Name(s): _____

For each of the following problems,
1. First carefully sketch and shade the relevant area (label points on axes)
2. Write out the definite integral that will give its exact value. Show work in finding the bounds for integration.
3. Finally, evaluate the integral - you can use maple to do this, no need to show work. **Give your answer as a decimal with 4 decimal places.** You may need to type "evalf(%)" to get maple to write it as a decimal.

You may use maple to plot the graphs if it is helpful. Unless otherwise specified (e.g. you are asked explicitly to *estimate*) find the exact coordinate of the bounds (e.g show any work in solving for the bounds – give and solve equations, etc.)

1. The area bounded by $y = 2^x$, $y = 8$, and the $y-axis$.

2. The area bounded by $y = 3^x$, $x = 2$, the $x-axis$, and the $y-axis$.

3. The area bounded by $y^3 = x + 1$ and $x = -y^2 + 3y$ that lies ABOVE the $x-axis$.

4. The area in the <u>first quadrant</u> between $x^2 + y^2 = 1$ and $x^{1/2} + y^{1/2} = 1$.

5. The area in the <u>first quadrant</u> bounded by the curves $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 1$ and $x = -\dfrac{y^2}{4} + 1$.

6. The area between the curves $y = \cos x$ and $y = .5x - 1$, bounded on the left by the $y - axis$. Use maple to estimate the points of intersection.

7. Find the area between the curves $y = \sin x,\ y = x^3 - 2x - 1$. Use maple to estimate the points of intersection.

8. The area between $y = -\sin(x)$ and $y = -2\sin(x)$ from 0 to π. *Before calculating the area, make a guess based on your sketch.*
    Sketch:

    Guess:

    Definite Integral and actual value: