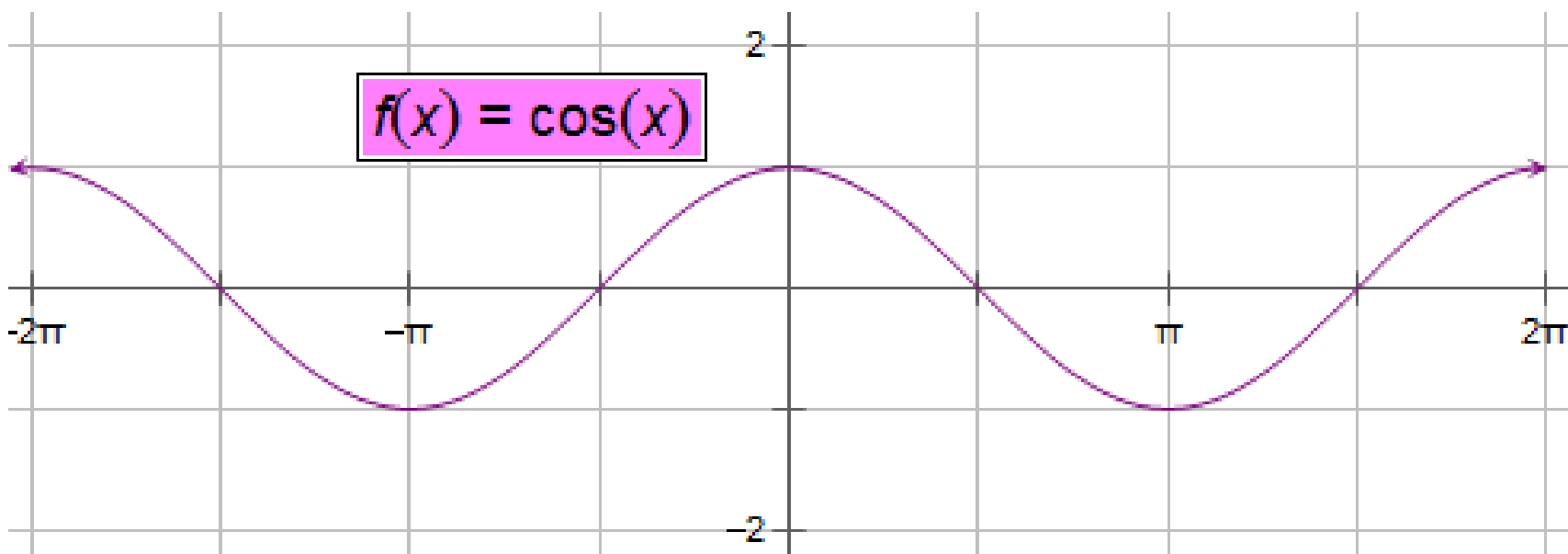
Maximum Value:

Minimum Value:

Any values not included in the graph?

How often does it repeat?

$$Y = \cos(X)$$



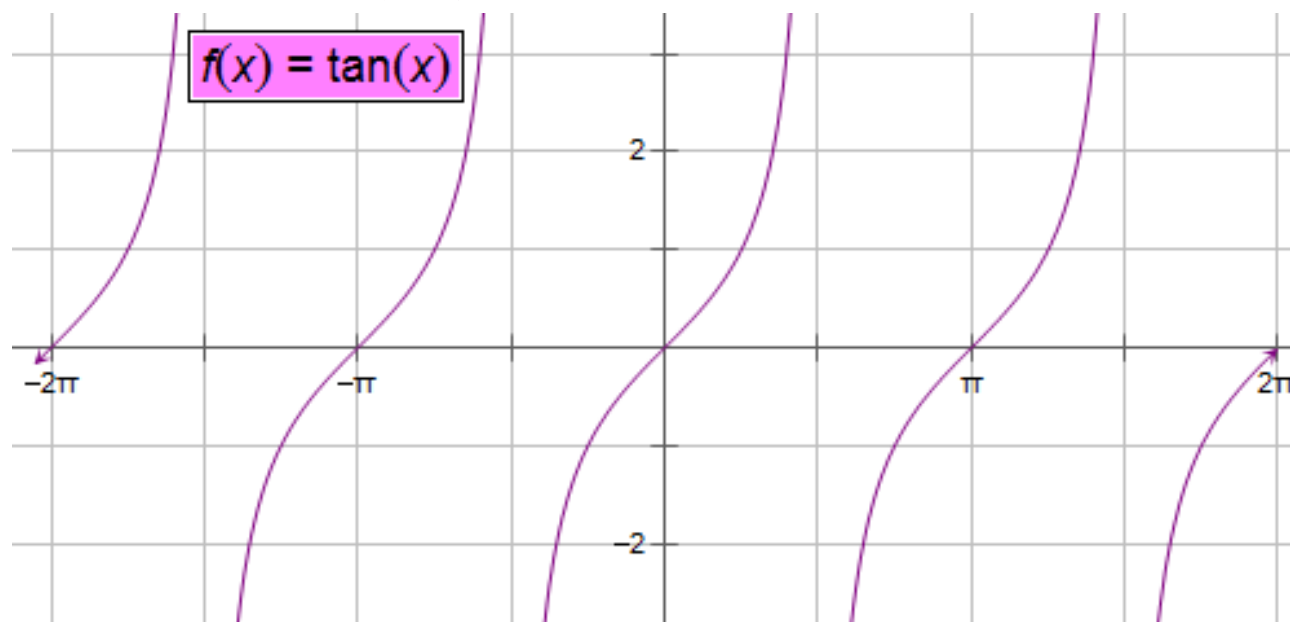
Maximum Value:

