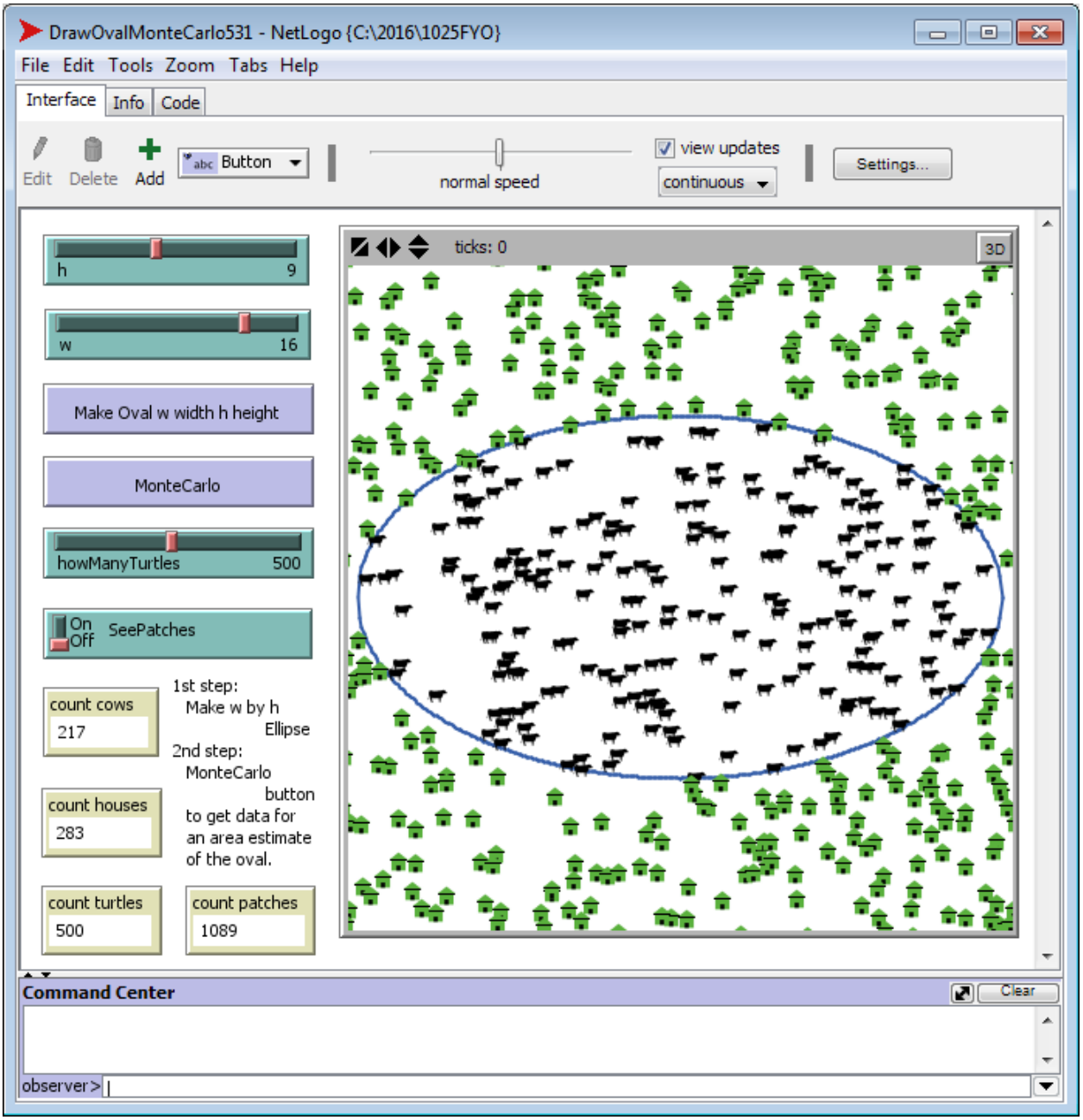
MONTE CARLO PROBLEM ONE

For the following, use the Monte Carlo method. What is the estimated area of the OVAL by the Monte Carlo method?

Helpful hint: Figure out what a, b, c and d are? Which ONE is the unknown or the goal? Which 3 of the 4 are known and can be known?

What is a?

What is b? What is c? What is d?



