APRENDE A INTEGRAR - 1ª PARTE

- F(x) es una primitiva de f(x) si $F'(x) = f(x)$

  Ejemplo: $F(x) = x^2$ es primitiva de $f(x) = 2x$ ya que $F'(x) = 2x = f(x)$

- LA INTEGRAL DEFINIDA DE f(x) ES EL CONJUNTO DE TODAS SUS PRIMITIVAS:

$$\boxed{\int f(x)dx = F(x) + C \text{ tal que } F'(x) = f(x)}$$

$$\text{Ejemplo: } \int 2x dx = x^2 + C$$

PROPIEDADES

$$\boxed{\int a \cdot f(x)dx = a \cdot \int f(x)dx}$$

$$\boxed{\int (f(x) \pm g(x))dx = \int f(x)dx \pm \int g(x)dx}$$

¡INTEGREMOS!

$$\boxed{y = \int a dx = ax + C}$$

1. $y = \int 3dx = 3x + C$
2. $y = \int \frac{2}{3}dx = \frac{2}{3}x + C$

$$\boxed{y = \int x dx = \frac{x^2}{2} + C}$$

3. $y = \int 3x dx = 3\frac{x^2}{2} + C$
4. $y = \int (\frac{2}{3} - 2x)dx = \frac{2}{3}x - \frac{\cancel{2}x^2}{\cancel{2}} + C$

$$\boxed{y = \int x^n dx = \frac{x^{n+1}}{n+1} + C \text{ , } n \neq -1}$$

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

6. $y=\int \frac{x-2}{3}dx = \frac{1}{3}\int x-2\,dx = \frac{1}{3}\left(\frac{x^2}{2}-2x\right)+C$

7. $y=\int (2x-1)^2dx = \int 4x^2+1-4x\,dx = \frac{4x^3}{3}+x-\frac{4x^2}{2}+C$

8. $y=\int \left(\frac{x^2-3x}{4}-2x\right)dx = \frac{1}{4}\int x^2-3x\,dx - \frac{\cancel{2}x^2}{\cancel{2}} = \frac{1}{4}\left(\frac{x^3}{3}-\frac{3x^2}{2}\right)-x^2+C$

9. $y=\int \left(\frac{3x^4-3x^2}{2x}-3x^3\right)dx = \frac{3}{2}\cdot\int \frac{x^4}{x}-\frac{x^2}{x}\,dx-\int 3x^3dx = \frac{3}{2}\int x^3-x\,dx-\frac{3x^4}{4} =$

$= \frac{3}{2}\cdot\left(\frac{x^4}{4}-\frac{x^2}{2}\right)-\frac{3x^4}{4}+C$

10. $y=\int \frac{1}{x^4\sqrt[3]{2x^5}}dx = \int \frac{1}{x^4\cdot(2x^5)^{1/3}}dx = \frac{1}{\sqrt[3]{2}}\cdot\int \frac{1}{x^4\cdot x^{5/3}}dx = \frac{1}{\sqrt[3]{2}}\cdot\int x^{-17/3}dx =$

$x^{17/3}$

$= \frac{1}{\sqrt[3]{2}}\cdot\frac{x^{-14/3}}{-14/3}+C$

$$\boxed{y=\int \frac{1}{x}dx = Lnx + C}$$

11. $y=\int \left(\frac{3}{x}-x^2\right)dx = 3\cdot Lnx-\frac{x^3}{3}+C$

12. $y=\int \left(\frac{4}{x^2}-x^3+5\right)dx = \int 4x^{-2}-x^3+5\,dx = \frac{4x^{-1}}{-1}-\frac{x^4}{4}+5x+C = \frac{-4}{x}-\frac{x^4}{4}+5x+C$

$$\boxed{y=\int e^x dx = e^x + C}$$

13. $y=\int 3e^x-\frac{4}{3x}dx = 3e^x-\frac{4}{3}Lnx+C$

14. $y=\int (3e^x-x^3-2x)dx = 3e^x-\frac{x^4}{4}-\frac{2x^2}{2}+C$

15. $y = \int (\frac{e^x}{4} - 3\underbrace{\sqrt{x}}_{x^{1/2}} + 2)dx = \frac{e^x}{4} - \frac{\cancel{3}x^{3/2}}{\cancel{3}/2} + 2x + C = \frac{e^x}{4} - 2x^{3/2} + 2x + C$

$$\boxed{y = \int a^x dx = \frac{a^x}{Lna} + C}$$

16. $y = \int (5^x - x^2 + 3)dx = \frac{5^x}{Ln5} - \frac{x^3}{3} + 3x + C$

17. $y = \int (4^x - 3x^2 + e^x)dx = \frac{4^x}{Ln4} - \frac{\cancel{3}x^3}{\cancel{3}} + e^x + C$