Minimum Value:

Any values not included in the graph?

How often does it repeat?

$$Y = \tan(X)$$



Maximum Value:

Minimum Value:

Any values not included in the graph?

How often does it repeat?

AMPLITUDE

Amplitude

- ◉ The amplitude is the distance from the "resting" position (otherwise known as the **mean value** or **average value**) of the curve.
- ◉ Amplitude is always a **positive** quantity. We could write this using absolute value signs. For the curve $y = a \sin x$,

$$\text{amplitude} = |a|$$

IDENTIFY THE AMPLITUDE

1. $y = 2\sin(x)$

2. $y = \frac{1}{2}\cos(x)$

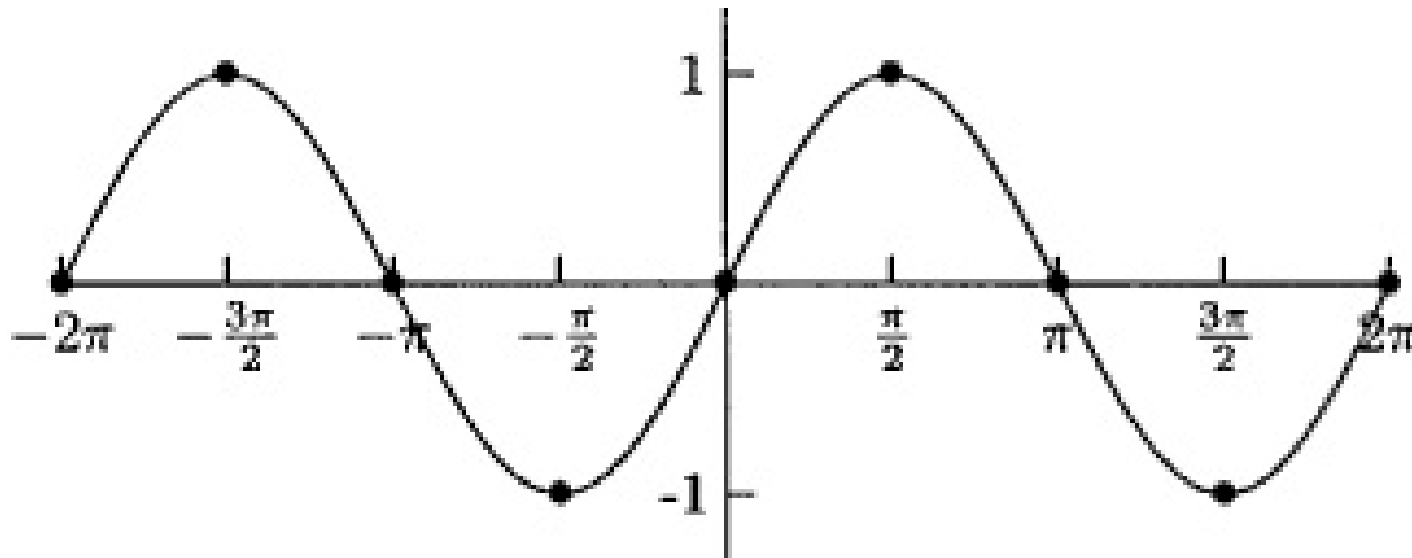
3. $y = -3\cos(x)$

4. $y = \frac{2}{5}\sin(x)$

5. $y = -\frac{3}{4}\cos(x)$

PERIOD

- ◉ The **period** is the time it takes to go through one cycle and then start over again.



