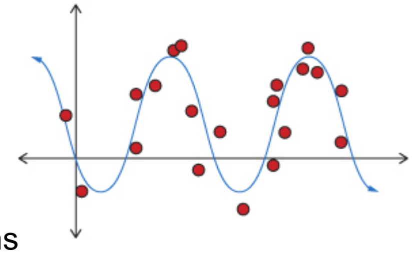
Unit 7.6-7.8 Trigonometric Graphs and Applications



By the end of this unit, you should be able to:

- ☐ graph sine, cosine, cosecant, secant, tangent, and cotangent graphs
- ☐ find domain, range, amplitude, asymptotes, and period of all 6 functions
- ☐ list transformations for all 6 functions
- ☐ write sine/cosine function given graph
- ☐ find a sinusoidal function from data
- ☐ make a sinusoidal model for a situation

Assignments:

7.6A – Sine/Cosine Graphs – pg. 570 #39-42, 43, 47, 51, 55, 59, 63 For each graph, also state the transformations and find the domain, range, amplitude, and period.
7.8A – Sine/Cosine Graphs with Phase Shifts – pg. 589 #3-11odd For each graph, also state the transformations and find the domain, range, amplitude, and period.
7.6B – Writing Sine/Cosine Equations – pg. 571 #67-83odd and pg. 589 #15, 17
7.8B – Sinusoidal Models – pg. 590 #29, 31, 33, 35
7.7A – Secant/Cosecant Graphs – pg. 580 #25, 27, 29, 31, 35, 39, and pg. 589 #21, 25 For each graph, also state the transformations and find the domain, range, amplitude, asymptotes, and period.
7.7B – Tangent/Cotangent Graphs – pg. 580 #17, 19, 21, 23, 33, 37, and pg. 589 #19, 23 For each graph, also state the transformations and find the domain, range, amplitude, asymptotes, and period.

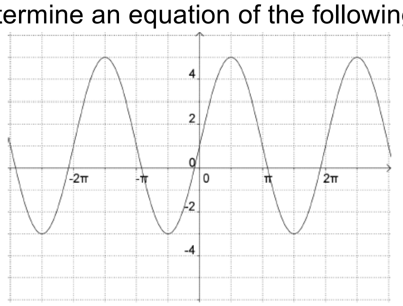
Review Problems

State the transformations in order. Sketch the graph (at least 2 periods) of the given trig function. State the domain, range, amplitude, asymptotes (if any), and period.

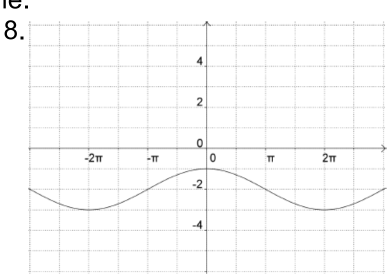
1. $f(x) = 3\sin(2x)$
2. $f(x) = 2\cos\left(2x - \frac{\pi}{2}\right) + 1$
3. $f(x) = 3\sec\left(x - \frac{\pi}{4}\right)$
4. $f(x) = -2\csc\left(\dfrac{\pi}{2}x\right)$
5. $f(x) = -\cot\left(\frac{1}{2}x\right) - 1$
6. $f(x) = 2\tan(x) + 3$

Determine an equation of the following graphs using sine or cosine.

7.



8.



9. The following table shows the number, in millions, of unemployed people in the labor force for 1984-1995. Find a sinusoidal function to model the data.

year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
umemp	8.539	8.312	8.237	7.425	6.701	6.528	7.047	8.628	9.613	8.940	7.996	7.404

10. Tarzan is swinging back and forth on his grapevine. As he swings, he goes back and forth across the riverbank, going alternately over land and water. Jane decides to model mathematically his motion and starts her stopwatch. Let *t* be the number of seconds the stopwatch reads and let *y* be the number of meters Tarzan is from the riverbank. Assume that y varies sinusoidally with *t*, and that *y* is positive when Tarzan is over water and negative when his is over land. Jane finds that when *t* = 2, Tarzan is at one end of his swing, where *y* = -23. She finds when *t* = 5, he reaches the other end of his swing and y = 17.
    a) Write an equation expressing Tarzan's distance from the riverbank in terms of *t.*
    b) Predict *y* when *t* = 2.8