

Απειροστικός Λογισμός ΙΙΙ, χειμερινό εξάμηνο 2016-17.

Απαντήσεις πρώτου φυλλαδίου ασκήσεων.

1. i. $\frac{\sin 1}{9}$
 ii. $\frac{1}{(m+1)(n+1)}$
 iii. 0
2. $\iint_D f(x, y) dx dy = \int_{-1}^1 \left(\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} f(x, y) dy \right) dx = \int_{-1}^1 \left(\int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} f(x, y) dx \right) dy$
3. $\iint_D f(x, y) dx dy = \int_0^1 \left(\int_{x^2}^x f(x, y) dy \right) dx = \int_0^1 \left(\int_y^{\sqrt{y}} f(x, y) dx \right) dy$
4. $\frac{865}{6}$
5. 0
6. 3π
7. $\frac{2}{3}$
8. $1 + e^{-2}$
9. i. $\int_0^1 \left(\int_{\sqrt{y}}^1 f(x, y) dx \right) dy$
 ii. $\int_0^1 \left(\int_{\sqrt{y}}^{\sqrt[3]{y}} f(x, y) dx \right) dy$
 iii. $\int_1^e \left(\int_0^{\log y} f(x, y) dx \right) dy$
 iv. $\int_0^4 \left(\int_{-\sqrt{4-x}}^{\sqrt{4-x}} f(x, y) dy \right) dx$
 v. $\int_{-3}^3 \left(\int_{|y|}^3 f(x, y) dx \right) dy$
 vi. $\int_0^1 \left(\int_0^{\sqrt{1-y^2}} f(x, y) dx \right) dy$
 vii. $\int_0^1 \left(\int_0^{\arccos y} f(x, y) dx \right) dy$
 viii. $\int_2^4 \left(\int_1^{y/2} f(x, y) dx \right) dy + \int_4^7 \left(\int_{(y-1)/3}^2 f(x, y) dx \right) dy$
 ix. $\int_0^{\log 2} \left(\int_1^{e^y} f(x, y) dx \right) dy + \int_{\log 2}^e \left(\int_1^2 f(x, y) dx \right) dy + \int_e^{e^2} \left(\int_{\log y}^2 f(x, y) dx \right) dy$
 x. $\int_{-3}^{-\sqrt{5}} \left(\int_0^{\sqrt{9-x^2}} f(x, y) dy \right) dx + \int_{-\sqrt{5}}^0 \left(\int_0^2 f(x, y) dy \right) dx$
 xi. $\int_0^{\pi/2} \left(\int_0^{3 \cos x} f(x, y) dy \right) dx$
10. i. $\int_{-2}^0 \left(\int_{-x/2}^1 f(x, y) dy \right) dx + \int_0^1 \left(\int_x^1 f(x, y) dy \right) dx + \int_{-2}^0 \left(\int_{-1}^{x/2} f(x, y) dy \right) dx$
 + $\int_0^1 \left(\int_{-1}^{-x} f(x, y) dy \right) dx$
 ii. $\int_0^4 \left(\int_{\sqrt{x}}^2 f(x, y) dy \right) dx + \int_0^9 \left(\int_{-3}^{-\sqrt{x}} f(x, y) dy \right) dx$
11. i. $e - 2$
 ii. $\frac{2a^3}{3}$
 iii. $\sqrt{5} - \frac{1}{\sqrt{2}} + \frac{1}{2} \log \frac{\sqrt{5}+2}{\sqrt{2}+1} - \frac{1}{6}(5^{3/2} - 2^{3/2})$
 iv. $\frac{1-\cos 1}{2}$
 v. $e^4 - 1$
 vi. $\frac{e-1}{3}$

14. $\frac{11}{2}$

15. $\frac{196}{15}$

16. $\frac{1}{4}$

17. $\frac{8}{15}$

18. 1

19. 128π