SINE AND COSINE

- ◉ To calculate: $\frac{2\pi}{B}$
- ◉ $Y = A\sin(Bx)$
- ◉ $Y = A\cos(Bx)$

IDENTIFY THE PERIOD

1. $y = \sin(2x)$

2. $y = \cos(4x)$

3. $y = \cos\left(\frac{1}{2}x\right)$

4. $y = \sin(\pi x)$

5. $y = \sin\left(\frac{\pi}{2}x\right)$

TANGENT

- ◉ To calculate: $\frac{\pi}{B}$
- ◉ $Y = A \tan(Bx)$

IDENTIFY THE PERIOD

1. $y = \tan(2x)$

2. $y = \tan(4x)$

3. $y = \tan\left(\frac{1}{2}x\right)$

4. $y = \tan(\pi x)$

5. $y = \tan\left(\frac{\pi}{2}x\right)$

BREAK

EVALUATE THE FUNCTION

⊙ *Identify the Amplitude and the period of the following:*

1. $y = -2\sin(3x)$

2. $y = 3\cos(5x)$

3. $y = -\frac{1}{4}\tan(2x)$

4. $y = 4\tan\left(\frac{\pi}{2}x\right)$

5. $y = -\frac{1}{2}\cos(\pi x)$

6. $y = \frac{3}{2}\sin\left(\frac{\pi}{4}x\right)$

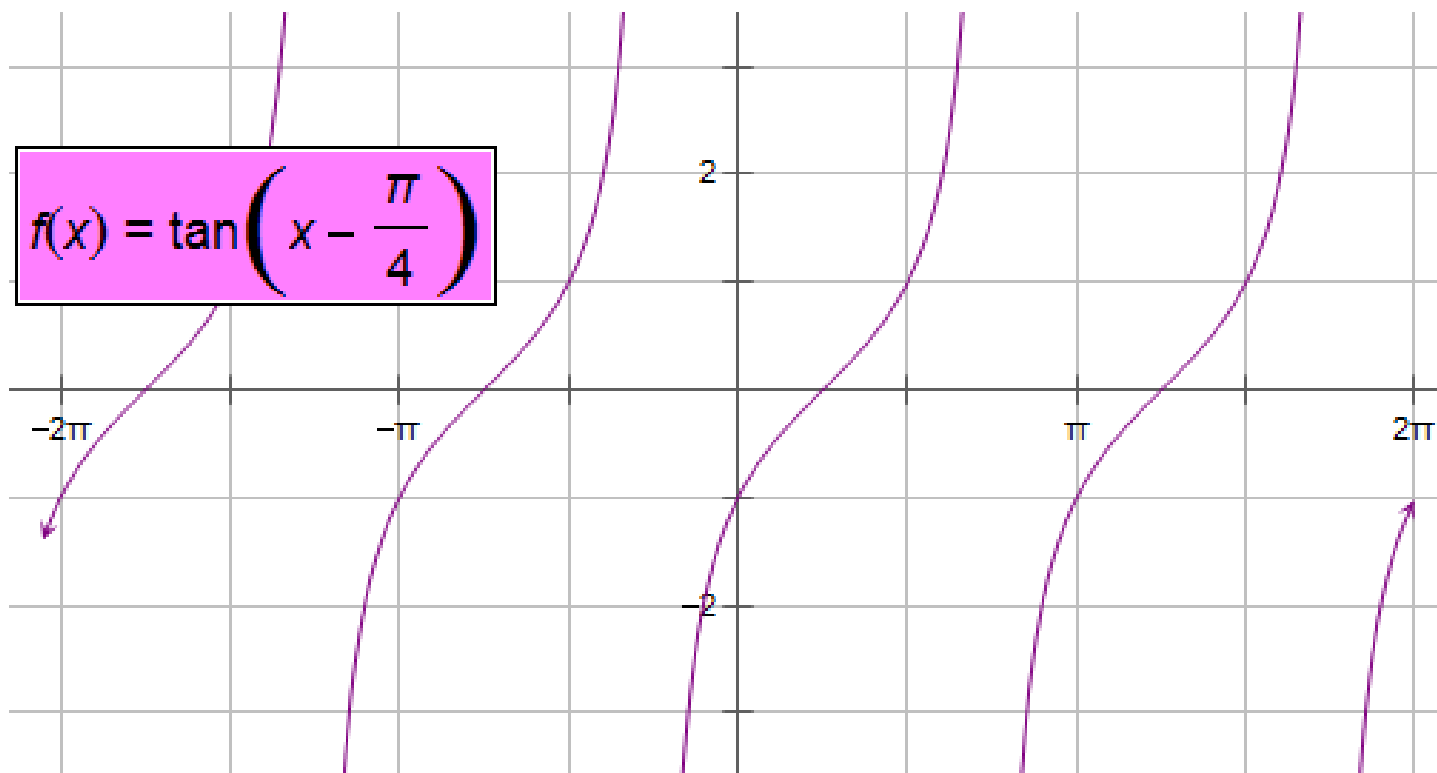
ASYMPTOTES

- Occur when the value of the function is undefined
- Set limits on the function

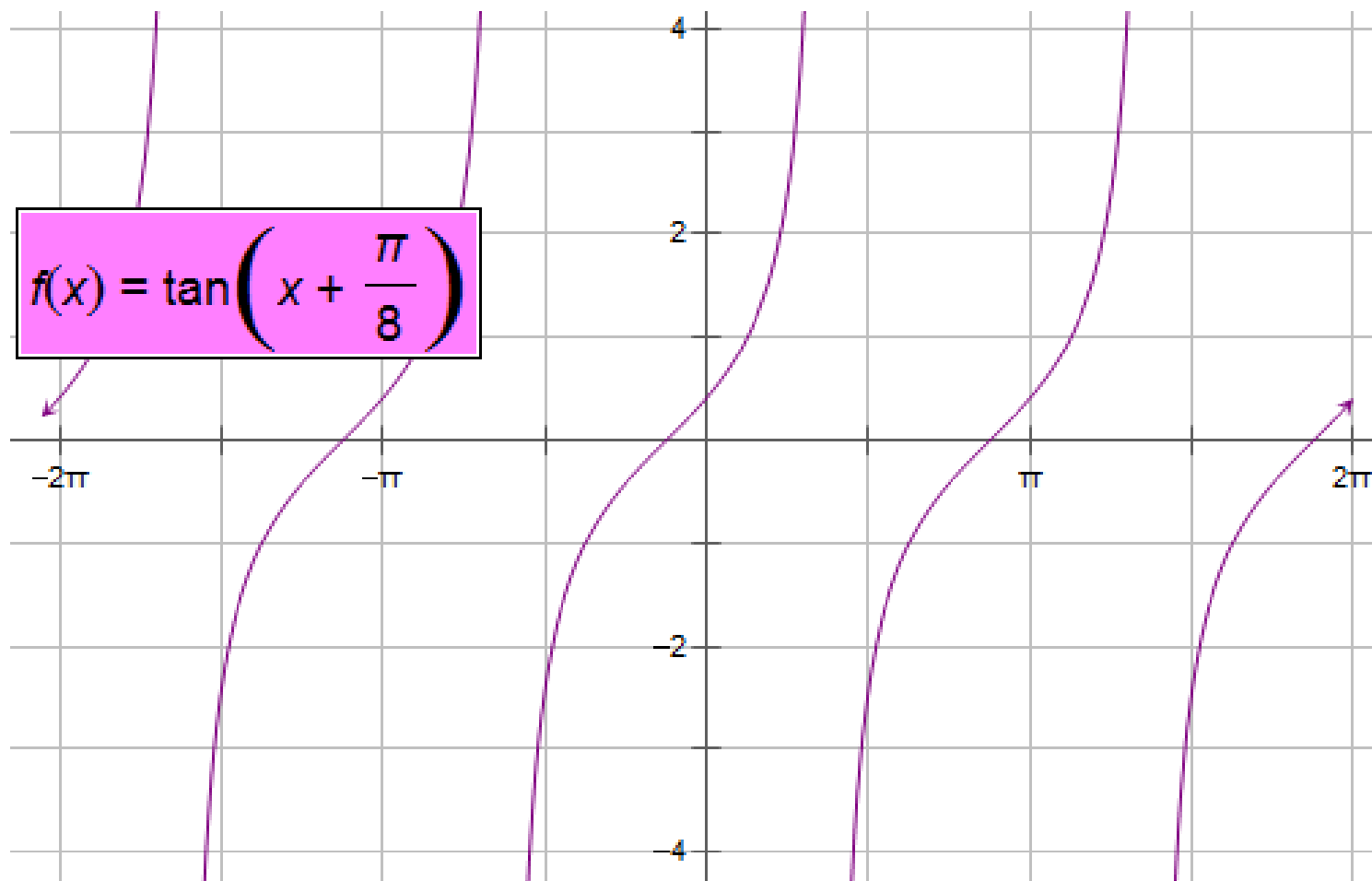
WHAT DOES IT MEAN TO BE UNDEFINED?

