

**Lesson #74 Homework**

Name: \_\_\_\_\_

Per: \_\_\_\_\_

1. Find the Area of the region enclosed by Region R:  $y = e^x$ ,  $y=0$ ,  $x=0$ ,  $x=1$

4. Find the Volume of Region R in problem #3, by rotating about the y-axis. (Use Cylindrical Shell Method – Just set-up, do not solve)

2. Find the Volume of Region R in problem #1, but rotated about the x-axis. (Use Disk Method)

5. Find the Area of the region enclosed by region R:  
 $f(x) = 2e^{-x}$ ,  $g(x) = e^x$ ,  $x = 0$   
(No Calculator – find intersection by hand)

3. Find the Area of the region enclosed by region R:  
 $y = e^x$ ,  $y=1$ ,  $x=1$

6. Find the Volume of the solid that is generated when the region enclosed by  $y = 1/x^2$ ,  $y=4$ ,  $x=3$ , is revolved about the y-axis. (Solve by Washer Method)

7. Find the Volume of the solid that is generated when the region enclosed by:  
 $y = 1/\sqrt{x}$ ,  $y=0$ ,  $x=1$ ,  $x=4$ , is revolved about the x-axis. (Solve by Disk Method)

1. Given that  $g(2) = 5$  and  $f'(5) = \frac{1}{2}$ . If  $f$  and  $g$  are inverses to each other, then find  $g'(2)$ .

2. Let  $f(x) = x^3 + x$ . If  $h$  is the inverse function of  $f$ , then find  $h'(2)$ .

3. Suppose that  $f(x) = \cos^2(2x)$  and  $g(x)$  is the inverse of  $f(x)$  where  $0 \leq g(x) \leq \frac{\pi}{4}$ , what is  $g'\left(\frac{1}{2}\right)$ ?

4. Two functions  $f$  and  $g$  are differentiable for all real numbers, and  $g$  is strictly increasing. The table below gives values for the functions and their first derivatives at selected values of  $x$ .

$x$	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
1	6	4	2	5
2	9	2	3	1
3	10	-4	4	2
4	-1	3	6	7

a) If  $f^{-1}$  is the inverse function of  $f$ , find the slope of the line tangent to  $f^{-1}(x)$  when  $x = 10$ .

b) If  $g^{-1}$  is the inverse function of  $g$ , write an equation for the tangent line to the graph of  $y = g^{-1}(x)$  at  $x = 2$ .