15 Jan 2009

1.

a) $\dim M = 2$, $\dim N = 2$, $\dim M \cap N = 1$

b) $p = (x, y, z)$, $T_p(M \cap N) = span\{(x/y(y + v), v, 1)\}$, $v = -(2x^2 - 1)y/(2x^2 - 2y^2)$, $T_p(M \cap N)^\perp = span\{(-1/x, 1/y, 1), (2x, -2y, -1)\}$

2.

a) (0,1/2,0)

b) $\pi^{1/2}$

c) mais perto: $(2 - 2a, 3 - 3a, 4, 4a)$, mais longe: $(2 + 2a, 3 + 3a, 4 + 4a)$; $a = 29^{-1/2}$

3.

a) 78π

b) 0

4. não é aditiva

5.

a) 2

30 Jan 2009

1.

b) $\varphi(\theta) = (\cos\theta, \cos\theta, \sin\theta)$, $\theta \in]-\pi/2, \pi/2[$

2.

a) $\sqrt{3}(e^{2\pi} - 1)$

b) $e^{2\pi - 1}$

3. $x = y = z = 1$

4.

a) 0

b) 0

5. $\{\emptyset, \Omega, A_o, A_1, A_0^c, A_1^c, A_0 \cup A_1, (A_0 \cup A_1)^c\}$, $\mu(B) = \#B/\#\Omega$

6.

a) 0

b) $2 + f(0)$

6 Jan 2010

1.

a) $\dim M = 3$

b) $T_p M = \{(x, y, z, w): x + w = 0\}$, $T_p M^\perp = \{(x, 0, 0, w): x - w = 0\}$

2.

a) mais perto (2/3,0,2/3), mais longe (2,0,-2)

b) (0,1/2,0)

c) 1/2

d) $(5 - \cos 2)/8$

3.

a) $\{\emptyset, \Omega, A_0, A_1, A_0 \cup A_1, A_0^c, A_1^c, (A_0 \cup A_1)^c\}$

27 Jan 2010

1.

a) $\theta \neq 0$, $\dim M_\theta = 2$

b) $T_p M = span\{(1, 0, 0, -1), (0, \theta, 1, 0)\}$, $T_p M^\perp = span\{(0, -1, \theta, 0), (1, 0, 0, 1)\}$

2.

b) $1/(e^\pi - 1) + \pi^3/24 - 1$

3.

a) $]0, 1[\times] - 1, 0[\times]0, 2[$

c) $\pi/2$

4.

a) 0, $m(E)$, decrescente

b) sse $m(f^{-1}(a)) = 0$

5 Jan 2011

2.

a) $2\pi(1 - 1/e)$

b) $45/56$

c) 2π

3. $(1 - e^{-1})/16$

4. $\pi\alpha^2/6$

5.

b) $1/2$

26 Jan 2011

1.

a) $(0, 3/8, 0)$

b) $\sqrt{\pi}$

c) $(-1, 0, 0)$

2. $\sqrt[4]{2}$

3. 0

4.

b) $e^{-\lambda}(1 + 2\lambda + 3\lambda^2/2)$

c) $(1 - e^{-\lambda})/\lambda$

6. integrável

9 Jan 2012

2.

a) $T_p M = span\{(1, 1, \sqrt{2}), (1, -1, 0)\}$, $T_p M^\perp = span\{(1, 1, -\sqrt{2})\}$

b) $\sqrt{2}/3$

3.

a) $2R/3$

b) $x^2 + y^2 = 1/2$, $z = 1/2$

c) $\frac{3}{8} \frac{R^2 - r^2}{R^{3/2} - r^{3/2}}$

4.

a) 3

b) $1 + 1/4 + 1/9$

25 Jan 2012

2.

a) $3R/4$

b) $(0, 3/4, 0)$

c) $\sqrt{\pi}$

3.

a) $(2x, 2y, -1)/\sqrt{4z + 1}$

b) 0

4.

a) 55

b) 10

11 Jan 2013

1.

b) $2\pi^2$

2.

b) $\frac{\pi}{2}\frac{e-1}{e^2}$

3.

a) $3R/4$

b) $(1,1,1,0)$

4.

a) dim=2

b) $(0,0,\pm 1)$ em $\bar{D}\cap\{(x,y,z)\in\mathbb{R}^3\colon z=0\}$ e $\bar{D}\cap\{(x,y,z)\in\mathbb{R}^3\colon z=1\}$, $\pm(x,y,0)$ em S, $(0,\pm 1,0)$ em $\bar{D}\cap\{(x,y,z)\in\mathbb{R}^3\colon y=0\}$

c) $\pi/2$

31 Jan 2013

1.

a) $\gamma(t)=(\sin(t),\sin(2t),0)$, $t\in[0,2\pi]$, $\Gamma=\gamma([0,2\pi])$ não é uma variedade

b) $p=\gamma(\pi/2)=(1,0,0)$, $T_p\Gamma=span\{(0,1,0)\}$, $T_p\Gamma^\perp=span\{(1,0,0),(0,0,1)\}$

2.

b) $(\pi/2)^3$

3.

a) $(3/2,3/2)$

b) $2\sqrt{R}/3$

4.

a) dim=2

b) $(0,0,\pm 1)$ em $\bar{D}\cap\{(x,y,z)\in\mathbb{R}^3\colon z=0\}$ e $\bar{D}\cap\{(x,y,z)\in\mathbb{R}^3\colon z=1/2\}$, $(0,\pm 1,0)$ em $\bar{D}\cap\{(x,y,z)\in\mathbb{R}^3\colon y=0\}$, $\pm(x,y,1-z)/[\sqrt{2}(1-z)]$ em S

c) $\pi/4$