1. a) $\frac{2|x|}{\sqrt{4x^2+9}},\ x\neq 0$ b) $\frac{|x|\sqrt{4x^2+9}}{2x}+c$ **2.** a) $\frac{3}{2}\ln|2x-1|+2\ln\left(x^2+1\right)-5\arctan x+c$

b) $-\frac{1}{4}\arccos^2(2x)\Big|_0^{1/4}=\frac{5\pi^2}{144}$ c) $\frac{1}{2}\left[x^4\sin\left(x^2\right)+2x^2\cos\left(x^2\right)-2\sin\left(x^2\right)\right]+c$

d) $-\frac{1}{5}\left[\ln|\cos(5x)|-\frac{\cos^2(5x)}{2}\right]+c$ e) $-\frac{1}{3}\left(\frac{\sqrt{1-x^2}}{x}\right)^3+c$

3. a) $\lim_{x\to\infty}\frac{1}{2}\arctan\left(\frac{x-5}{2}\right)\Big|_5^x=\frac{\pi}{4}$ b) $\lim_{x\to 0^+}2\sqrt{\tan x}\Big|_x^{\pi/4}=2$

4. a) $-\frac{1}{3}$ b) e^{-2} c) $\frac{2}{5}$

5. $\frac{4}{3}units^2$ 6. a) $2\pi\int_0^{3/2}x\left(-x^2+3x-x^2\right)dx$ b) $\pi\int_0^{3/2}\left(1+3x-x^2\right)^2-\left(1+x^2\right)^2\,dx$

7. $2\ln\left(\frac{\left(2+\sqrt{2}\right)\sqrt{3}}{3\sqrt{2}}\right)$ 8. $y=\frac{3}{2}-\frac{1}{2x^2}$ 9. *conv. to* $\frac{3\pi}{2}$

10. a) *conv. by comp.test or* integral *test* b) *conv. by ratio.test*
c) *conv. by Root.test* d) *Div. by Divergence test*

11.a) *conv. by Alternating series test and div. by Limit Comparaison test. So it is conditionally convergent.*
b)Absolutely Conv. By Ratio test

12. a) *conv. telescoping* $sum=-\frac{\pi}{6}$ b) *Geometric conv.* $sum=\frac{1}{3}$

13.a) Conv. b) we can not say anything about this series as x=5 might be the other end point of interval of convergence c)Conv. d)Div.

14. $R=\frac{1}{9}$ and the interval $\frac{17}{9}<x\leq\frac{19}{9}$

15.a) $-\frac{1}{3}+\frac{1}{9}\frac{(x-5)}{}-\frac{2}{27}\frac{(x-5)^2}{2!}+\frac{6}{81}\frac{(x-5)^3}{3!}-\frac{24}{243}\frac{(x-5)^4}{4!}$

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