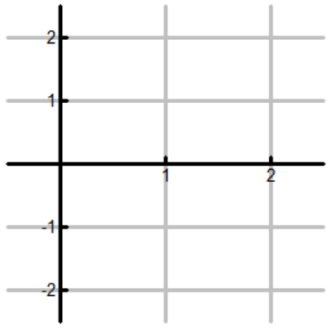
AP Calculus
Volume

Name_____
Application of Integration Day 5

1-10: Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. Sketch the region and the solid.

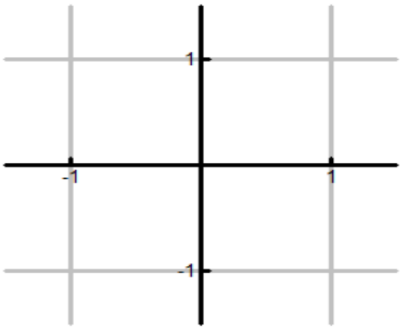
1. $y=2-\frac{1}{2}x$, $y=0$, $x=1$, $x=2$; about the x-axis

All on Calculator. Show what you put into calculator .

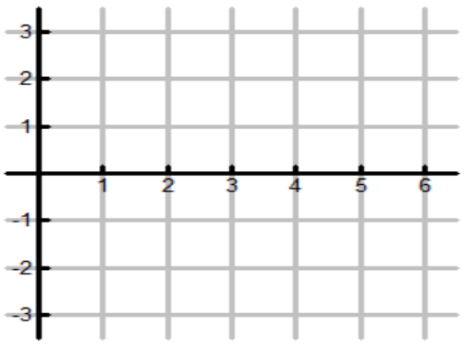


2. $y=1-x^2$, $y=0$; about the x-axis

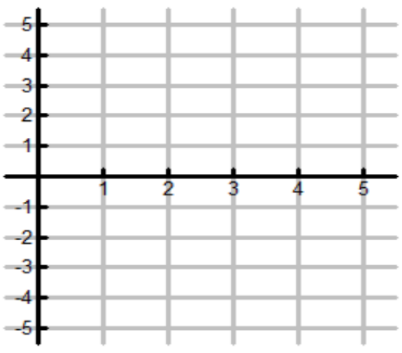
All on Calculator. Show what you put into calculator.



3. $y=\sqrt{x-1}$, $y=0$, $x=5$; about the x-axis **All by Hand.**



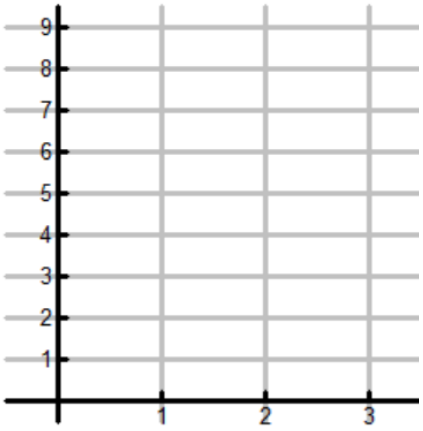
4. $y=\sqrt{25-x^2}$, $y=0$, $x=2$, $x=4$; about the x-axis **All by Hand.**



AP Calculus
Volume

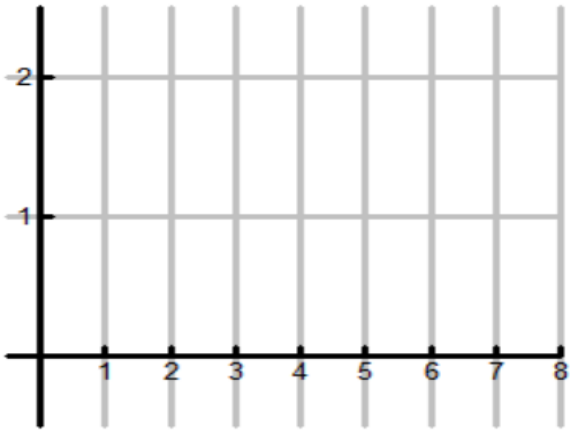
Name_____
Application of Integration Day 5

5. $x = 2\sqrt{y}$, $x = 0$, $y = 9$; about the y-axis **All by Hand.**

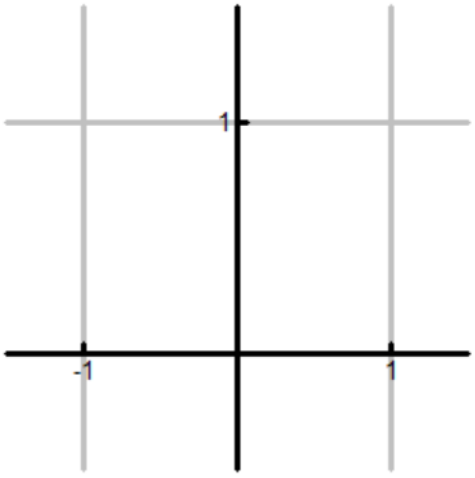


6. $y = \ln x$, $y = 1$, $y = 2$, $x = 0$; about the y-axis

All on Calculator. Show what you put into calculator.



