

**Hints and answers of the tutorial sheet-2.**

1. a)  $e^{-\frac{1}{2}}$ ,    b) 1,    c) 1,    d)  $\frac{1}{12}$ ,    e) 1,    f)  $-\frac{1}{4\pi}$ ,    g)  $\sqrt{6}$ ,    h)  $\frac{n+1}{2}$
2. Apply L'Hospital rule. a)  $a = -\frac{7}{6}$     b)  $a = \pm 2$ ,  $b = 1$ .
3. Use Lagrange's form of remainder after 3 terms.
4. Apply Taylor's theorem to  $f$  with Lagrange's form of remainder after 2 terms.
5. Apply Taylor's theorem to  $f$  and Mean Value theorem (Lagrange) to  $f'$ .
6. a) 0,    b)  $\log \frac{5}{3}$ ,    c)  $\frac{\pi}{4}$ .
7. a) 0.    b)  $\frac{3}{2}$ ,    c)  $\frac{1}{3}$ ,    d) 1.
10.  $\frac{e}{120}$ .
11. a) Consider Maclaurin's series expansion of  $\sqrt{1+x}$ .  
b) Take the function  $\cos x$  and use Taylor's series expansion.
13. 6.
14. Check  $f'(0)$  exists or not.