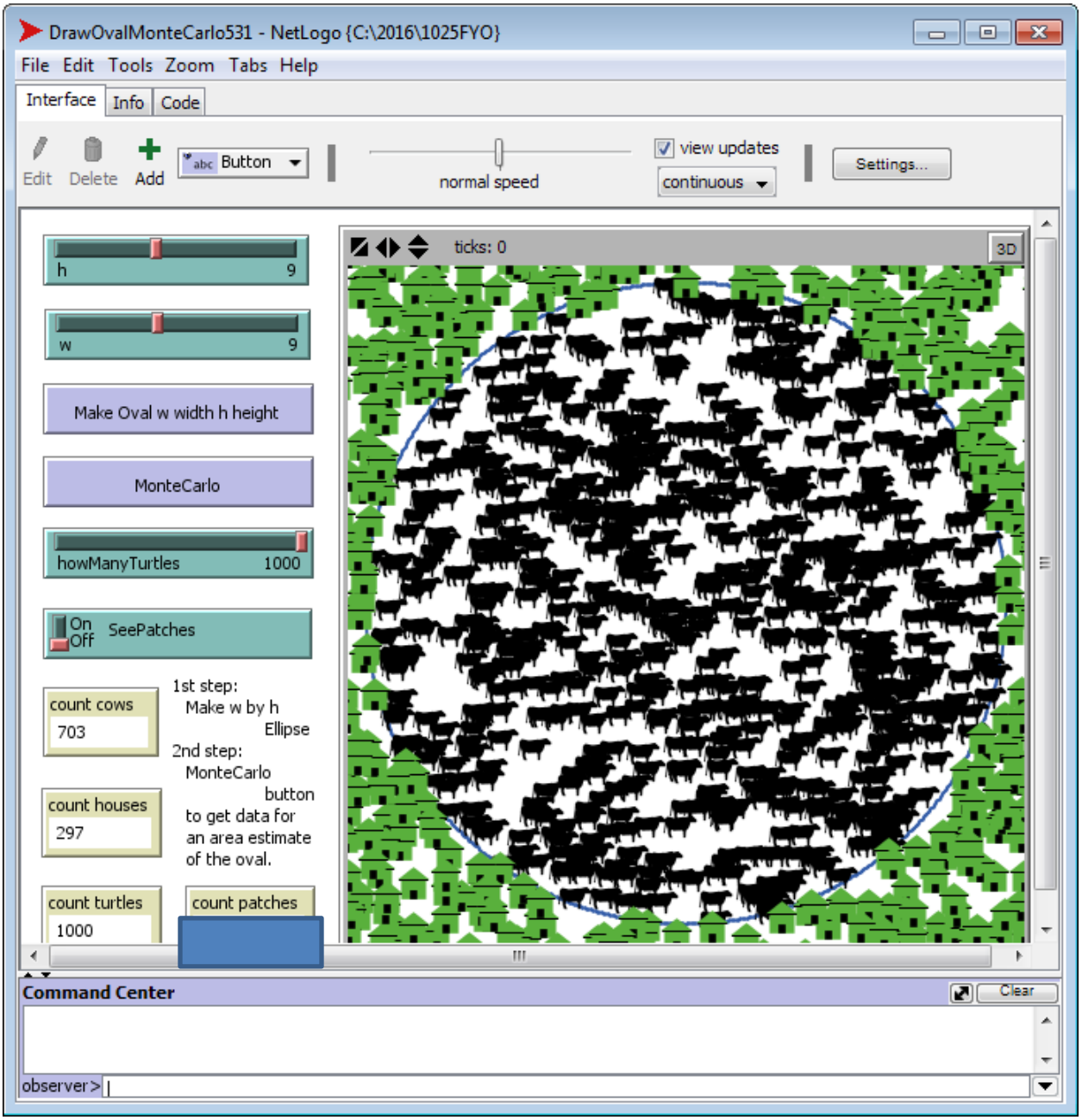
Note the area of the world or the turtle grid is 33 rows and 33 columns of patches.

Note that you MUST SHOW YOUR WORK! Not just the answer.

MONTE CARLO PROBLEM TWO

For the following, we have a perfect circle with a RADIUS of 9 and thus a DIAMETER of 18. Recall that the AREA of a circle is PI times RADIUS squared, i.e. PI R squared. Get the estimate for the area of the entire turtle world using Monte Carlo. The answer will be in square patches. What is the one thing you are trying to find? Is it a or b or c or d?

What is a? What is b? What is c? What is d?



Be sure to show your work? Note that d is the unknown now, instead of a being the unknown. We solved this type of problem in class and a detailed solution is available and scanned in for you to study on the web page. If you have trouble, take notes and rewrite the solved and scanned in solution. At the end of that process you will be much closer to understanding it and probably understanding it and how to do it.

