with(plots $):$
$\int_{0}^{6}\left(2 \cdot x-\left(x^{2}-4 \cdot x\right)\right) \mathrm{d} x$

$$
\begin{equation*}
36 \tag{1}
\end{equation*}
$$

$\int_{0}^{12}\left(2+\operatorname{sqrt}(y+4)-\frac{y}{2}\right) \mathrm{d} y+\int_{-4}^{0}(2+\operatorname{sqrt}(4+y)-(2-\operatorname{sqrt}(y+4))) \mathrm{d} y$
36

$$
2+\operatorname{sqrt}(4+y)-(2-\operatorname{sqrt}(y+4)) \quad 2 \sqrt{y+4}
$$

$f:=x \rightarrow x^{2}-4 \cdot x$

$$
\begin{equation*}
f:=x \mapsto x^{2}-4 \cdot x \tag{4}
\end{equation*}
$$

$$
\begin{equation*}
g:=x \mapsto 2 \cdot x \tag{5}
\end{equation*}
$$

$g:=x \rightarrow 2 \cdot x$
$\operatorname{plot}([f(x), g(x)], x=-4 . .8, y=-6 . .15$, thickness $=2$, color $=[$ blue, black $])$


Finally got this sucker!

$$
\int_{-4}^{-3} 2 \cdot \operatorname{sqrt}(x+4) \mathrm{d} x+\int_{-3}^{0}(\operatorname{sqrt}(1-x)+\operatorname{sqrt}(x+4)-1) \mathrm{d} x+\int_{0}^{1} 2 \cdot \operatorname{sqrt}(1-x) \mathrm{d} x
$$

$$
\begin{equation*}
\int_{0}^{3}\left(-2 \cdot y^{2}+6 \cdot y\right) d y \tag{7}
\end{equation*}
$$

