```
Ara formula Az Dardy
                                   1 ph dy - y dx) dt = 1 /2/2 cst - cs2t) (cost - cos2t) + (25M - smet) ( smt - smxt) H
                                                                                                                     2 cost + cost 2t -3 cost cos2t + 2 sn't + 5 mit -3 ont smitht
                                                                                  = 13-3(cost-cost tsutsinit)dt
                                                                                                  cstart+25m2cost
                                                                                                            = (0)t C (0)2t + 25h't)
                                                                                                          = \cos t (2\cos^2 t + 2\cos t - 1)
                                                                                                                     2 (ost
                                                                             A = 3 \int_{0}^{\infty} (1 - \cos t) dt = 6\pi
                                     A = \frac{1}{2}\int (2\cos t + \cos t)\cos t - (6)2t) At
+ 2(\sin t + \sinh t)(2\cos t - \cos t)
                                          = PT-(cost-cost + sut simt) dt

= (1 - cost) dt
      = St-1/2 Smitcost - out cosit at
     - 1 copt snt - sut (2 cost -1) dt
     = \left(\frac{\pi}{3}\right)^{\frac{1}{2}} \int_{0}^{\pi} 
4 A= \frac{1}{2} \int (2acost -asnet) boot + bout (2asnt + 2acoset)
                                         -Deab cos't - absortalt + 2about + 2about + 2about at
                                         =\frac{1}{2}\int_{0}^{\infty} 20b + 2absut cos2t - about t cost <math>4
                                  = \frac{1}{2} \left( \frac{2\pi \tap{\frac{1}{2}}{2ab} - 2\absubstruct + 2\absubstruct - 2\defta \text{k}t \ dt
                                                       =2abT
                   6 Norm when Mg = F
                                      \chi(2x,2y,2z) = (yz^2, xz), 2xy)
                                                      \Rightarrow \frac{\lambda}{yz^2} = \frac{y}{xz^1} = \frac{2}{2xyz} = \frac{1}{2xy}
                                                                         -) y^2 = = \frac{2}{2}, x^2 - y^2.
                                                                Substitute bael to constraint
                                                                                                         322 = P=>2= +N=
                                                                                                             了一大成子, X-175
                                             8 New d0= |(V_r \times V_0)|_{abs} |(cosi + onoi) \times -roman + rchait)|_{arab} = |svoi + -coso + (coso + roso)|_{arab} |arab}
                                                                            M= S 8dQ- 656 2 r Ji+r dr do
                                                                                                                                             =\frac{1}{3}(1+r^{2})^{3/2}
                                                                                                                                                     =\frac{4\pi}{3}\left(\left(\frac{1}{2}\right)^{3}-1\right)
                                                                                                                                                                                                                                                          CMMg = W
                                                                                                                                                                                              12 SIMilarly
                                                                                                                                                                                             12 SIMILANY
13 (ODVCb) true CC) SS wdv
15 $PE dr = $PAXE AD

= $PB A A B

=-2 $PB A A B
                                                                                                                                                                                                   16 \quad D \quad D \quad H = 0
b \quad H \quad D \quad F + 0, 80, 40

\Pi X(fog) = Gxf)g + fwg \\
= 0fxgg

                                                                                                                                                                                                18 Pick on 5' with D
                                                                                                                                                                                                                                            55F. nd6= 555F. dV
= 5556F. dV= 57F. nd6
                                                                                                                                                                                                                              Pill bondon avec Is! C
                                                                                                                                                                                                                  SF2 Êdr= 2/forE+n = 29$ DXF, n

C' = 6F, Edr

Totymen are mobile C's which

compres would form
                                                                                                                                                                                                                                                     As F. 76- AF. F-16
                                                                                                                                                                                                choole a set of different curves such that

End orthogonal to the first set of curves

at each point and we have
                                                                                                                                                                                                                                                                       # F_ F_ 46 = #F, F_ 16
                                                                                                                                                                                                                                                                                                                                                    FICTIBLE TOTAMS CLOSED
                                                                                                                                                                                 19 DXF=0=>F=DF
                                                                                                                                                                                             but \nabla F = 0 \Rightarrow \nabla \nabla f = 0
                                                                                                                                                                                                             7-1-0 aloes not imply t=00r
                                                                                                                                                                                                                                                                                                                                                                                         tor an closes 51, as 2, 2 in mutually orthogonal
                                                                                                                                                                                                       in other moral, FED
                                                                                                                                                                                                                                                                                                                                                                                                                         For example F = 12
                                                                                                                                                                                                                                                               1 cross product = parallebyam
                                                                                                                                                                                                     prejection of Tudu onto direction of Tudu
                                                                                                                                                                                                             _ Tudu Tudu
                                                                                                                                                                                                             Pathagorns (8vdv)= 1h1+
                                                                                                                                                                                                               Aren = JIhi Wudul = Wudul Wudul - Wudul - Wudul
                                                                                                                                                                                                                                                                                             - [Vul'Vul- Vv Mu dvan
                                                                                                                                                                                            21 \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta
= \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \int d\theta = \frac{1}{3} \int \int \partial d\theta = \frac{1}{3} \int \partial d\theta
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