

$$\begin{aligned}
 & \textcircled{17} \quad \int \frac{1}{\sqrt{3-x^2}} dx \quad \int \frac{1}{\sqrt{1-x^2}} dx \\
 &= \int \frac{1}{\sqrt{3} \sqrt{1-\frac{x^2}{3}}} dx \\
 &= \frac{1}{\sqrt{3}} \int \frac{1}{\sqrt{1-(\frac{x}{\sqrt{3}})^2}} dx \quad "f(ax+b)" \\
 &= \frac{1}{\sqrt{3}} (\sqrt{3}) \sin^{-1}\left(\frac{x}{\sqrt{3}}\right) + C \\
 &= \sin^{-1}\left(\frac{x}{\sqrt{3}}\right) + C
 \end{aligned}$$

$$(18) \int \frac{x-2}{x^4+3x^3+2x^2 - 12x + 8} dx$$

factor

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

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

quadratic!

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

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

$$= \int \frac{1}{\frac{9}{4}-(x+\frac{1}{2})^2} dx$$

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

$$= \frac{2}{3} \int \frac{1}{\sqrt{1-(\frac{2x+1}{3})^2}} dx = \frac{2}{3} \left(\frac{3}{2}\right) \sin^{-1}\left(\frac{2x+1}{3}\right) + C$$

$$= 8\sin^{-1}\left(\frac{2x+1}{3}\right) + C$$

$$\int \frac{1}{\sqrt{1-(ax+b)^2}} dx$$

$$\hookrightarrow \int \frac{1}{\sqrt{c^2-(ax+b)^2}} dx$$

$$= \int \frac{1}{c\sqrt{1-(\frac{ax+b}{c})^2}} dx$$

$$(19) \int \frac{1}{x^2+9x+13} dx$$

$$= \int \frac{1}{(x+3)^2+2^2} dx = \frac{1}{4} \int \frac{1}{1+(\frac{x+3}{2})^2} dx = \frac{1}{2} \tan^{-1}\left(\frac{x+3}{2}\right) + C$$

$$\begin{aligned}
 & \textcircled{20} \int \frac{x^5 + 3x^4 - x^3 - (4x^2 + 4)}{x^4 + 4x^3 + 3x^2 - 16x - 28} dx \\
 &= \int \left( x-1 + \frac{5x^2+2x+3}{(x-2)(x+2)(x^2+4x+7)} \right) dx \\
 &= \frac{x^2}{2} + x + \int \left( \underbrace{\frac{3}{4(x-2)} - \frac{3}{4(x+2)} + \frac{2}{x^2+4x+7}}_{\alpha^2 + (bx+c)^2} \right) dx \\
 &= \frac{x^2}{2} + x + \frac{3}{4} \ln|x-2| - \frac{3}{4} \ln|x+2| + 2 \int \frac{1}{(x+2)^2 + (\sqrt{3})^2} dx \\
 &= \frac{x^2}{2} + x + \frac{3}{4} \ln \left| \frac{x-2}{x+2} \right| + \frac{2}{\sqrt{3}} \tan^{-1} \left( \frac{x+2}{\sqrt{3}} \right) + c
 \end{aligned}$$