1. If $y=\frac{sin^2x}{1+cotx}+\frac{cos^2x}{1+tanx}$ then $\frac{dy}{dx}$ at x $=\frac{\pi}{4}$ is
   (a) 0
   (b) -1
   (c) 1
   (d) 2
2. The value of $cot(\frac{1}{2}(3\pi-tan^{-1}(\frac{1}{3})))$ equals
   (a) $(10+\sqrt{3})^{-1}$
   (b) $(3+\sqrt{10})^{-1}$
   (c) $(3+\sqrt{10})$
   (d) $(10+\sqrt{3})$
3. $\lim_{x\to-1^+}\frac{sin^{-1}(\sqrt{\pi}-\sqrt{cos^{-1}x})}{\sqrt{1-x^2}}$ equals
   (a) 0
   (b) 1
   (c) $\frac{1}{2\sqrt{\pi}}$
   (d) $\frac{1}{\sqrt{\pi}}$
4. If $f(x)=3+(1+7^{\frac{1}{1-x}})^{-1}$ then
   (a) $\lim_{x\to1^-}f(x)=4$
   (b) $\lim_{x\to1^+}f(x)=3$
   (c) $\lim_{x\to1^+}f(x)=5$
   (d) f has irremovable discontinuity at x=1
5. If f(x) $=3x^{10}-7x^8+5x^6-21x^3+3x^2-7$ then the value of $\lim_{x\to1^+}\frac{f(1-h)-f(1)}{h^3+3h}$ is
   (a) $\frac{-53}{3}$
   (b) $\frac{-22}{3}$
   (c) $\frac{53}{3}$
   (d) $\frac{22}{3}$
6. If the triangle formed by the lines $x^2-y^2=0$ and the line $lx+2y=1$ is isosceles then l =
   (a) 1
   (b) 2
   (c) 3
   (d) 0
7. Using L'Hospital's rule or otherwise evaluate the limit $\lim_{x\to0}\frac{(e^{2x^2}-1-2x^2)(cosx-1)}{(sin3x-ln(1+3x))x^4}$
8. Evaluate $\lim_{x\to0}\frac{e^x-ln(x+e)}{e^x-1}$ Use of L'Hospital's rule or surd expansion not allowed.
9. Find all real numbers t satisfying the equation $(3^t-9)^3+(9^t-3)^3=(9^t+3^t-12)^3$
10. Find $g'(3)$ if $g(x)=x.2^{u(x)}$ where h(3) =-2 and $h'(3)=5$