AP Calculus AB

"Most Complicated" Rule

1) $\int (x+2)^4 dx$

$\frac{1}{5}(x+2)^5 + C$

2) $\int (1-x)^9 dx$

$-\frac{1}{10}(1-x)^{10} + C$

check:

$10(1-x)^9 \cdot (-1)$

3) $\int \frac{dx}{(4-x)^2} = \int (4-x)^{-2} dx$

$(4-x)^{-1} + C$

check

$-1(4-x)^{-2}(-1)$ ✓

4) $\int \frac{dx}{x+2} = \int (x+2)^{-1} dx$

$\ln|x+2| + C$

5) $\int \frac{dx}{2x-1} = \int (2x-1)^{-1} dx$

$\frac{1}{2}\ln|2x-1| + C$

check:

$\frac{2}{2x-1}$

6) $\int (3x+2)^{-2} dx$

$-\frac{1}{3}(3x+2)^{-1} + C$

check:

$-1(3x+2)^{-2} \cdot 3$

7) $\int x(x^2-1)^4 dx$

$\frac{1}{10}(x^2-1)^5 + C$

check

$5(x^2-1)^4 \cdot 2x$

8) $\int \frac{x}{1+x^2} dx = \int x(1+x^2)^{-1} dx$

$\frac{1}{2}\ln(1+x^2) + C$

check:

$\frac{2x}{1+x^2}$

9) $\int \frac{x}{\sqrt{1-x^2}} dx = \int x(1-x^2)^{-1/2} dx$

$-(1-x^2)^{1/2} + C$

check:

$\frac{1}{2}(1-x^2)^{-1/2} \cdot (-2x)$

$(1-x^2)^{-1/2}(-x)$

10) $\int x(x^2-1)^{1/2} dx$

$\frac{1}{3}(x^2-1)^{3/2} + C$

check:

$\frac{3}{2}(x^2-1)^{1/2} \cdot 2x$

11) $\int x e^{x^2} dx$

$\boxed{\frac{1}{2}e^{x^2} + C}$

check:

$e^{x^2} \cdot 2x$

12) $\int x \sin x^2 dx$

$\boxed{-\frac{1}{2}\cos x^2 + C}$

check:

$-\sin x^2 \cdot 2x$

13) $\int e^x \cos e^x dx$

$\boxed{\sin e^x + C}$

check

$\cos e^x \cdot e^x$ ✓

14) $\int \cos x \left(e^{\sin x}\right) dx$

$\boxed{e^{\sin x} + C}$

check:

$e^{\sin x} \cos x$ ✓

15) $\int (2x-1)^4 dx$

$\boxed{\frac{1}{10}(2x-1)^5 + C}$

check:

$5(2x-1)^4 \cdot 2$

16) $\int \frac{dx}{1-x} = \int (1-x)^{-1} dx$

$\boxed{-\ln|1-x| + C}$

check:

$\frac{-1}{1-x}$

17) $\int \frac{x}{1-x^2} dx = \int x(1-x^2)^{-1} dx$

$\boxed{-\frac{1}{2}\ln|1-x^2| + C}$

check:

$\frac{-2x}{1-x^2}$

18) $\int x(x^2+1)^9 dx$

$\boxed{\frac{1}{20}(x^2+1)^{10} + C}$

check:

$10(x^2+1)^9 \cdot 2x$

19) $\int x(1-x^2)^{1/2} dx$

$\boxed{-\frac{1}{3}(1-x^2)^{3/2} + C}$

check:

$\frac{3}{2}(1-x^2)^{1/2}(-2x)$

20) $\int x(x^2+4)^{-1/2} dx$

$\boxed{(x^2+4)^{1/2} + C}$

check:

$\frac{1}{2}(x^2+4)^{-1/2} \cdot 2x$ ✓

21) $\int x^2(x^3+1)^{-1} dx$

$\boxed{\frac{1}{3}\ln|x^3+1| + C}$

check:

$\frac{3x^2}{x^3+1}$

22) $\int x^2(x^3+1)^{1/2} dx$

$\boxed{\frac{2}{9}(x^3+1)^{3/2} + C}$

check:

$\frac{3}{2}(x^3+1)^{1/2} \cdot 3x^2$

23) $\int \cos x(1+\sin x)^{-1} dx$

$\boxed{\ln|1+\sin x| + C}$

24) $\int e^x(1+e^x)^{-1} dx$

$\boxed{\ln|1+e^x| + C}$