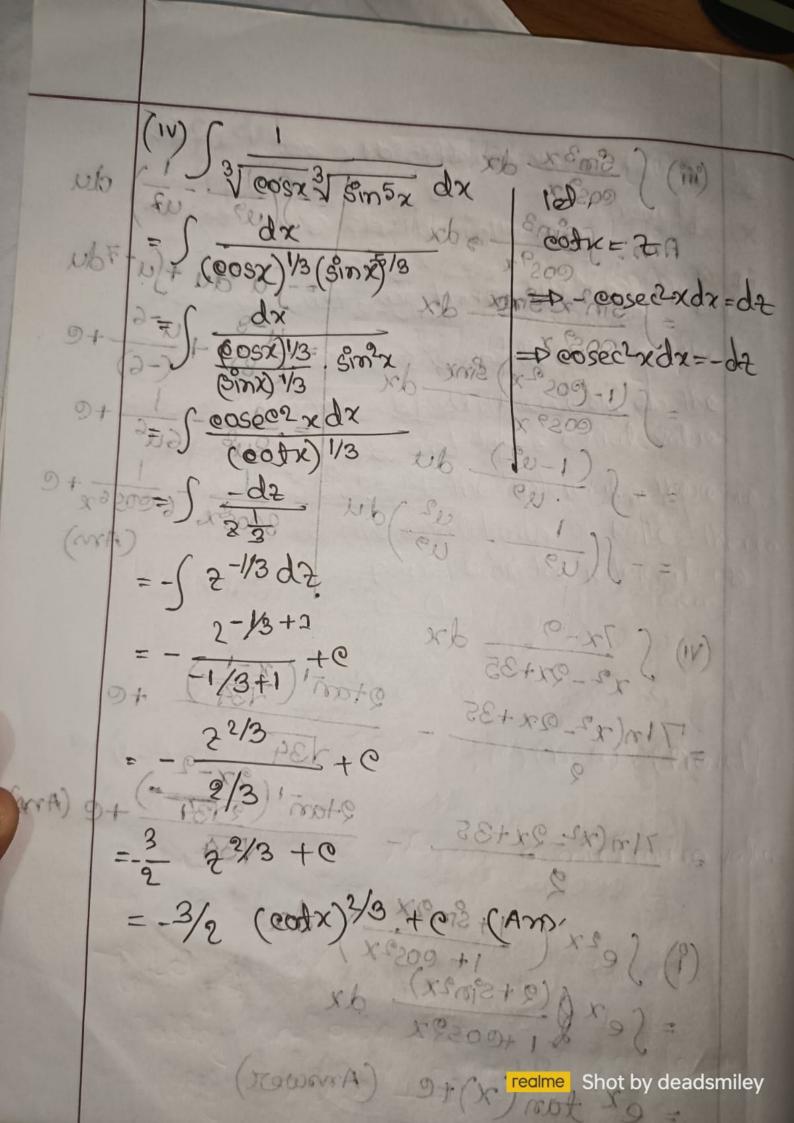
(6×5-3). x2 (1+x)5 (- Smo) 00 3/0 0-2/3 - - zodu n-3 9 00 (00%-) (0000) (\$13 me -) (0-x) seoo) (- 8 -X+1) Shot by deadsmiley 6002 (5 - 5) (- 3w) TE + She By uning H (000 to 01-100 to 0200) 3/ 560000 Se = 1 600 5 600 - 1 Jan 100 1 = (eme-) - xb xe = 1 1- too 9 200 1 300 0 9 0 G いっところす Or dx = -x2du

4(11) 5 @05 2 @01-1 J-x dx - x Let 1 = feos 2 cost - 1 1-x dx to 19 so, dx = (-sino)do 1= Seos 2 cot-1 1-2 d dx = Seos 2 eot - 1 1-eoso (-8m0) do = $\int \cos 2 \cot^{-1} \sqrt{\frac{2 \sin^2 0/2}{2\cos^2 0}} (-\sin 0) d0$ =) cos ? con-1 tano/2 (-sma)do = 5 @0s2 (7 - 9) (-smo) do = \$ = 5 @052 (7-0) (-8m0)d9 1 = ((-e0s0) (-smo)d0 6 = 4) = 35 200505100 do = - 1 eos20+e () 8 == 1 Sin20d0 = (200520=2) te

712(22-02+35 = -)(- = (e2x (1)+ sm2x ... ex for (x) te (Amount) 71か(メレーシスナ35 Ans: Sans (ex 8 (2+sim2x) dx (x-600-1) 72-9 72-97+35 Some x Some dx Sm3x dx x (500 X 6500 @059x 68 Sinx dr محل و 69 69 26 2+001 2-tam (272-×dx D+ 5434 5000 174 02-8008x 60056x+0 (0) Swe Shot by deadsmiley



3. (a) State and prove lagrange's mean value theorem.