The formula a = (b / c) * d is a four page and scanned in series of notes. You have this as a handout. Use it. Do past problems from class with it. Memorize it. Redo these problems again tomorrow and the next day until the formula seems easy to you. Which is the number of made free throws? Which is the number of free throw attempts?

Here is the Where is Waldo question.

Find the exact xcor and ycor location of the turtle using Trigonometry.

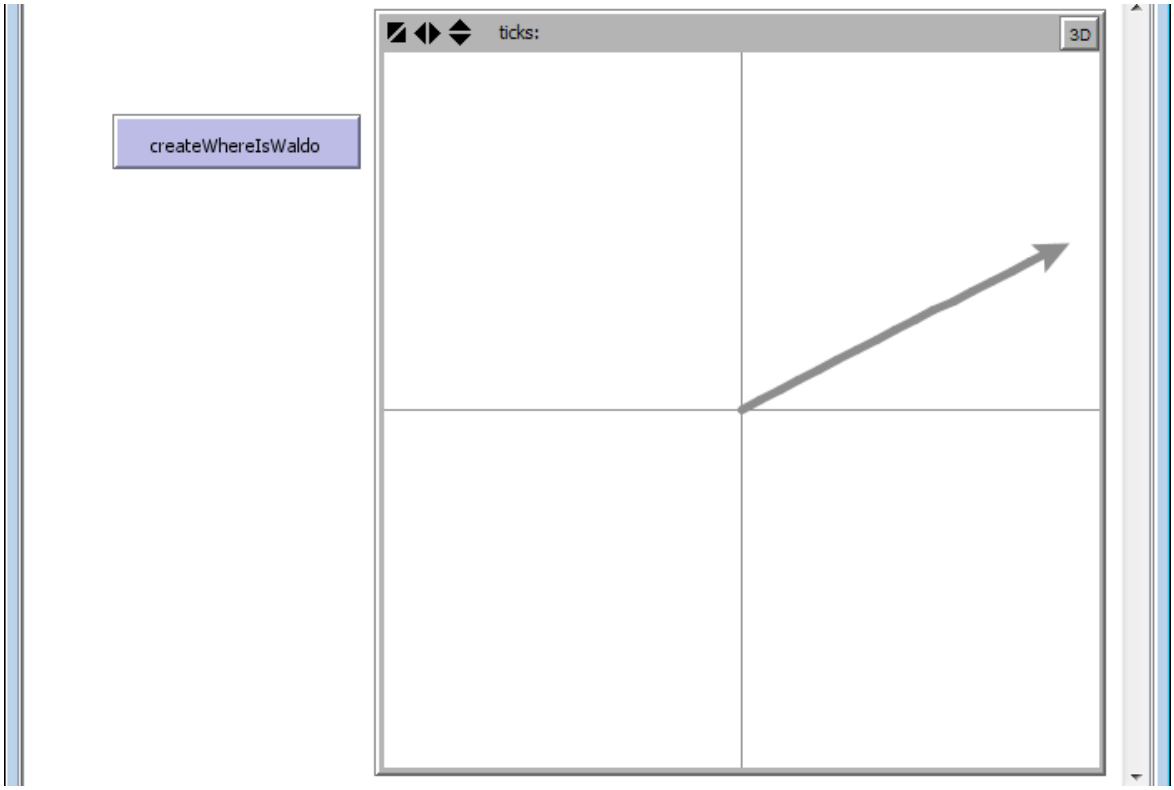
Use the Windows Calculator as needed. Be sure to practice with the WINDOWS calculator. You cannot use your own calculator on the test.