18. $y = \int (2^x - \frac{x^2-1}{2})dx = \frac{2^x}{Ln2} - \frac{1}{2}\int x^2 - 1\, dx = \frac{2^x}{Ln2} - \frac{1}{2}\cdot\left(\frac{x^3}{3} - x\right) + C$

19. $y = \int \frac{3^x - x}{3}dx = \frac{1}{3}\cdot\int 3^x - x\, dx = \frac{1}{3}\cdot\left(\frac{3^x}{Ln3} - \frac{x^2}{2}\right) + C$

$$\boxed{y = \int senxdx = -cosx + C}$$

20. $y = \int (4senx - x^2)dx = -4\cos x - \frac{x^3}{3} + C$

21. $y = \int (\frac{-2senx + 3x}{2})dx = \frac{1}{2}\cdot\int -2senx + 3x\, dx = \frac{1}{2}\cdot\left[2\cos x + \frac{3x^2}{2}\right] + C$

$$\boxed{y = \int cosxdx = senx + C}$$

22. $y = \int (3cosx - e^x + 2)dx = 3\,senx - e^x + 2x + C$

23. $y = \int \frac{3cosx - 2senx}{4} dx$ $= \frac{1}{4}\int 3\cos x - 2\operatorname{sen} x \, dx = \frac{1}{4}\cdot\left[3\operatorname{sen} x + 2\cos x\right] + C$

$$\boxed{y = \int \frac{1}{cos^2x} dx = tgx + C} \; ; \; \boxed{y = \int (1 + tg^2x) dx = tgx + C}$$

24. $y = \int \frac{4}{cos^2x} dx$ $= 4\,tg\,x + C$

25. $y = \int (2 + 2tg^2x) dx$ $= 2\int 1 + tg^2x \, dx = 2 \cdot tgx + C$

26. $y = \int (3sec^2x - 2x) dx$ $= \int \frac{3}{\cos^2 x} - 2x \, dx = 3\,tg\,x - \frac{\cancel{2}x^2}{\cancel{2}} + C$

27. $y = \int 4tg^2xdx$ $= 4\int tg^2x + 1 - 1 \, dx = 4\int (tg^2x - 1)\, dx - \int 4dx =$
$= 4\,tgx - 4x + C$

$$\boxed{y = \int \frac{1}{\sqrt{1 - x^2}} dx = arcsen(x) + C}$$

28. $y = \int \frac{3}{\sqrt{1 - x^2}} dx$ $= 3\operatorname{arcsen} x + C$

$$\boxed{y = \int \frac{1}{1 + x^2} dx = arctg(x) + C}$$

29. $y = \int \frac{4}{1 + x^2} dx$ $= 4\operatorname{arctg} x$

$$\boxed{y=\int f(x)^n\cdot f'(x)dx=\frac{f(x)^{n+1}}{n+1}+C\ ,\ n\neq -1}$$

30. $y=\int \underbrace{(x+3)}_{f}{}^3dx = \frac{(x+3)^4}{4}+C$

$f'=1$

31. $y=\int \underbrace{(3x+1)}_{f}{}^3dx = \int\frac{3}{3}(3x+1)^3dx=\frac{1}{3}\int 3(3x+1)^3dx=\frac{1}{3}\cdot\frac{(3x+1)^4}{4}+C$

$f'=3$

32. $y=\int x\underbrace{(x^2-2)}_{f}{}^3dx = \int\frac{2}{2}x(x^2-2)^3dx=\frac{1}{2}\int 2x(x^2-2)^3dx=\frac{1}{2}\cdot\frac{(x^2-2)^4}{4}+C$

$f'=2x$

33. $y=\int \underbrace{(4x^3+1)}_{f}{}^3x^2dx = \int\frac{12}{12}(4x^3+1)^3\cdot x^2dx=\frac{1}{12}\cdot\int 12x^2\cdot(4x^3+1)^3dx=$