Statement: Lagrangers' mean value theorem (MVT) States that if a function f(x) is continuous on a closed interval [a,b] and differentiable on the open interval (a,b) then there exists at least one point eay (x=e) within (a,b) where

(a, b) = f'(c) (b-a) bord (c) (b) = f'(c) (b) = f'(c)

This theorem (also known as Firest Hearn Value Theorem) allows to express the merement of a function on an intermediate value of the derivative of an intermediate point of the segment.

Proof:

Consider the auxiliary function F(x) = F(x) + JxWe choose a number λ such that the condition $F(\alpha) = F(b)$ is satisfied. Then

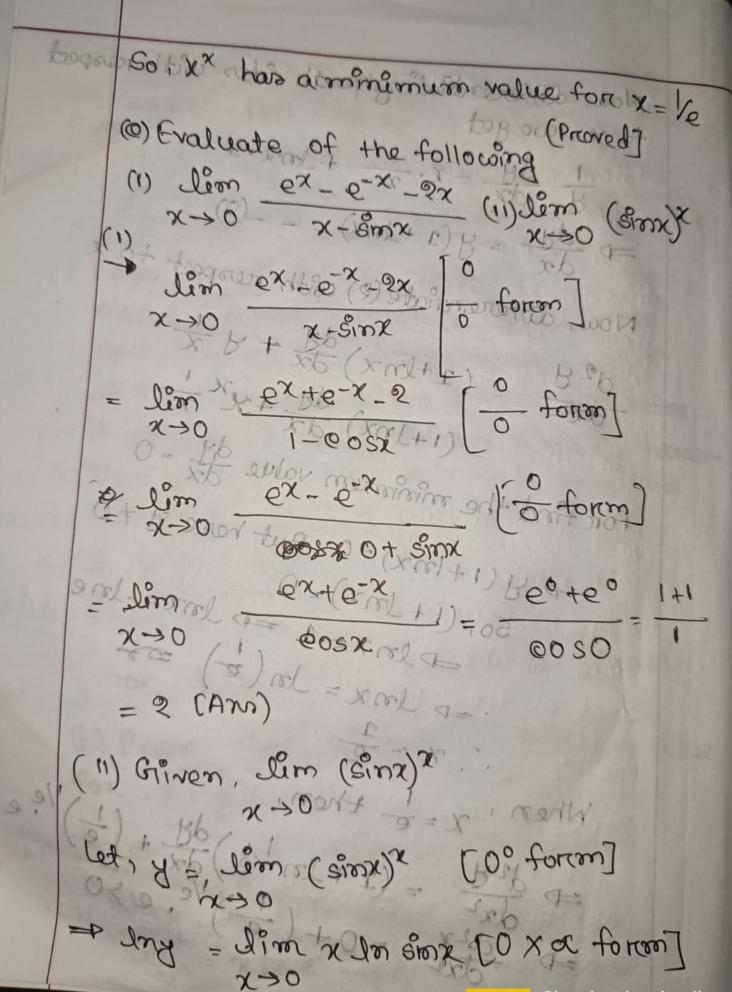
enter effect the state (a) of each (b) the state (a) s $\Rightarrow f(b) - f(a) = \lambda(a-b)$ As a respult, we have, $f(x) = f(x) \frac{f(b)-f(a)}{b-a}$ The function f(x) is continuous on the closed intercial [a,b], differentiable on the open interval (a,b) and takes equal values at the endpoints of the intercral therefore, it satisfies all the conditions of Rolle's theorem Then there is a point o on the interval (a16) transporter (c)=0 celo) monogate and on It follows that , 2 walls (moroent suler fortation or or of or to obstations = f(c)(b-a). [Proved] or, f (b)-f(a) tronggod out to triog (b) Prove that, xx has a minimum value for meter the auxillant of nobemos Taking In both side second on Iny = x (nx (1) realme Shot by de Shot by deadsmiley

began it is repeat the offente throughton wou to x nove get Stand of pit to the policy (Sease) dx = y(2+2mx) = - (8) Now, differentiate (9) with respect to x d2 8 = (1+lnx) dx + y x 1 for find the minimum value $\frac{dy}{dx} = 0$ -10 y (1+1mx)=0 But hore & +0 0200 50= (1+ mx)=0 Dlnx=1 = lnx=-lne = Jmx = Jm(e) When, x=e then, moning (1) = 1 dx2 = (2 + ln /e) dx + (=) /e e

- dx2 = 0 + (=) /e e > 0

- dx2 = 0 + (=) /e e > 0

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=
$$\lim_{x\to 0} \frac{\ln \sin x}{1/x} \left[\frac{\alpha}{\alpha} + \int_{-\infty}^{\infty} \frac{1}{x} + \int_{-\infty}^{\infty} \frac$$

