$f(x) = 3^x * sinx = 3 * ln3 * sinx + 3^x * cosx$

$f(x) = 5^8 + \frac{1}{\sqrt{x}} + lnx = 40x^7 - \frac{1}{2} * \frac{1}{\sqrt{x^3}} + \frac{1}{x}$

$f(x) = \ln(3 - 5cosx) = \frac{1}{3 - 5cosx} * 5sinx = \frac{5sinx}{3 - 5cosx}$

$f(x) = 3x^4 + \frac{1}{\sqrt[3]{x}} = 12x^3 - \frac{1}{3} * x^{-\frac{4}{3}} = 12x^3 - \frac{1}{3\sqrt[3]{x^4}}$

$\int x^2(x^3+1)^4 dx = \frac{1}{3}\int 3x^2 * (x^3+1)^4 dx = \frac{1}{3} * \frac{(x^3+1)^5}{5} = \frac{(x^3+1)^5}{15} + c$

$\int x^2(2x^3+9)^5 dx = \frac{1}{6}\int 6x^2 * (2x^3+9)^5 dx = \frac{1}{6} * \frac{(2x^3+9)^6}{5} + c$

$\int x\, sinx\, dx = -x * cosx - \int 1 * (-cosx) = -x\, cosx + sinx + c$ $\quad u = x \mid u' = 1 \mid v = -cosx \mid v' = sinx$

$\int x\, cosx\, dx = x * sinx - \int 1 * sinx\, dx = x\, sinx + cosx + c$ $\quad u = x \mid u' = 1 \mid v = sinx \mid v' = cosx$

$\int_2^8 \frac{dx}{x^3} = \lim_{3\to 8} \int_2^3 \frac{1}{x^3} dx = \lim_{3\to 8} \left[\frac{x^{-2}}{-2}\right] = \lim_{3\to 8} \left(-\frac{1}{2} * \frac{1}{8^2} + \frac{1}{2} * \frac{1}{2^2}\right) = -\frac{1}{2} * 0 + \frac{1}{8} = \frac{1}{8}$

$\int_1^8 \frac{dx}{x^3} = \lim_{3\to 8} \int_1^3 \frac{1}{x^3} dx = \lim_{3\to 8} \left[\frac{x^{-2}}{-2}\right] = \lim_{3\to 8} \int_1^3 x^{-3} dx = \lim_{3\to 8} \left[\frac{x^{-2}}{-2}\right] = \lim_{3\to 8} \left[-\frac{1}{2} * \frac{1}{x^2}\right] = -\frac{1}{2}(0-1) = \frac{1}{2}$

1. a) $\int (2x+9)^3 dx = \frac{(2x+9)^4}{4 \cdot 2} + C$ 1. b) $\int (11x-12)^{13} dx = \frac{(11x-12)^{14}}{11 \cdot 14} + C$

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

3. a) $\int \sqrt{5x-8} dx = \int (5x-8)^{\frac{1}{2}} dx = \frac{(5x-8)^{\frac{3}{2}}}{\frac{3}{2} \cdot 5} + C$

3. b) $\int \sqrt[3]{1-2x} dx = \int (1-2x)^{\frac{1}{3}} dx = \frac{(1-2x)^{\frac{4}{3}}}{\frac{4}{3} \cdot (-2)} + C$ 3. c) $\int (4x+2)^{\frac{2}{3}} dx = \frac{(4x+2)^{\frac{5}{3}}}{\frac{5}{3} \cdot 4} + C$

1. a) $\int 8x(1+4x^2)^3 dx = \frac{(1+4x^2)^4}{4} + C$

1. b) $\int x^2(2x^3+9) dx = \frac{1}{6}\int 6x^2(2x^3+9) dx = \frac{1}{6}\frac{(2x^3+9)^2}{2} + C$

1. c) $\int x^2(x^3-2)^5 dx = \frac{1}{3}\int 3x^2(x^3-2)^5 dx = \frac{1}{3}\frac{(x^3-2)^6}{6} + C$

2. a) $\int x^2\sqrt{6x^3+7} dx = \frac{1}{18}\int 18x^2(6x^3+7)^{\frac{1}{2}} dx = \frac{1}{18}\frac{(6x^3+7)^{\frac{3}{2}}}{\frac{3}{2}} + C$

2. b) $\int x \cdot \sqrt[4]{2-3x^2} dx = -\frac{1}{6}\int -6x(2-3x^2)^{\frac{1}{4}} dx = -\frac{1}{6}\frac{(2-3x^2)^{\frac{5}{4}}}{\frac{5}{4}} + C$

3. a) $\int \frac{x}{\sqrt{x^2+1}} dx = \int x(x^2+1)^{-\frac{1}{2}} dx = \frac{1}{2}\int 2x(x^2+1)^{-\frac{1}{2}} dx = \frac{1}{2}\frac{(x^2+1)^{\frac{1}{2}}}{\frac{1}{2}} + C = \sqrt{x^2+1} + C$

3. b) $\int \frac{x}{\sqrt{(x^2+1)^3}} dx = \int x(x^2+1)^{-\frac{3}{2}} dx = \frac{1}{2}\int 2x(x^2+1)^{-\frac{3}{2}} dx = \frac{1}{2}\frac{(x^2+1)^{-\frac{1}{2}}}{-\frac{1}{2}} + C = -\frac{1}{\sqrt{x^2+1}} + C$

3. c) $\int \frac{7x^2}{\sqrt{5-4x^3}} dx = \int 7x^2(5-4x^3)^{-\frac{1}{2}} dx = -\frac{7}{12}\int -12x^2(5-4x^3)^{-\frac{1}{2}} dx = -\frac{7}{12}\frac{(5-4x^3)^{\frac{1}{2}}}{\frac{1}{2}} + C$

3. d) $\int \frac{2x-5}{\sqrt[3]{(x^2-5x+13)^7}} dx = \int (2x-5)(x^2-5x+13)^{-\frac{7}{3}} dx = \frac{(x^2-5x+13)^{-\frac{4}{3}}}{-\frac{4}{3}} + C$

1. $\int \frac{2x}{x^2+7} dx = \ln(x^2+7) + C$ 2. $\int \frac{5x^2}{x^3+4} dx = \frac{5}{3}\int \frac{3x^2}{x^3+4} dx = \frac{5}{3}\ln|x^3+4| + C$

3. $\int \frac{x^3}{x^4+5} dx = \frac{1}{4}\int \frac{4x^3}{x^4+5} dx = \frac{1}{4}\ln(x^4+5) + C$

4. $\int \frac{x-3}{x^2-6x+10} dx = \frac{1}{2}\int \frac{2x-6}{x^2-6x+10} dx = \frac{1}{2}\ln(x^2-6x+10) + C$