$f'=12x^2$

$=\frac{1}{12}\cdot\frac{(4x^3+1)^4}{4}+C$

34. $y=\int(2x+3)\cdot\sqrt{\underbrace{x^2+3x}_{f}}dx = \frac{(x^2+3)^{3/2}}{3/2}+C$

$f'=2x+3$

35. $y=\int\frac{2x+1}{\sqrt{x^2+x}}dx=\int(2x+1)\cdot\underbrace{(x^2+x)}_{f}{}^{-1/2}dx=\frac{(x^2+x)^{1/2}}{1/2}+C$

$f'=2x+1$

36. $y=\int\frac{3}{\sqrt[3]{3x-5}}dx=\int 3\cdot\underbrace{(3x-5)}_{f}{}^{-1/3}dx=\frac{(3x-5)^{2/3}}{2/3}+C$

$f'=3$

37. $y=\int 2\underbrace{sen^3x}_{f}cosxdx = 2\cdot\frac{(senx)^4}{4}+C$

$f'=cosx$

$$\boxed{y=\int\frac{f'(x)}{f(x)}dx=Lnf(x)+C}$$

38. $y=\int\frac{e^x}{\underbrace{e^x+3}_{f}}dx = Ln|e^x+3|+C$

$f'=e^x$

39. $y=\int\frac{3x}{\underbrace{4x^2+3}_{f}}dx = 3\cdot\int\frac{8}{8}\frac{x}{4x^2+3}dx=\frac{3}{8}\int\frac{8x}{4x^2+3}dx=\frac{3}{8}Ln|4x^2+3|+C$

$f'=8x$

40. $y = \int \frac{2senx}{\underbrace{-3cosx + 1}_{f}}dx = 2\cdot\int\frac{3}{3}\cdot\frac{senx}{-3cosx+1}dx = \frac{2}{3}\cdot Ln|-3cosx+1|+C$

$f' = 3senx$

41. $y = \int \frac{1}{xLnx}dx = \int\frac{1/x}{\underbrace{Lnx}_{f}}dx = Ln|Ln|x||+C$

$f' = \frac{1}{x}$

42. $y = \int \frac{2x+3}{3x}dx = \int\frac{2\cancel{x}}{3\cancel{x}}+\frac{\cancel{3}}{\cancel{3}x}dx = \frac{2}{3}x + Ln|x|+C$

43. $y = \int \frac{x-2}{x+3}dx = \int\frac{x-2+3-3}{x+3}dx = \int\underbrace{\frac{x+3}{x+3}}_{=1}+\frac{-5}{\underbrace{x+3}_{f}}dx = x-5Ln|x+3|+C$

$f' = 1$

$$\boxed{y = \int f'(x)e^{f(x)}dx = e^{f(x)} + C}$$

44. $y = \int e^{\overbrace{2x-1}^{f}}dx$ $\quad f'=2$ $\quad = \int\frac{2}{2}e^{2x-1}dx = \frac{1}{2}\cdot e^{2x-1}+C$

45. $y = \int e^{\overbrace{x^2-2}^{2x}}xdx = \int\frac{2}{2}e^{x^2-2}x\,dx = \frac{1}{2}\cdot e^{x^2-2}+C$

46. $y = \int \frac{e^{\overbrace{Lnx}^{f}}}{3x}dx$ $\quad f'=\frac{1}{x}$ $\quad = \frac{1}{3}\cdot\int e^{Lnx}\cdot\frac{1}{x}dx = \frac{1}{3}e^{Lnx}+C$

47. $y = \int 3e^{\overbrace{2senx}^{f}}cosxdx$ $\quad f'=2cosx$ $\quad = \frac{3}{2}e^{2senx}+C$

$$\boxed{y = \int f'(x)a^{f(x)}dx = \frac{a^{f(x)}}{Lna} + C}$$

48. $y = \int 2^{\overbrace{3x-1}^{f}}dx$ $\quad f'=3$ $\quad = \int\frac{3}{3}2^{3x-1}dx = \frac{1}{3}\cdot\frac{2^{3x-1}}{Ln2}+C$

49. $y = \int 5^{\overbrace{x^2-1}^{f}}xdx$ $\quad f'=2x$ $\quad = \int\frac{2}{2}5^{x^2-1}x\,dx = \frac{1}{2}\cdot\frac{5^{x^2-1}}{Ln5}+C$

$$\boxed{y=\int f'(x)senf(x)dx=-cosf(x)+C}$$

50. $y=\int e^x sen(\underbrace{e^x-1}_{f})dx = -\cos(e^x-1)+C$

$f'=e^x$

51. $y=\int x sen(\underbrace{x^2-3}_{f})dx = \int \frac{2}{2} x \, sen(x^2-3)dx = \frac{1}{2}\cdot(-\cos(x^2-3))+C$