degrees	radians	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\csc \theta$	$\sec \theta$	$\cot \theta$
0°	0	0	1	0	—	1	—
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sqrt{2}$	$\sqrt{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$
90°	$\frac{\pi}{2}$	1	0	—	1	—	0

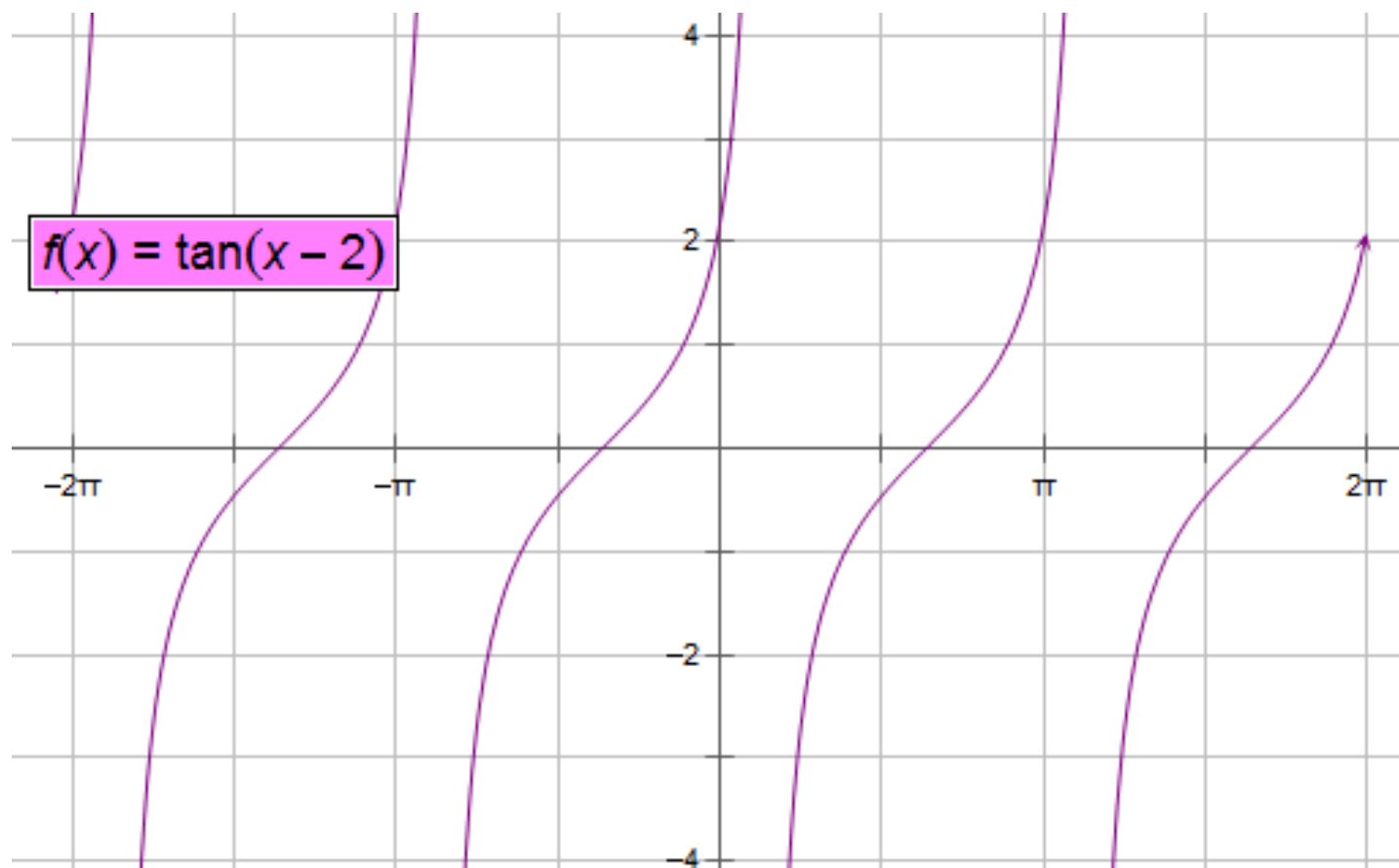
WHERE ARE THE ASYMPTOTES?



WHERE ARE THE ASYMPTOTES?



WHERE ARE THE ASYMPTOTES?



EVALUATE THE FUNCTIONS

- ◉ With a graphing calculator, graph the functions and identify two asymptotes.

1. $y = \tan\left(x + \frac{\pi}{4}\right)$

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

3. $y = \tan(x + \pi)$

What did you learn today?

CLOSURE

- ◉ What was one thing you learned today?
- ◉ What was one thing you would like to spend more time on?