Matemáticas - (Ldo. en Biología. Primer Curso)

Relación de ejercicios Nº 2. Curso 2003-2004.

Calcula las siguientes integrales indefinidas.

1.- $\int \frac{1}{3t^2+5}\ dt$

2.- $\int \frac{t}{3t^2+5}\ dt$

3.- $\int (5t^2-7)^3 t\, dt$

4.- $\int \frac{8t^3}{t^8+1}\ dt$

5.- $\int e^{3t} \operatorname{sen} t\, dt$

6.- $\int (t^2+t)e^{t/3}\, dt$

7.- $\int \frac{t^4}{t^4-1}\ dt$

8.- $\int \frac{1}{(t+1)(t-2)(t+3)}\ dt$

9.- $\int \frac{t}{t^2+t+1}\ dt$

10.- $\int \frac{\sqrt{\ln t}}{t}\ dt$

11.- $\int \frac{\operatorname{arc\,tg} t}{1+t^2}\ dt$

12.- $\int \frac{1}{(2t-1)(t-2)}\ dt$

13.- $\int t \operatorname{sen}(3t^2)\, dt$

14.- $\int \cos 3t \operatorname{sen} 5t\, dt$

15.- $\int 5te^{3t^2}\, dt$

16.- $\int (t+1) \operatorname{sen} 2t\, dt$

17.- $\int \operatorname{sen} t \cos^3 t\, dt$

18.- $\int \frac{1}{(t-1)^2(t^2+1)}\ dt$

Soluciones

1. – $\frac{1}{\sqrt{15}} \operatorname{arc\,tg}(\frac{\sqrt{3}}{\sqrt{5}}\, t) + C;$

2. – $\frac{1}{6} \ln|3t^2+5| + C = \frac{1}{6} \ln(3t^2+5) + C;$

3. – $\frac{1}{40}\,(5t^2-7)^4 + C;$

4. – $2 \operatorname{arc\,tg}(t^4) + C;$

5. – $\frac{e^{3t}}{10}(3 \operatorname{sen} t - \cos t) + C;$

6. – $(3t^2-15t+45)e^{t/3} + C;$

7. – $t + \frac{1}{4} \ln|\frac{t-1}{t+1}| - \frac{1}{2} \operatorname{arc\,tg} t + C;$

8. – $-\frac{1}{6} \ln|t+1| + \frac{1}{15} \ln|t-2| + \frac{1}{10} \ln|t+3| + C;$

9. – $\frac{1}{2} \ln|t^2+t+1| - \frac{1}{\sqrt{3}} \operatorname{arc\,tg}\,(\frac{2}{\sqrt{3}}(t+\frac{1}{2})) + C =$

$\frac{1}{2} \ln(t^2+t+1) - \frac{1}{\sqrt{3}} \operatorname{arc\,tg}\,(\frac{2}{\sqrt{3}}(t+\frac{1}{2})) + C;$

10. – $\frac{2}{3}(\ln t)^{3/2} + C;$

11. – $\frac{(\operatorname{arc\,tg} t)^2}{2} + C;$

12. – $\frac{1}{3} \ln|\frac{t-2}{t-\frac{1}{2}}| + C = \ln(|\frac{t-2}{t-\frac{1}{2}}|^{1/3}) + C;$

13. – $-\frac{1}{6} \cos(3t^2) + C;$

14. – $-\frac{1}{16}(5 \cos(3t) \cos(5t) + 3 \operatorname{sen}(3t) \operatorname{sen}(5t)) + C;$

15. – $\frac{5}{6}\, e^{3t^2} + C;$

16. – $-\frac{1}{2}(t+1) \cos(2t) + \frac{1}{4} \operatorname{sen}(2t) + C;$

17. – $-\frac{(\cos t)^4}{4} + C;$

18. – $-\frac{1}{2} \ln|t-1| - \frac{1}{6}\frac{1}{(t-1)^3} + \frac{1}{4} \ln|t^2+1| + C.$