$f'=2x$

52. $y=\int sen(\underbrace{4x-1}_{f})dx = \int \frac{4}{4} sen(4x-1)dx = \frac{1}{4}\cdot(-\cos(4x-1))+C$

$f'=4$

$$\boxed{y=\int \frac{f'(x)}{cos^2 f(x)}dx = tgf(x)+C} \; ; \; \boxed{y=\int f'(x)(1+tg^2 f(x))dx = tgf(x)+C}$$

53. $y=\int \frac{3}{cos^2(\underbrace{3x-1}_{f})}dx = tg(3x-1)+C$

$f'=3$

54. $y=\int (2+2tg^2(\underbrace{2x-1}_{f}))dx = \int 2\cdot(1+tg^2(2x-1))dx = tg(2x-1)+C$

$f'=2$

$$\boxed{y=\int \frac{f'(x)}{\sqrt{1-f(x)^2}}dx = arcsenf(x)+C}$$

$$\boxed{y=\int \frac{f'(x)}{1+f(x)^2}dx = arctgf(x)+C}$$

55. $y=\int \underbrace{\frac{3x}{1+4x^2}}_{f}dx = 3\cdot\int \frac{8}{8}\frac{x}{1+4x^2}dx = \frac{3}{8}\cdot \ln|1+4x^2|+C$

$f'=8x$

56. $y=\int \frac{3}{1+4x^2}dx = 3\cdot\int \frac{2}{2}\cdot\frac{1}{1+(2x)^2}dx = \frac{3}{2}\cdot arctg(2x)+C$

$f=(2x)$ $\quad f'=2$

57. $y=\int \frac{4x}{1+8x^4}dx = 4\cdot\int \frac{2\sqrt{8}}{2\sqrt{8}}\frac{x}{1+(\sqrt{8}x^2)^2}dx = \frac{4}{2\sqrt{8}}\cdot arctg(\sqrt{8}x^2)+C$

$\underbrace{(\sqrt{8}x^2)^2}_{f}$

$f'=2\sqrt{8}x$

58. $y = \int \frac{2x}{1+x^4 dx} = \arctg(x^2) + C$

$\underbrace{(x^2)}_{f} \quad f' = 2x$

59. $y = \int \frac{3x^2}{1+4x^2} dx = 3\int \frac{4}{4}\frac{x^2}{1+4x^2} dx = \frac{3}{4} \cdot \int \frac{4x^2+1-1}{1+4x^2} dx = \frac{3}{4}\left[\int \frac{4x^2+1}{4x^2+1} - \frac{1}{4x^2+1} dx\right]$

$= \frac{3}{4} \cdot \int 1 dx - \frac{3}{4}\int \frac{2}{2}\frac{1}{1+\underbrace{(2x)}_{f'=2}^2} dx = \frac{3}{4}x - \frac{3}{4} \cdot \frac{1}{2} \cdot \arctg(2x)$

60. $y = \int \frac{senx}{\sqrt{1-\underbrace{4cos^2x}_{(2\cos x)^2}}} dx = \int \frac{-2}{-2} \cdot \frac{\operatorname{sen} x}{\sqrt{1-4\cos^2 x}} dx = -\frac{1}{2} \cdot \operatorname{arcsen}(2\cos x) + C$

$\llcorner f' = -2\operatorname{sen} x$

61. $y = \int \frac{2}{2}\frac{e^x}{\sqrt{1-4e^{2x}}} dx = \frac{1}{2} \cdot \int \frac{2e^x}{\sqrt{1-(2e^x)^2}} dx = \frac{1}{2}\operatorname{arcsen}(2e^x) + C$

$(2e^x)^2$

$\llcorner f' = 2e^x$

UN POCO DE TODO

62. $y = \int (3 + 2x + x^4 - \frac{2}{x} - \sqrt[3]{x^2})dx = 3x + x^2 + \frac{x^5}{5} - 2\ln|x| - \frac{x^{5/3}}{5/3} + C$

63. $y = \int (5^x - 3x^5)dx = \frac{5^x}{\ln 5} - \frac{3x^6}{6} + C$

64. $y = \int \frac{3senx}{\underbrace{2cosx - 2}_{f}}dx = \frac{3}{-2} \cdot \ln|2\cos x - 2| + C$

