**8.8 - Applications of Trig Functions**

1. The geese population in a certain area fluctuates periodically between a maximum of 600 geese and a minimum of 350 geese. This population cycle repeats every 5 years. Write a sine function to the model the geese population when time is measured in years.

2. The average monthly temperature in Greenville varies periodically with a maximum of 69°F and a minimum of 41°F. A complete cycle repeats every year. Write a cosine function to model the temperature in Greenville when time is measured in months.

3. The function $f(x)= -33cos\left(\frac{π}{6}x\right)+40$ models the height of a rider on a Ferris wheel, where *x* represents time in minutes. Determine the maximum and minimum height the rider reaches, and determine the amount of time it takes for the rider to complete a full revolution.

4. A Ferris wheel has a diameter of 92 m and makes a complete revolution every 8 minutes.. The wheel starts turning when a rider is at its lowest point, 9 m above the ground. Write a cosine function to model the rider’s height above the ground when time is measured in minutes.

5. The function $f(x)=1.3cos\left(4πx\right)+88.7$ models the altitude of the midday sun at Venus’s equator, where *x* represents time in years. Determine the maximum and minimum altitude the sun reaches, and determine the amount of time it takes for the sun to complete a full cycle.

6. When an appliance is plugged into an outlet, voltage fluctuates between positive and negative values. In Barbados, the voltage fluctuates between 163 volts and −163 volts with a frequency of 50 cycles per second. Write a sine function to model the voltage when time is measured in seconds.



Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Math 3 Unit 8: Trigonometry**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **May 7*** Angles in degrees

HW: worksheet 8.1 | **May 8*** Angles in radians

HW: worksheet 8.2 | **May 9*** Right triangle trig

HW: worksheet 8.3 | **May 10*** Unit circle
* Exact values of sine and cosine

HW: worksheet 8.4 | **May 11*** QUIZ!!
* Exact values of all trig functions

HW: worksheet 8.5 |
| **May 14*** Graphs of sine and cosine

HW: worksheet 8.6 | **May 15*** Equations of sine and cosine

HW: worksheet 8.7 | **May 16*** QUIZ!!
* Applications of trig functions

HW: worksheet 8.8 | **May 17*** Review for test

HW: finish review | **May 18*** TEST!!!
 |

**8.1 - Angles and Their Measures in Degrees**

*Draw each angle in standard position.*

1. $120^{o}$ 2. $-240^{o}$ 3. $550^{o}$ 4. $-270^{o}$



5. $300^{o}$ 6. $40^{o}$ 7. $-400^{o}$ 8. $-100^{o}$



*Find one positive and one negative coterminal angle that corresponds to the given angle.*

9. $55^{o}$ 10. $-40^{o}$ 11. $-1600^{o}$ 12. $415^{o}$

*Determine an angle between* $0^{o}$ *and* $360^{o}$ *that is coterminal to the given angle.*

13. $665^{o}$ 14. $-70^{o}$ 15. $-640^{o}$ 16. $1190^{o}$

**8.7 - Equations of Sine and Cosine Worksheet**

1. $y= -4cos4x+7$ 2. $y=6sin\frac{1}{3}x-4$

Amplitude:\_\_\_\_\_\_\_\_ Amplitude:\_\_\_\_\_\_\_\_

Period:\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_\_\_\_

Frequency:\_\_\_\_\_\_\_\_ Frequency:\_\_\_\_\_\_\_\_

Vertical Shift:\_\_\_\_\_\_\_\_ Vertical Shift:\_\_\_\_\_\_\_\_

3. $y=sinx+2$ 4. $y=\frac{1}{2}cos\frac{4}{3}x$

Amplitude:\_\_\_\_\_\_\_\_ Amplitude:\_\_\_\_\_\_\_\_

Period:\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_\_\_\_

Frequency:\_\_\_\_\_\_\_\_ Frequency:\_\_\_\_\_\_\_\_

Vertical Shift:\_\_\_\_\_\_\_\_ Vertical Shift:\_\_\_\_\_\_\_\_

5. $y= -2cos8x-4$ 6. $y= -sin3x+1$

Amplitude:\_\_\_\_\_\_\_\_ Amplitude:\_\_\_\_\_\_\_\_

Period:\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_\_\_\_

Frequency:\_\_\_\_\_\_\_\_ Frequency:\_\_\_\_\_\_\_\_

Vertical Shift:\_\_\_\_\_\_\_\_ Vertical Shift:\_\_\_\_\_\_\_\_

7. Given an amplitude of 7, a period of 4𝜋, and a vertical shift down 3 units, write the equation of the sine function.

8. Given an amplitude of 3, a frequency of $\frac{1}{π}$, and a vertical shift up 7 units, write the equation of the cosine function.

