

Calcolo 1 - Esercizi Proposti

Calcolare i seguenti integrali indefiniti immediati

1. $\int \frac{2x^3-x}{x} dx$

2. $\int x(x^2 + 1) dx$

3. $\int 2x^2(1 - x + 2x^2) dx$

4. $\int (x - 1)(2x + 5) dx$

5. $\int (x + 2)(x - 3) dx$

6. $\int \frac{4x^2-12x+9}{3-2x} dx$

7. $\int \frac{1+x^2+2x}{x+1} dx$

8. $\int \frac{x^3-8}{x-2} dx$

9. $\int (\frac{1}{x} + x) dx$

10. $\int \frac{3x^2+4x}{x^2} dx$

11. $\int (x + \frac{2}{3x}) dx$

12. $\int \frac{(x^2-3)(x^2+3)}{x^5} dx$

13. $\int \frac{(\sqrt{x}-1)(2\sqrt{x}+3)}{4x} dx$

14. $\int (\frac{1}{x} + 3)^2 dx$

15. $\int \frac{3x^2+4x}{x^2} dx$

16. $\int 2(2x + 1)^2 dx$

17. $\int (x^3 + \ln x)^3(3x^2 + \frac{1}{x}) dx$

18. $\int \frac{2x}{\sqrt{x^2+1}} dx$

19. $\int \sqrt{3x + 2} dx$

20. $\int x^2\sqrt{x^3 + 1} dx$

21. $\int x(x^2 + 1)^3 dx$
22. $\int x\sqrt{3 - x^2} dx$
23. $\int x\sqrt{5 + 4x^2} dx$
24. $\int (\sin x + 1) \cos x dx$
25. $\int \cos x \sqrt{\sin x} dx$
26. $\int \frac{1}{x} \sqrt[3]{\ln x} dx$
27. $\int \sqrt[5]{x + \sin x} (1 + \cos x) dx$
28. $\int \sin^2 x \cos x dx$
29. $\int \frac{e^x}{e^x + 1} dx$
30. $\int \frac{2e^x}{4 + 3e^x} dx$
31. $\int \frac{e^{2x}}{3 - e^{2x}} dx$
32. $\int \frac{-3 \sin x}{3 \cos x - 5} dx$
33. $\int \frac{1}{1 + \tan x} \frac{1}{\cos^2 x} dx$
34. $\int \frac{1}{\ln x} \frac{1}{x} dx$
35. $\int x(x^2 + 1) + \left(\frac{x}{x^2 + 1}\right) dx$
36. $\int \frac{x}{x+1} dx$
37. $\int \frac{x+1}{x-1} dx$
38. $\int \frac{2x+1}{3x+4} dx$
39. $\int (2x + \sin x - \cos x) dx$
40. $\int (x - \sin x + 2 \cos x) dx$
41. $\int \left(\frac{1}{x} - 2 \sin x\right) dx$
42. $\int \left(2 - \frac{3}{\sin^2 x}\right) dx$

43. $\int \left(\frac{2}{\cos^2 x} - \frac{3}{\sin^2 x} \right) dx$

44. $\int \left(\frac{1}{\cos^2 x} + \frac{2}{\sin^2 x} \right) dx$

45. $\int (e^x + 2^x) dx$

46. $\int (e^{x^2} 2^x) dx$

47. $\int (x e^{x^2}) dx$

48. $\int \frac{e^{2+\sqrt{x}}}{\sqrt{x}} dx$

49. $\int (1 + \sin x) e^{x - \cos x} dx$

50. $\int \cos x e^{2+\sin x} dx$

Calcolare i seguenti integrali di funzioni razionali fratte

1. $\int \frac{1}{x^2-4} dx$

2. $\int \frac{1}{x^2-3x+2} dx$

3. $\int \frac{1}{4x^2+12x+9} dx$

4. $\int \frac{x+1}{x^2-2x+1} dx$

5. $\int \frac{2x-3}{4x^2-4x+1} dx$

6. $\int \frac{1}{5+4x^2} dx$

7. $\int \frac{2x+1}{x^2+25} dx$

8. $\int \frac{x}{x^2-2x+3} dx$

9. $\int \frac{2x+5}{x^2+3x+5} dx$

10. $\int \frac{x+2}{x^2-4x+5} dx$

11. $\int \frac{x^2-6x+4}{x^2+2x+4} dx$

12. $\int \frac{1}{x^3+1} dx$

13. $\int \frac{1}{2x^3-3x^2+x} dx$

14. $\int \frac{1}{x^4 - 5x^2 + 4} dx$
15. $\int \frac{x^4 - 3x^2 - 1}{x^3 - 1} dx$
16. $\int \frac{x+3}{x^3 + x^2 - x - 1} dx$
17. $\int \frac{1+x}{x^2(2-x)} dx$
18. $\int \frac{2x^2 - 3}{(x-1)(x+1)} dx$