7. $y = x^3$, $y = x$, $x \geq 0$; about the x-axis **All by Hand.**

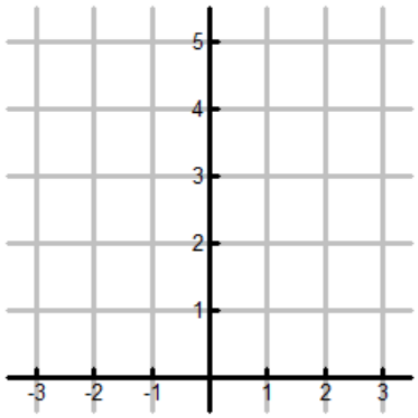


AP Calculus
Volume

Name_____
Application of Integration Day 5

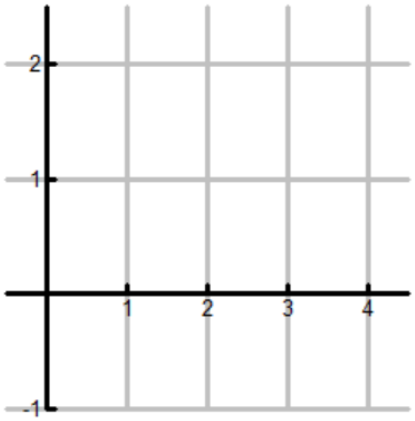
8. $y=\frac{1}{4}x^2$, $y=5-x^2$; about the x-axis

All on Calculator. Show what you put into calculator.

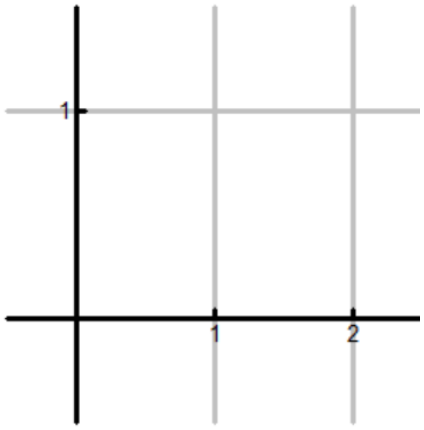


9. $y^2=x$, $x=2y$; about the y-axis

All on Calculator. Show what you put into calculator.



10. $y=\frac{1}{4}x^2$, $x=2$, $y=0$: about the y-axis **All by Hand.**



AP Calculus
Volume

Name_____
Application of Integration Day 5

A calculator may be used on all of these questions.

Use this for problems 11 & 12.
The rate of natural gas sales for the year 1993 at a certain gas company is given by $P(t) = t^2 - 400t + 160000$, where P(t) is measured in gallons per day and t is the number of days in 1993 (from day 0 to day 365).

11. To the nearest gallon, what is the total number of gallons of natural gas sales at this company for 31 days (day 0 to day 31) of January 1993?
   a.) 4,777,730
   b) 4,617,930
   c) 154,120
   d) 148,965
   e) 148,561

12. To the nearest gallon, what is the average rate of natural gas sales at this company for the 31 days (day 0 to day 31) of January 1993?
   a.) 4,777,730
   b) 4,617,930
   c) 154,120
   d) 148,965
   e) 148,561

13. A solid is generated by revolving the region bounded by the x-axis, the line x=5, and the function y=lnx around the x-axis. The volume of the solid is
   a.) 4.047
   b) 4.857
   c) 15.259
   d) 88.706
   e) 90.216

14. A continuous function g(t) is defined in the closed interval [0,6] with values given in the table below. Using a midpoint Riemann sum with three subintervals of equal length, the approximate value of $\int_0^6 g(t)dt$ is

t	0	1	2	3	4	5	6
g(t)	4	7	8	12	15	22	26

   a.) 68
   b) 82
   c) 89
   d) 94
   e) 153

Answers:

1. $\frac{19\pi}{12}$ 2. $\frac{16\pi}{15}$ 3. 8π 4. $\frac{94\pi}{3}$ 5. 162π 6. $\frac{\pi}{2}\left(e^4 - e^2\right)$ 7. $\frac{4\pi}{21}$
8. $\frac{176\pi}{3}$ 9. $\frac{64\pi}{15}$ 10. 2π 11. A 12. C 13. C 14. B