The dependent variable is $y(x)$. The equation is nonlinear. The variables separate.

Note that in separating the variables we divided by zero, thus eliminating consideration of $y = 0$. However, looking back, we see that the function $y \equiv 0$ which is identically zero for every $x$, is also a solution.

> restart:
sol:=int(1/y^2,y)=int(-sin(x),x)+c1;

\begin{equation}
sol := \frac{-1}{y} = \cos(x) + c1
\end{equation}

> sol:=y=solve(%,y);

\begin{equation}
sol := y = -\frac{1}{\cos(x) + c1}
\end{equation}

The equation is also Bernoulli and can be solved in that manner.

> de:=diff(y(x),x)=-sin(x)*y(x)^2;

\begin{equation}
d : \frac{d}{dx} y(x) = -\sin(x) y(x)^2
\end{equation}

> subst:=y(x)=v(x)^(1/(1-2));

\begin{equation}
subst := y(x) = \frac{1}{v(x)}
\end{equation}

> subs(subst,de);
simplify(%);
%*(-v(x)^2);
p:=0;
int(%t);
mu:=exp(%);

\begin{equation}
p := 0
\end{equation}

\begin{equation}
0
\end{equation}

\begin{equation}
\mu := 1
\end{equation}

> vsol:=v(x)=1/mu*(int(mu*sin(x),x)+c2);

\begin{equation}
vsol := v(x) = -\cos(x) + c2
\end{equation}

> subs(vsol,subst);
The two answers agree, with $-c_2 = c_1$. 

\[ y(x) = \frac{1}{-\cos(x) + c_2} \]