Calcolare i seguenti integrali applicando il metodo d'integrazione per sostituzione

1. $\int \sqrt{2+x} dx$
2. $\int \frac{e^x}{e^x + 2} dx$
3. $\int \sqrt{3x+2} dx$
4. $\int \sqrt[3]{4-5x} dx$
5. $\int \frac{1}{\sqrt{3-4x}} dx$
6. $\int \frac{\ln x}{x} dx$
7. $\int \frac{\ln^2 x}{x} dx$
8. $\int \frac{1}{\sqrt{x+x\sqrt{x}}} dx$
9. $\int \frac{1}{x\sqrt{1-\ln^2 x}} dx$
10. $\int \frac{e^{\tan x}}{\cos^2 x} dx$
11. $\int \frac{e^x + 1}{e^x - 1} dx$
12. $\int \sqrt{1-x^2} dx$
13. $\int \sqrt{16-x^2} dx$
14. $\int \sqrt{3-x^2} dx$
15. $\int \frac{2-3x}{\sqrt{2-5x^2}} dx$

16. $\int \sin^4 x \cos^3 x \, dx$

17. $\int \tan^4 x \, dx$

18. $\int \frac{1}{x\sqrt{2x-1}} \, dx$

19. $\int \frac{x}{\sqrt[3]{x-1}} \, dx$

20. $\int \frac{x^2}{\sqrt[3]{2x+1}} \, dx$

Calcolare i seguenti integrali applicando il metodo d'integrazione per parti

1. $\int \ln x \, dx$

2. $\int x^2 \ln x \, dx$

3. $\int \sqrt{x} \ln x \, dx$

4. $\int x^2 \sin x \, dx$

5. $\int x^2 \cos x \, dx$

6. $\int e^x \cos x \, dx$

7. $\int \cos \ln x \, dx$

8. $\int \frac{\ln x}{x^3} \, dx$

9. $\int e^x \ln(3 + e^x) \, dx$

10. $\int \ln(1 + x^2) \, dx$

11. $\int x \ln(1 + 4x^2) \, dx$

12. $\int \ln(1 - \sqrt{1 - x^2}) \, dx$

13. $\int x \tan^2 x \, dx$

14. $\int x^2 \ln(1 + x^2) \, dx$

15. $\int \frac{x+1}{x} \ln |x| \, dx$

16. $\int x e^{3x} \, dx$

17. $\int x e^{-x} dx$

18. $\int \arcsin \sin x dx$

19. $\int \arctan x dx$

20. $\int \sin \ln x dx$

Calcolare i seguenti integrali definiti

1. $\int_1^e \frac{x-1}{x^2} dx$

2. $\int_1^2 \frac{x^2-3x+1}{x} dx$

3. $\int_1^e (\frac{2}{x} + \frac{1}{x^2}) dx$

4. $\int_1^e \frac{x-1}{x^2} dx$

5. $\int_1^2 \frac{x^2-3x^3+1}{2x^3} dx$

6. $\int_0^1 (e^{2x} + e^{-2x}) dx$

7. $\int_{-1}^0 (e^x + e^{2x}) dx$

8. $\int_0^{\frac{\pi}{2}} (2 \sin 2x - 3 \cos 3x) dx$

9. $\int_0^{\frac{\pi}{4}} 2 \cos^2 x dx$

10. $\int_0^{\pi} (2 \sin x - 3 \cos x) dx$

11. $\int_{\frac{1}{2}}^{\frac{\sqrt{3}}{2}} \frac{2}{\sqrt{1-x^2}} dx$

12. $\int_1^{\sqrt{3}} \frac{3}{1+x^2} dx$

13. $\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} e^x \sin x dx$

14. $\int_{\frac{1}{2}}^1 \sqrt{1-x^2} dx$

15. $\int_1^e \ln^2 x dx$

16. $\int_2^3 \ln x dx$