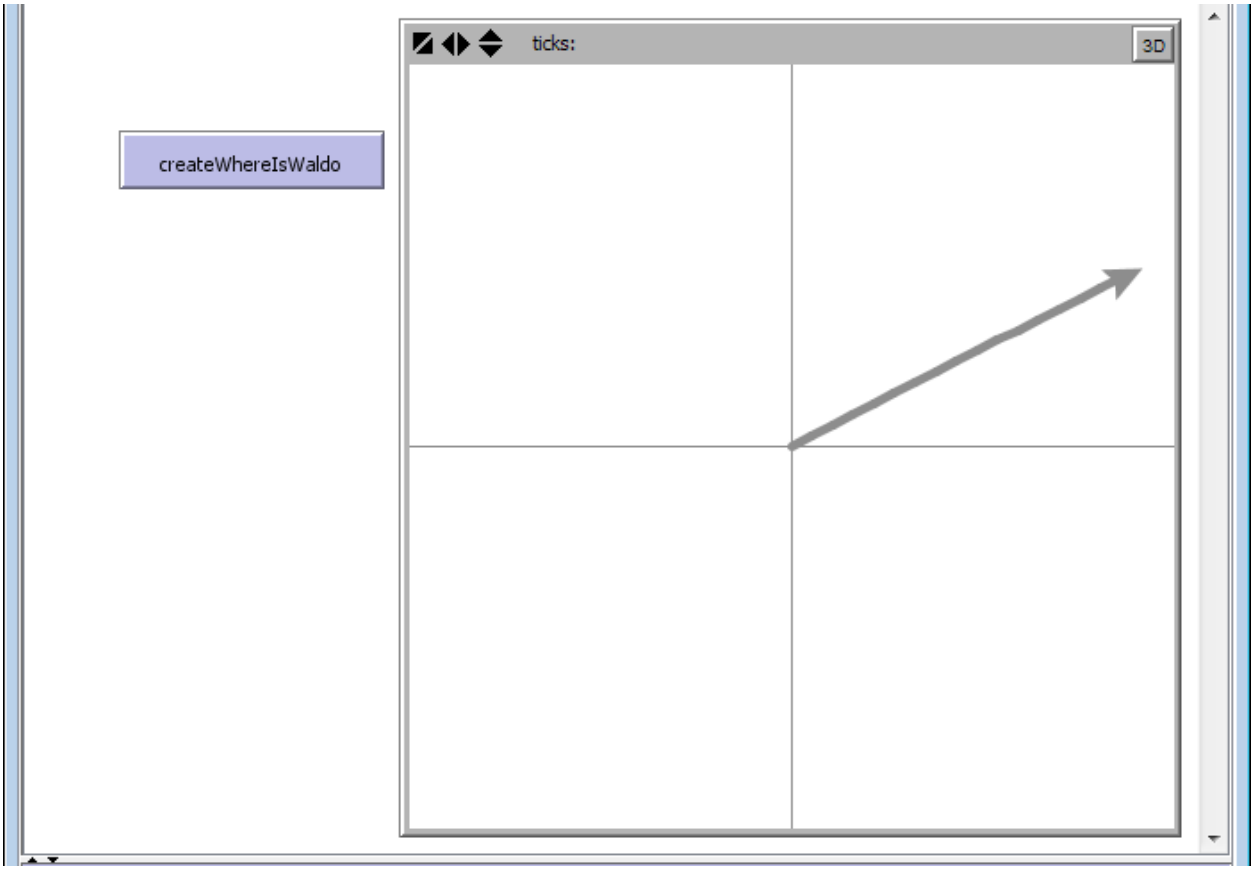
YOU MUST SHOW ALL YOUR WORK TOO! Every step, numerator and denominator and formula setup, etc.

Here is the code:

Solve the problem using only the SOH and the CAH, i.e. only the SINE and the COSINE to find the (xcor, ycor). Standard way to solve it.

```
TO createWhereIsWaldo
  ca

  ask patches [ set pcolor white ]

  cro 1

  ask turtles
  [
    pd
    drawAxis
    set pen-size 5
    set size 2

    rt 63

    fd 16
  ]
END

TO drawAxis
   fd 33        ;; draw the y axis
   rt 90
   fd 33        ;; draw the x axis
   lt 90        ;; face 0 degrees again
END
```





Now solve the same Where is Waldo problem, from the beginning, using only the TANGENT trigonometry function. TOA is TANGENT and TANGENT is the Opposite over the Adjacent. Do not stub your TOA, or rather do not stub your TOE (TOA). 2nd way to be able to solve it. Using only the TANGENT.

Finally, 3rd way to be able to solve it: Solve the same problem using only the SINE function once and using no other TRIG functions. Remember the Pythagorean theorem that the sum of the squares of the legs of the right triangle will be the square of the hypotenuse, so the square root of the sum of the squares of the legs of the triangle will be the length of its hypotenuse. Note: You have to know this formula for the exam. It has been shown many times during class! Third way to solve it: Use only the SINE function ONE TIME. Then use Pythagorean theorem to find length of the other LEG.

Pythagorean theorem

From Wikipedia, the free encyclopedia

In mathematics, the **Pythagorean theorem**, also known as **Pythagoras' theorem**, is a fundamental relation in Euclidean geometry among the three sides of a right triangle. It states that the square of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the other two sides. The theorem can be written as an equation relating the lengths of the sides *a*, *b* and *c*, often called the "Pythagorean equation":[1]

$$a^2 + b^2 = c^2,$$

where *c* represents the length of the hypotenuse and *a* and *b* the lengths of the triangle's other two sides.