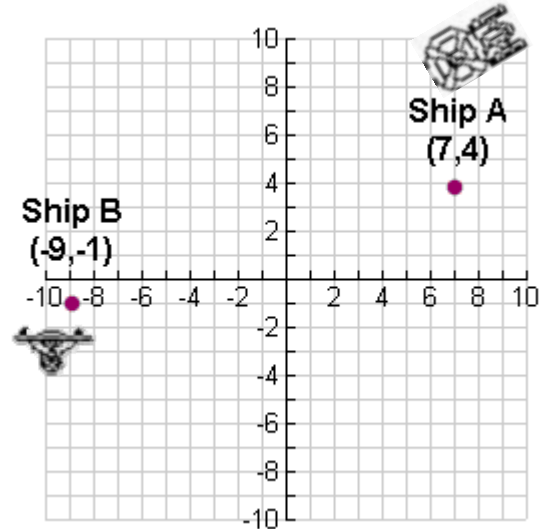# Coordinate Geometry
Star Trek Holodeck

Name_____

1. In a holodeck simulation, the starship Enterprise at point A is traveling to meet the Excelsior transport ship at point B. The ship at point B is transporting an ailing ambassador who must board the Enterprise but cannot use the transporter. The ships have agreed to meet at the midpoint of the line segment connecting the two ships' current positions.

a. Find the holodeck grid coordinates of the meeting location?

b. Find the holodeck distance (as represented to the *nearest grid unit*), between the ships' current positions.

Ship A
(7,4)

Ship B
(-9,-1)

1 grid unit = 500 miles

c. If each grid unit in the holodeck represents 500 actual miles, find the actual distance, to the *nearest mile* between the ships' current positions.

2. A holodeck designer uses a coordinate system to lay out the scale drawing of an upcoming botanical garden holodeck scene requested by Dr. Crusher. One plant is located at (0,8) and another at (12,4). The designer wants to create a stepping stone path so that any stone in the path is an equal distance from the two plants.
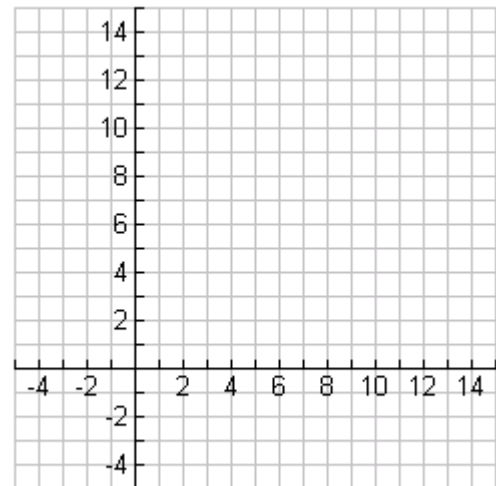
a. Locate each plant on the coordinate scale and connect these points with a line segment.

b. Determine the midpoint of the line segment connecting the two plants.

c. Determine the slope of the line connecting the plants.

d. What is the slope of the line containing the path?
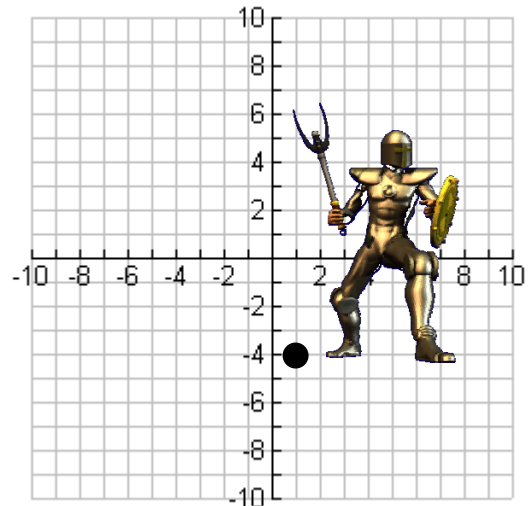
e. The equation for a line that passes through the point (x_1, y_1) and has a slope of m is $(y - y_1) = m(x - x_1)$. Using the information you have already found, write the equation of the line containing the path.

3. During a holodeck Batlith competition, all fighting must remain within the designated circular ring surrounding the opponent's initial position. Should the challenger leave this ring, the competition is lost. The opponent's initial position is located at holodeck coordinates (1,-4). The circular ring for this competition is to have a radius of 6 holodeck grid units.

a. Draw the ring on the holodeck grid at the right.

b. Write the equation of the circular ring.

c. If each grid unit in the holodeck represents 3 actual feet, find the area of the actual Batlith ring to the *nearest square foot..*

4. Commander Will Riker and Counselor Deanna Troi have designed a holodeck exercise program that they use at the same time. Deanna does yoga in a rectangular floor space with a horizontal length of 8 holodeck grid units, a width of 4 holodeck grid units, and centered at (5,7). Will runs on a track that is constantly 7 holodeck grid units from the point (-3,-3).

a. Draw the exercise areas used by Deanna and Will on the holodeck grid at the right.

b. Find the area of Deanna's holodeck floor space to the *nearest square unit.*

c. Find the area of the floor space surrounded by Will's running track to the *nearest square unit.*

d. If a straight wall is built in the holodeck to separate the two exercise spaces (without intersecting either space), write the equation of a straight line where the wall could be placed.