Ficha 7 – Soluções

1.

a. $\frac{1}{6}$.

b. $\frac{3}{4}$.

c. $-2+e$.

d. 2π.

e. $\frac{109}{42}$.

f. $\frac{1}{6}$.

g. $\text{sen}^2\left(\frac{1}{2}\right)$.

h. $-\frac{1}{2}e(e^3-4)$.

2.

a. $\frac{20}{3}$.

b. $\frac{1}{12}$.

c. $\frac{3}{4}$.

d. $-\frac{1}{e}+e$.

e. $-\frac{40}{9}+\pi^2$.

f. $\frac{7}{6}\log(2)$.

g. $\frac{3}{2}$.

3.

a. $\int_0^4 \int_0^{\frac{3}{4}x} f(x,y)dy\,dx + \int_4^5 \int_0^{\sqrt{25-x^2}} f(x,y)dy\,dx$.

b. $\int_0^1 \int_{e^y}^e f(x,y)dx\,dy$.

c. $\int_{-1}^0 \int_{2\,\text{arcsen}\,(-y)}^{\pi} f(x,y)dx\,dy + \int_0^1 \int_{\text{arcsen}\,(x)}^{\pi-\text{arcsen}\,(x)} f(x,y)dx\,dy$.

d. $\int_1^2 \int_1^y f(x,y)dx\,dy + \int_2^4 \int_1^2 f(x,y)dx\,dy$.

4.

a. $R = \{(x, y) \in \mathbb{R}^2 : y \geq 0 \wedge x \leq 1 \wedge y \leq 2x\}$.

b. $\int_0^1 \int_0^{y^2} x\ sen(y^5) dx\, dy$.

c. $\frac{1}{5}\sin^2\left(\frac{1}{2}\right)$.

5.

a. $R = \{(x, y) \in \mathbb{R}^2 : y \geq 0 \wedge x \leq 1 \wedge y \leq 2x\}$.

b. $\int_0^1 \int_0^{2x} e^{3x^2} dy\, dx$.

c. $\frac{1}{3}(e^3 - 1)$.

6.

a. $\frac{609}{8}$.

b. $\frac{\pi}{4}(e - 1)$.

c. $\frac{a^4}{8}$.

d. $\frac{\pi^2}{6}$.

e. $\frac{\pi}{12}$.

f. $\frac{12}{5}$.

7.

a. $\frac{64}{3}$.

b. $2\sqrt{2}$.

c. $-\frac{1}{2} + \frac{\sqrt{3}}{4} + \frac{\pi}{12}$.

d. $2\sqrt{3} + \frac{2\pi}{3}$.

8.

a. π.

b. 1.

c. $\frac{176\pi}{3}$.

d. $\frac{14\pi}{3}$.

9.

a. 14.

b. $\frac{2}{3}(2\sqrt{2}-1)\pi$.

c. $\frac{a^2}{\sqrt{2}}$.

d. $8r^2$.

10.

a. 36.

b. $-\frac{1}{12}$.

c. $\frac{7561}{5}$.

d. $\frac{19}{3}(3+e^2)$.

11.

a. $\frac{\pi^2}{16}-\frac{1}{2}$.

b. $\frac{7}{5}$.

c. $\frac{\pi}{6}$.

d. 4π.

12.

a. $e-\frac{1}{e}$.

b. $\frac{\pi^4}{3}$.

14. $\frac{5\pi}{6}$.

15.

a. 64π.

b. $7\sqrt{3}\frac{\pi}{3}$.

c. $\frac{64\pi}{3}$.

d. $\frac{9\pi}{4}$.

16. $8\sqrt{3}\pi$.

17. $\frac{729}{4}a$, onde a é a constante de proporcionalidade.