Math 1432

Final Exam Review Key

1. $\frac{4}{3}$
2. $\frac{3}{2}$
3. $\frac{64}{3}$
4. $\int_0^4 \pi x^4 dx$
5. $\int_0^4 2\pi x[x^2]dx$
6.
   a. $A=\frac{32}{3},\ V_x=\int_0^4 2\pi y\left[6-y-\sqrt{y}\right]dy,\ V_y=\int_0^4 \pi\left[(6-y)^2-\left(\sqrt{y}\right)^2\right]dy$
   b. $A=\frac{22}{3},\ V_x=\int_0^2 \pi\left[(6-x)^2-\left(x^2\right)^2\right]dx,\ V_y=\int_0^2 2\pi x\left[6-x-x^2\right]dx$
7.
   a. $A=\frac{1}{6},\ \overline{x}=\frac{1}{2},\ \overline{y}=-\frac{1}{10}$
   b. $A=\frac{32}{3},\ \overline{x}=-2,\ \overline{y}=-\frac{8}{5}$
8.
   a. $c=\frac{1}{2}\pm\frac{\sqrt{3}}{6}$
   b. $c=-\frac{3}{2}\pm\frac{\sqrt{3}}{2}$
   c. $c=\pm\frac{2}{\sqrt{3}}$
9.
   a. $1+\left(\frac{x+1}{3}\right)^2=\left(\frac{y-1}{2}\right)^2$

b. $y = 1 - \left(\frac{x}{2}\right)^{-2}$

10.

a. $-2\sqrt{\cot(x)} + C$

b. 4

c. $\frac{1}{12}\sin^4(3x) + C$

d. $\frac{1}{3}\left(51^{3/2} - 6^{3/2}\right)$

e. $\frac{1}{3}\sin(x^3 - 6x) + C$

f. $-2\sqrt{9 - x^2} + C$

g. $\frac{37}{5184}$

h. $\frac{1}{2}\tan(2x) + C$

i. $-\frac{1}{3}\cot(3x) + C$

j. $\frac{1}{2}\sec(2x) + C$

k. $\frac{2}{3}(x+1)^{3/2} + C$

l. $\frac{1}{10}\left(x^2 + 1\right)^5 + C$

m. $\frac{1}{3}\sinh(3x) + \frac{1}{2}\cosh(2x) + C$

n. $\frac{1}{3}e^{3x} + C$

o. $\frac{3}{2}\left(\ln(x)\right)^2 + C$

p. $\frac{1}{7}e^{7x} - \frac{1}{5}\cosh(5x) + C$

q. $\frac{1}{12}\arctan\left(\frac{\cos(3x)}{4}\right) + C$

r. $\frac{3}{2}\arctan\left(\frac{x^2}{2}\right)+C$

s. $\frac{1}{3}\ln\left|\sec(3x)\right|+C$

t. $\frac{1}{6}\left(\arctan(3x)\right)^2+C$

u. $\ln\left|x+\sqrt{4+x^2}\right|+C$

v. $\frac{9}{2}\arcsin\left(\frac{x}{3}\right)-\frac{1}{2}x\sqrt{9-x^2}+C$

w. $3x\ln(4x)-3x+C$

x. $x^2e^x-2xe^x+2e^x+C$

y. $-3\ln\left|x+1\right|+2\ln\left|x-2\right|+\ln\left|x+2\right|+C$

z. $\ln\left|x+1\right|+\ln\left(x^2+1\right)+3\arctan(x)+C$

aa. $9\arcsin\left(\frac{x}{3}\right)-x\sqrt{9-x^2}+C$

bb. $\frac{20x}{1+100x^2}-\frac{1}{10}\ln\left(1+100x^2\right)+C$

cc. $\frac{3}{2}x\sin(2x)+\frac{3}{4}\cos(2x)+C$

11.

a. 2
b. Diverges
c. 0
d. Diverges
e. 4

12.

a. B
b. A
c. B
d. B
e. C
f. C
g. A

h. A
i. B

13.

a. $\frac{18}{13}$

b. $-\frac{9}{2}$

14.

a. $\sum_{n=1}^{\infty} \frac{(n^3+n)x^{n-1}}{\sqrt{n^5+3n}}$

b. $\sum_{n=1}^{\infty} \frac{(2n+1)x^{n-1}}{n^2}$

15.

a. $\sum_{n=1}^{\infty} \frac{(n^2+1)x^{n+1}}{(n+1)\sqrt{n^5+3n}}$

b. $\sum_{n=1}^{\infty} \frac{(2n+1)x^{n+1}}{(n^4+n)}$

16.

a. 6

b. $2\left[e^2-1\right]$

c. π

17.

a. $A=\frac{1}{2}\int_{7\pi/6}^{11\pi/6}\left[1+2\sin\theta\right]^2 d\theta$

b. $A=\frac{1}{2}\int_{-\pi/6}^{7\pi/6}\left[1+2\sin\theta\right]^2 d\theta-\frac{1}{2}\int_{7\pi/6}^{11\pi/6}\left[1+2\sin\theta\right]^2 d\theta$

c. $A=\frac{1}{2}\int_{\pi}^{7\pi/6}\left[1+2\sin\theta\right]^2 d\theta+A=\frac{1}{2}\int_{11\pi/6}^{2\pi}\left[1+2\sin\theta\right]^2 d\theta$

18. 999

19.

a. 3, $[-1,5)$

b. $3,\ (-2,4)$
c. $4,\ (-4,4)$

20.
a. Diverge
b. Diverge
c. Converge
d. Converge
e. Diverge
f. Converge
g. Converge
h. Converge
i. Converge
j. Converge
k. Diverge
l. Converge
m. Converge
n. Converge
o. Converge
p. Converge
q. Diverge