9. Given an amplitude of 7456, a period of $\frac{π}{46}$, and a vertical shift up 81903 units, write the equation of the sine function.

**8.6 - Graphs of Sine and Cosine**

*Determine the amplitude, period, frequency, vertical shift, and equation for each graph below.*



A B





C D

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Amplitude** | **Period** | **Frequency** | **Vertical Shift** | **Equation** |
| A |  |  |  |  |  |
| B |  |  |  |  |  |
| C |  |  |  |  |  |
| D |  |  |  |  |  |

**8.2 - Angles and Their Measures in Radians**

*Convert angle in degrees to radians.*

1. $18^{o}$ 2. $150^{o}$ 3. $330^{o}$ 4. $-270^{o}$

*Convert each angle in radians to degrees.*

5. $\frac{π}{9}$ 6. $\frac{3π}{4}$ 7. $\frac{11π}{6}$ 8. $-\frac{25π}{18}$

*Draw each angle in standard position.*

9. $\frac{5π}{6}$ 10. $-\frac{π}{4}$ 11. $\frac{10π}{3}$ 12. $-\frac{7π}{6}$



13. $π$ 14. $-\frac{2π}{3}$ 15. $-\frac{7π}{3}$ 16. $\frac{11π}{6}$



**8.3 - Right Triangle Trig**

*Solve for the variable.*



1. 2. 3.



4. 5. 6. 

7. The flagpole casts a shadow 40 feet long when the measurement of the angle of elevation to the sun is 31°. How tall is the flagpole?

8. A submarine dives at an angle of depression of 15°. It travels a horizontal distance of 1500 feet during the dive. What is the depth of the submarine after the dive?

9. Sally is standing a distance away from a skyscraper that is 780 feet tall. Marcie is between Sally and the skyscraper. The angle of elevation from Sally’s position to the top of the skyscraper is 42°. The angle of elevation from Marcie’s position to the top of the skyscraper is 71°. How far is Sally from Marcie?

*Use the unit circle to determine the exact value of each trigonometric function.*

1. $sin225^{o}$= 2. $cos150^{o}$=

3. $tan60^{o}$= 4. $sin\frac{π}{6}$=

5. $sec\frac{2π}{3}$= 6. $cot\frac{5π}{3}$=

7. $tan90^{o}$= 8. $cosπ$=

9. $csc\frac{3π}{4}$= 10. $sin2π$=

11. $cos-30^{o}$= 12. $sec585^{o}$=

13. $cot180^{o}$= 14. $sin\frac{π}{2}$=

15. $cos270^{o}$= 16. $sec\frac{7π}{6}$=

**8.5 - Exact Values of Trig Functions**

*Complete the unit circle*

****



**….said no teacher ever.**

**Turn the page to get to homework 8.4**

**(Like I would really give you a day without homework. Puh-lease)**

**8.4 - Exact Values of Sine and Cosine worksheet**

*Complete the unit circle.*



*Use the unit circle to determine the exact value of each trigonometric function.*

1. $sin 45^{o}$= 2. $cos 0$=

3. $sin -210^{o}$= 4. $cos \frac{3π}{4}$=

5. $sin \frac{4π}{3}$= 6. $cos 240^{o}$=

7. $sin \frac{8π}{3}$= 8. $cos -90^{o}$=

9. $sin -855^{o}$= 10. $cos 570^{o}$=

11. $sin 270^{o}$= 12. $cos -\frac{π}{3}$=

13. $sin -3π$= 14. $cos \frac{11π}{6}$=