CCSS Advanced Algebra 4 Trigonometric Functions (part 2) Name _____

1. Use your knowledge of transformations to find the equation $y = a\ sin(bx + c) + d$ of each situation described below (assume all parts of the model Ferris wheel from part 1 remain the same unless specifically stated below: Ferris Wheel starts at point A, radius of 1 meter, rotates counterclockwise in 6 minutes, center of Ferris Wheel at the water line). Use the Ferris Wheel site from part 1 as needed:

a. The Ferris wheel has a radius of 10 meters. Parent: $y = \sin x$

$y = 10\sin x$

b. The Ferris wheel has a radius of 1 meter and completes a rotation in 3 minutes (rather than the typical 6 minutes).

$y = \sin 2x$

c. The Ferris wheel has a radius of 10 meters and completes a rotation in 12 minutes.

$y = 10\sin(x/2)$

d. The Ferris wheel has a radius of 3 meter and completes a rotation in 6 minutes, but the center of the wheel is 1 meter above the water line.

$y = 3\sin x + 1$

e. The Ferris wheel has a radius of 10 meters, completes a rotation in 12 minutes, and the center of the water wheel is 0.5 meters below the water line.

$y = 10\sin(x/2) - .5$

f. The Ferris wheel has a radius of 10 meters and completes a rotation in 6 minutes, but turns the opposite direction (clockwise).

$y = 10\sin(-x)$

g. The Ferris wheel has radius of 1 meter and makes a complete rotation (counterclockwise) in 6 minutes, but riders board the Ferris wheel at point D (so point D occurs at 0 seconds).

$y = \sin(x - 90)$

2. For each equation below, describe the Ferris wheel:
   i. radius,
   ii. time to complete one rotation,
   iii. height of the center of the Ferris wheel,
   iv. what point on the Ferris wheel riders board,
   v. rotating clockwise or counterclockwise.

a. $y = 12\ sin(x) + 1$

r=12
p=360
m=1
A
Counter

b. $y = sin(6x) + 8$

r=1
p=60
m=8
A
Counter

c. $y = -3\ sin(0.25x)$

r=3
p=1440
m=0
A
Clock

d. $y = 20\ sin(x - 90)$

r=20
p=360
m=0
D
Counter

e. $y = 10\ sin(x + 60) - 5$

r=10
p=360
m=-5
K
Counterclock