NAME: _____

THIS IS PARTS FROM SEVERAL DIFFERENT EARLIER TESTS TO SHOW WHAT KINDS OF THINGS GET ASKED. YOU CAN LOOK UP STUFF AT processing.org. For example you can look up color() to learn about the color function if you have forgotten things about it. HINT: I often take questions from the study guide!

This exam fits in a normal 50 minute class period but you will probably get to stay for 55min. Do NOT forget semicolons at the end of statements! Write LARGE and legibly. If I can't read it I will count it as wrong.

1. (xx pts) Ball is a **class**. Create a variable called b that is of type Ball. Use the keyword **new** to allocate/initialize an **instance** of the class Ball and put it in b.

2. (xx pts) How do you call a constructor for a class Ball?

3. (xx pts) The class Ball had a method called move(); If b is of type Ball, how do I call the method move() on b?

4. (xx pts) True or false: Object oriented programming (OOP) let's one encapsulate both data and operations on that data in a single class. It also may restrict the ability of code outside the object to access and alter the data inside the object allowing for more independent coding of objects.

5. (xx pts) Define the class Ratio. It should have the data a and b which are both integers. The constructor should set a to 0 and b to 1. There is one method called **increment** which sets a to $a + b$. (HINT: watch out were your braces are and that **increment** does not return a value.)

6. (xx pts) How do I declare the variable GOAT to a global variable and an integer?

7. (xx pts) How do I declare the variable KID to a variable local to the setup() procedure and of type float?

8. (xx pts) I want the variable USAGI to be visible in both procedures setup() and draw(). Should it be a local variable or a global variable?

9. (xx pts) Short answer (only a few words). Be clear and not vague!

    a. Unlike NetLogo, Processing requires that you declare what about each variable you are going to use?

    b. What is the name of the function used to initialize a Processing program?

    c. What is the name of the function used to repeatedly display a set of graphics by executing the function at a specific frame rate?

    d. In default mode, does Y get larger as you go toward the top of the window or smaller?

10. (xx pts)

    When we do software development we carefully think about what we want the code to do next, then we edit our code to add that little bit of functionality. Then what is the next thing we do?

11. (xx pts)

    a. Write a statement that declares the variables x, y, and z to be able to contain floating point numbers.

    b. Write a statement that declares the variables x, y, and z to be able to contain integer values.

    c. Write a statement that declares the variables x, y, and z to be able to contain strings.

    d. Write a statement that assigns to x the value of the remainder when y is divided by 10.

    e. Assuming you are in RGB mode, write an expression that gives the color green. That is, it has no blue or red and green is completely "on". (HINT: the result is of type color.)

f. Assuming you are in HSB mode and you have $color(137, 0, 0)$ what color is it?

g. Write a statement that creates a canvas that is 755 pixels in the x direction and 213 pixels in the y direction.

h. Give the statement that sets the color scheme to HSB.

i. Give the statement will set the frame rate to once per second?

j. What statement will draw a line from the point $(10, 20)$ to the point $(30, 40)$?

k. What statement will set the thickness of a line to 4 pixels like we did for the hour hand?

l. What statement will set the color of the next drawn lines to the color stored in the variable lineColor?

m. Declare a variable myColor to be of a type that can contain a color. Then set myColor to be the color green assuming you are in RGB Mode.

n. What statement will increment the value in the variable "zanzibar"? (there are several possible answers)

12. (xx pts) Give the statements that draw a rectangle in the upper left-hand corner of the window and size in the x direction of 10 and y direction of 20. The interior color is stored in variable rectColor make sure the rectangle is that color. Make sure there is no outline on the rectangle. (HINT: the rectangle's position is in the upper left-hand corner so what coordinate is that?)

13. (xx pts) Give the statements that draw a rectangle centered about the middle of the screen. (HINT: you'll need to compute the middle of the screen and set the **rectMode** to **CENTER**. The size in the x direction is 100 and y direction is 220. Make sure there is no interior coloring. The outline is the color that is stored in

the variable Orange. Orange is of type color.

14. (xx pts) Give the FULL CODE for the setup routine that just sets the background to white.

15. (xx pts) Given that we know that 212 degrees Fahrenheit is 100 degrees Celsius and 32 degrees Fahrenheit is 0 degrees Celsius, use **map** to give an expression that will convert the temperature T in Fahrenheit to degrees Celsius.

16. (xx pts) What statement will draw a line from the point $(10, 20)$ at an angle of 30 degrees and length 40? (HINT: beware degrees! Remember that the radians function will convert degrees to radians for you. To answer this you need to know the formula for converting from polar (pirate) coordinates to Cartesian coordinates.)

17. (xx pts) Write a function that takes two floats and returns the larger of the two as a float. (You won't be tested on this we didn't cover it.)

18. (xx pts) Write the statements that will do the two assignments: set z to x if x is greater than y. Otherwise, set z to y.

19. (xx pts) Write the code that will define a function called circle. It will take four arguments: an x, y location that are floats and a size that is also a float and a color. It will draw a circle at that location and of that size and color.

20. (xx pts) Assume HSB. Set the variable colorAngle by taking an variable angle in degrees and converting it to a color whose hue ranges from 0 to 255 as the angle goes from 0 to 360.

21. (xx pts) Write the code that will put the text "dogs and cats" at location (100, 200) of size 50. The text will be of color FlamingRed (assume the variable FlamingRed has been defined and is of type color). The text will be centered left and right and top and bottom around the location you are displaying it.

22. (xx pts) Assume a function:

```
void circle(float x, float y, float diam, color c, String msg)
```

Give an example of a call to circle with the correct syntax. Your example should demonstrated the right types in the call for all the arguments.

23. (xx pts) Write a function called cincoDeMayo that takes an single integer argument and returns an integer that is 5 times that as the value of the function. (HINT: remember that you have to get all the types declared in the function definition including the type to return. You have to return a value using the `return` statement which is the keyword `return` followed by the value to be returned.)

Here is the answer:

```
int cincoDeMayo(int x)
```

```
{
    return 5*x;
}
```

24. (xx pts) Write a loop that will call function myStuff() 173 times.

25. (xx pts)

Examine this code:

```
for (int a=0; a<3; a++) {
    for (int b=10; b<13; b++) {
        display(a, b);
    }
}
```

What will be the first four calls to display?

a)	b)	c)
display(0, 10)	display(0, 10)	display(0, 10)
display(0, 11)	display(1, 10)	display(1, 11)
display(0, 12)	display(2, 10)	display(2, 12)
display(1, 10)	display(0, 11)	display(3, 13)

26. (xx pts) Now for the big finish:
Declare an integer variable $cint$.
Set $cint$ to 0.
Write nested loops for integers x and y.
The x loop should go between 0 and up to but not including 160 in steps of 10.
The y loop should go between 0 and up to but not including 160 in steps of 10.
Inside both loops: Set the fill color to $cint$. This will make a gray scale color.
Draw a square of size 10 at location x, y.
Increment $cint$.