Indefinite Integrals

Although the integrals in each group below have similarities, they require different approaches. For each integral, first decide which of the following applies:

1. needs a w-substitution,
2. needs algebra to simplify,
3. has a trivial answer (you already know the antiderivative without substitution)
4. does not have an answer in closed form.

Finally, find each integral (except for the fourth case).

$$\int (x^3+1)dx \qquad \int x^2(x^3+1)^4dx \qquad \int \sqrt{x^3+1}dx \qquad \int (x^3+1)^2dx$$

$$\int \frac{e^x}{3+e^x}dx \qquad \int (3+e^x)dx \qquad \int \frac{\ln(e^x)}{x^2}dx \qquad \int e^{-x^2}dx$$

$$\int \sqrt{1-x^2}dx \qquad \int \sqrt{x}(1-x^2)dx \qquad \int \frac{x}{\sqrt{1-x^2}}dx \qquad \int \frac{1}{\sqrt{1-x^2}}dx$$

$$\int \sqrt{1-\cos^2(x)}dx \qquad \int \frac{1}{\cos(x)\sqrt{\sin(x)}}dx \qquad \int \cos\left(\frac{\pi}{4}\right)dx \qquad \int \frac{\cos(x)}{\sqrt{\sin(x)}}dx$$