17. $\int_2^3 x e^x dx$

$$18. \int_0^2 \frac{1}{4+x^2} dx$$

$$19. \int_{-\sqrt{5}}^{\sqrt{5}} \frac{2x+1}{x^2+5} dx$$

$$20. \int_1^4 \frac{e^{2+\sqrt{x}}}{\sqrt{x}} dx$$

Stabilire la convergenza dei seguenti integrali impropri

$$1. \int_1^{+\infty} \frac{1}{x\sqrt{x}} dx$$

$$2. \int_2^{+\infty} \frac{\sqrt{x}}{x\sqrt{x^2}} dx$$

$$3. \int_{-\infty}^0 e^{3x} dx$$

$$4. \int_{-\infty}^0 \frac{e^x}{1+e^x} dx$$

$$5. \int_{-\infty}^{+\infty} \frac{e^x}{1+e^{2x}} dx$$

$$6. \int_1^{+\infty} \frac{e^{\frac{1}{x}}}{x^2} dx$$

$$7. \int_{-\infty}^0 \frac{1}{(1+x^2)\arctan x} dx$$

$$8. \int_3^{+\infty} \frac{x}{x^2+1} dx$$

$$9. \int_1^{+\infty} \frac{1}{4x^2-4x+1} dx$$

$$10. \int_0^{+\infty} \frac{x}{x^4+1} dx$$

$$11. \int_2^{+\infty} \frac{\sin\sqrt{x-1}}{\sqrt{x-1}} dx$$

$$12. \int_2^{+\infty} \frac{1}{x \ln x} dx$$

$$13. \int_2^{+\infty} \frac{1}{x \ln^2 x} dx$$

$$14. \int_{-\infty}^0 e^x \sin x dx$$

$$15. \int_{-\infty}^0 e^x \sin 3x dx$$

$$16. \int_{-\infty}^{+\infty} \frac{1}{(x^2+1)\sqrt{1-x^2}} dx$$

$$17. \int_{-\infty}^0 e^{2x} \ln(1+e^x) dx$$

$$18. \int_1^{+\infty} \frac{\ln^3 x}{x} dx$$

19. $\int_0^{+\infty} \frac{e^{-x}}{2+e^{-x}} dx$
20. $\int_1^{+\infty} \frac{1}{x(\ln x+1)^2} dx$
21. $\int_0^{\frac{3}{4}} \frac{1}{\sqrt{3-4x}} dx$
22. $\int_2^3 \frac{1}{\sqrt[3]{x-2}} dx$
23. $\int_0^2 \frac{1}{\sqrt[3]{x-2}} dx$
24. $\int_0^1 (x \ln x + x) dx$
25. $\int_0^1 \frac{x-1}{\sqrt{x-1}} dx$
26. $\int_0^4 \frac{e^{-\frac{1}{\sqrt{x}}}}{\sqrt{x^3}} dx$
27. $\int_0^{\pi^2} \frac{\sin \sqrt{x}}{\sqrt{x}} dx$
28. $\int_0^1 \ln x dx$
29. $\int_0^3 \frac{1}{\sqrt{9-x^2}} dx$
30. $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{\sin x}{\sqrt{\cos^2 x}} dx$
31. $\int_{-1}^1 \frac{x-2}{\sqrt{1-x^2}} dx$
32. $\int_0^4 \frac{1}{\sqrt{x(4-x)}} dx$
33. $\int_0^{\frac{1}{3}} \frac{1}{\sqrt{x+x\sqrt{x}}} dx$
34. $\int_0^2 \frac{1}{\sqrt{-x^2+2x}} dx$
35. $\int_{-1}^1 \frac{x^3+1}{|x+1|} dx$
36. $\int_{-1}^2 (x + \frac{|x|}{x}) dx$
37. $\int_{-2}^0 \frac{x^2-1}{x^2-x-2} dx$
38. $\int_1^3 \frac{x^2+x-6}{|x-2|} dx$
39. $\int_{-1}^2 \frac{2x-1}{3\sqrt[3]{(x^2-x)^2}} dx$
40. $\int_{-1}^{+\infty} \frac{1}{3\sqrt[3]{x^2(\sqrt[3]{x}+8)^2}} dx$