Calculus Chapter 10 and Chapter 11.1 – 11.4 Review
AP Problems

1. Cat #10 Find the area of region R. R is the region bounded by the x-axis, $x=1$, and $y = 1/x^2$

2. Cat #11 A) Find the volume of the solid generated by revolving R about the y-axis. Let R be the region in the 1st quadrant bounded by the x and y axis, $y = e^{-x^2}$, and the line $x = k$

B) Evaluate the limit of the volume determined in part A as K Increases without bound.

3. Cat #16 $\int e^{-x}\,dx$

4. Cat #16 Which one of the following is an improper integral?

A) $\int_0^2 \frac{dx}{\sqrt{x+1}}$ B) $\int_{-1}^1 \frac{dx}{1+x^2}$ C) $\int_0^2 \frac{x\,dx}{1-x^2}$ D) $\int_0^{2} \frac{\sin x\,dx}{\cos^2 x}$

5. Cat #16 Which one of the following diverge?

A) $\int_1^\infty \frac{dx}{x^2}$ B) $\int_0^\infty \frac{dx}{e^x}$ C) $\int_{-1}^1 \frac{dx}{\sqrt[3]{x}}$ D) $\int_{-1}^1 \frac{dx}{x^2}$

6. Cat #16

$$\int_0^\infty \frac{1}{x^2+9}\,dx =$$

7. Cat #16

$$\int_{-\infty}^0 \frac{1}{(z-1)^2}\,dz =$$

8. Cat #16

$$\int_0^1 \frac{1}{x^3}\, dx =$$

9. Cat #16

$$\int_0^2 \frac{1}{(x-1)^{2/3}}\, dx =$$

10. Cat #16

$$\int_0^1 \frac{\ln x}{x}\, dx$$

11. Cat #11 Each cross section of a solid infinite horn cut by a plane perpendicular to the x-axis for $-\infty < x \leq \ln 2$ is a circular disc with one diameter reaching from the x-axis to the curve $y = e^x$. Find the volume of the horn.

12. Cat #8 Draw a picture of the meaning of

A) $\int_0^3 \ln x\, dx$

B) $\int_{-4}^{\infty} e^{-x}\, dx$

13. Cat # 14 Determine whether the sequence converges or not. If so, find the limit.

$$\left\{ \left(\frac{n+3}{n+1} \right)^n \right\}_{n=1}^{+\infty}$$

14. Cat #10 Find the area, if possible, in the 1st quadrant of region R. R is bounded by the x-axis, y-axis, x=4, and $y = 1/\sqrt{x}$

15.

Estimating Integrals from Numerical Data The velocity (in miles per hour) of a Piper Cub aircraft traveling due west is recorded every minute during the first 10 min after takeoff. Use the Trapezoidal Rule and Simpson's Rule to estimate the distance traveled after 10 min. (1 min = __ hr.) (10 min = __ hr.)

t	0	1	2	3	4	5	6	7	8	9	10
$v(t)$	0	50	60	80	90	100	95	85	80	75	85

16.

An airplane's velocity is recorded at 5-min intervals during a 1-hour period with the following results, in mph:

550, 575, 600, 580, 610, 640, 625, 595, 590, 620, 640, 640, 630

Use Simpson's Rule to estimate the distance traveled during the hour.

17.

Use *Trapezoidal Rule* to determine the average temperature in a museum over a 3-hour period, if the temperatures (in degrees Celsius) recorded at 15-min intervals, are

21, 21.3, 21.5, 21.8, 21.6, 21.2, 20.8,

20.6, 20.9, 21.2, 21.1, 21.3, 21.2