$f' = -2senx$

65. $y = \int \frac{2}{\sqrt{3x - 1dx}} = \int 2(\underbrace{3x-1}_{f})^{-1/2}dx = \frac{2}{3} \cdot \frac{(3x-1)^{1/2}}{1/2} + C$

$f' = 3$

66. $y = \int \frac{4x}{\sqrt{(3x^2 + 4)^3}dx} = \int 4x \cdot (\underbrace{3x^2+4}_{f})^{-3/2} dx = \frac{4}{6} \cdot (3x^2+4)^{-1/2} + C$

$f' = 6x$

67. $y = \int \frac{x^2}{\underbrace{x^3 - 3}_{f}}dx = \frac{1}{3} \ln|x^3 - 3| + C$

$f' = 3x^2$

68. $y = \int (\underbrace{3x - 1}_{f})^3 dx = \frac{1}{3} \frac{(3x-1)^4}{4} + C$

$f' = 3$

69. $y = \int \frac{e^{\sqrt{x}}}{\sqrt{2x}}dx = \frac{1}{\sqrt{2}} \int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx = \frac{2}{\sqrt{2}} \int \frac{e^{\sqrt{x}}}{2\sqrt{x}} dx = \frac{2}{\sqrt{2}} e^{\sqrt{x}} + C$

f

$f' = \frac{1}{2\sqrt{x}}$

70. $y = \int \frac{3}{\sqrt{x}(\underbrace{1 - 2\sqrt{x}}_{f})dx} = -3 \int -\frac{1}{\sqrt{x}} \cdot \frac{1}{1 - 2\sqrt{x}} dx = -3 \cdot \ln|1 - 2\sqrt{x}| + C$

$f' = \frac{-2}{2\sqrt{x}} = \frac{-1}{\sqrt{x}}$

$= \frac{-1/\sqrt{x}}{1 - 2\sqrt{x}}$ f', f

71. $y = \int \frac{2^x - 4^x}{3^x}dx = \int \left(\frac{2}{3}\right)^x - \left(\frac{4}{3}\right)^x dx = \frac{(2/3)^x}{\ln(2/3)} - \frac{(4/3)^x}{\ln(4/3)} + C$

72. $y = \int \frac{3+x^2}{x^2}dx = \int \underbrace{\frac{3}{x^2}}_{3x^{-2}} + 1\, dx = \frac{3\cdot x^{-1}}{-1} + x + c = -\frac{3}{x} + x + c$

73. $y = \int (\sqrt{3x} + \sqrt{\frac{1}{3x}})dx = \int \underbrace{(3x)}_{f}^{1/2} + \underbrace{(3x)}_{f}^{-1/2} dx = \frac{1}{3}\int 3\cdot(3x)^{1/2}dx + \frac{1}{3}\int 3(3x)^{-1/2}dx =$

$f' = 3 \qquad f' = 3 \qquad = \frac{1}{3}\cdot\frac{(3x)^{3/2}}{3/2} + \frac{1}{3}\cdot\frac{(3x)^{1/2}}{1/2} + c$

74. $y = \int \frac{\sqrt{2x} - 3\sqrt[3]{2x^2}}{\sqrt{3x^3}}dx = \int \frac{\sqrt{2x}}{\sqrt{3x^3}}dx - 3\int \frac{\sqrt[3]{2x^2}}{\sqrt{3x^3}}dx = \frac{\sqrt{2}}{\sqrt{3}}\int \frac{\sqrt{x}}{\sqrt{x^3}}dx - \frac{3\sqrt[3]{2}}{\sqrt{3}}\int \frac{\sqrt[3]{x^2}}{\sqrt{x^3}}dx$

$x^{1/2-1/3} \qquad x^{2/3-3/2}$

$= \sqrt{\frac{2}{3}}\cdot\int x^{1/6}dx - \frac{3\sqrt[3]{2}}{\sqrt{3}}\cdot\int x^{-5/6}dx = \sqrt{\frac{2}{3}}\cdot\frac{x^{7/6}}{7/6} - \frac{3\sqrt[3]{2}}{\sqrt{3}}\frac{x^{1/6}}{1/6} + c$

75. $y = \int \frac{cos(2x)}{\sqrt{3+sen(2x)}}dx = \int cos(2x)(\underbrace{3+sen(2x)}_{f})^{-1/2}dx = \frac{1}{2}\frac{(3+sen(2x))^{1/2}}{1/2} + c$

$f' = 2cos(2x)$

76. $y = \int \sqrt{3x\sqrt{x}}dx = \int \sqrt{3x\cdot x^{1/2}}dx = \sqrt{3}\int \sqrt{x^{3/2}}dx = \sqrt{3}\cdot\int x^{3/4}dx = \sqrt{3}\frac{x^{7/4}}{7/4} + c$

77. $y = \int \frac{3Ln^2x}{2x}dx = \int \frac{3}{2x}\cdot(\underbrace{Lnx}_{f})^2dx = \frac{3}{2}\cdot\int \frac{1}{x}\cdot(Lnx)^2dx = \frac{3}{2}\frac{(Lnx)^3}{3} + c$

$f' = \frac{1}{x}$

$f \qquad f' = \frac{2}{x}$

78. $y = \int \frac{(\overbrace{2Lnx}^{f})^2}{4x}dx = \int \frac{1}{4x}\cdot(2Lnx)^2dx = \frac{1}{4}\cdot\frac{1}{2}\cdot\frac{(2Lnx)^3}{3} + c$

79. $y = \int \underbrace{\frac{x^2}{3x^3-2}}_{f}dx = \frac{1}{9}\cdot Ln|3x^3-2| + c$

$f' = 9x^2$

80. $y = \int tg(3x)dx$ $= \int \underbrace{\frac{sen\, 3x}{\cos 3x}}_{f} dx$ $= -\frac{1}{3} \cdot Ln|\cos 3x| + C$

$f' = -3 sen\, 3x$

81. $y = \int \frac{1}{tg(2x)}dx$ $= \int \underbrace{\frac{\cos 2x}{sen\, 2x}}_{f} dx$ $= \frac{1}{2} \cdot Ln|sen\, 2x| + C$

$f' = 2\cos 2x$

82. $y = \int \frac{2x - x^4 + 3x^2}{2x}dx$ $= \int 1 - \frac{x^3}{2} + \frac{3}{2}x\, dx = x - \frac{x^4}{8} + \frac{3x^2}{4} + C$

83. $y = \int \frac{2x^2 - 1}{x - 2}dx$ $= \int 2x + 4 + \frac{7}{x-2} dx$ $= \frac{2x^2}{2} + 4x + 7 Ln|x-2| + C$

$2x^2 - 1 \;\; \lfloor x - 2$

$-2x^2 + 4x \quad 2x + 4$

$4x - 1$

$-4x + 8$

7

$\boxed{D = d \cdot c + R}$

$\boxed{\frac{D}{d} = c + \frac{R}{d}}$

84. $y = \int \frac{2^x}{5^x}dx$ $= \int \left(\frac{2}{5}\right)^x dx = \frac{(2/5)^x}{Ln(2/5)} + C$

85. $y = \int \frac{2^{\sqrt{x}}}{\sqrt{3x}}dx$ $=$ f $f' = \frac{1}{2\sqrt{x}}$ $\frac{1}{\sqrt{3}} \int \frac{1}{\sqrt{x}} 2^{\sqrt{x}} dx = \frac{1}{\sqrt{3}} \cdot 2 \cdot \frac{2^{\sqrt{x}}}{Ln\, 2} + C$

86. $y = \int \frac{e^{3x} - e^{-2x}}{3}dx$ $= \frac{1}{3} \cdot \int e^{\overbrace{3x}^{f}} dx - \frac{1}{3} \cdot \int e^{\overbrace{-2x}^{f}} dx =$ $f' = 3$ $f' = -2$

$= \frac{1}{9} \cdot e^{3x} + \frac{1}{6} \cdot e^{-2x} + C$

87. $y = \int \frac{\cos(\overbrace{Lnx}^{f})}{2x}dx$ $f' = \frac{1}{x}$ $= \frac{1}{2} \cdot sen(Lnx) + C$

88. $y = \int \underbrace{(2x^4 - 2x)}_{f}{}^3(4x^3 - 1)dx = \frac{1}{2} \cdot \frac{(2x^4 - 2x)^4}{4} + c$

$f' = 8x^3 - 2$

$2(4x^3 - 1)$

89. $y = \int e^{\overbrace{3x-2}^{f}} dx \quad f' = 3 \quad = \frac{1}{3} e^{3x-2} + c$