C
$\vec{F}$
$\vec{F}$
$\vec{d}$
$W =$
$\vec{F}\cdot$
$\vec{d}$
$\vec{F}$
C
??
C
s
ds
$\vec{T}$
$\vec{d} =$
$\vec{T}ds$
C
C
$\vec{F}\cdot$
$\vec{d} =$
$\vec{F}\cdot$
$\vec{T}ds$
ds

$$W = \int_C \vec{F}\cdot\vec{T}ds,$$

C
t
$\vec{r}(t)$
??
$ds =$
$(t)dt$
$\vec{T} =$
$(t)/(t)$

$$W = \int_C \vec{F}\cdot\vec{T}ds = \int_C \vec{F}\cdot\frac{(t)}{(t)}(t)dt = \int_C \vec{F}\cdot(t)dt = \int_C \vec{F}\cdot d\vec{r}, \tag{1}$$

$d\vec{r}$
$(t)\,dt$
??
$z =$
$f(x, y)$
$_integral2LineIntegralOverVectorFieldLet\vec{F}$
C
$\vec{T}$
$\vec{F}$
C

$$\int_C \vec{F}\cdot d\vec{r} = \int_C \vec{F}\cdot\vec{T}ds.$$

??
$\vec{F}\cdot$
$\vec{T}$
??
$f(s) =$
$\vec{F}(s)\cdot$
$\vec{T}(s)$
$\int_C f(s)ds$
$_integral, toclearlystatehowtoevaluatealineintegraloveravectorfieldinthefollowingKeyIdea.$
$\vec{F}$
C
$a \leq$
$t \leq$
b
$\vec{r}$

$$\int_C \vec{F}\cdot\vec{T}ds = \int_C \vec{F}\cdot d\vec{r} = \int_a^b \vec{F}\big(\vec{r}(t)\big)\cdot(t)dt.$$

C
C
Notation
note:
$\vec{F}$
C
$\vec{F} =$
$\langle x+$
$y, x-$
$y\rangle$
$=$
$\langle t^2, \cos t\rangle$
$\vec{F}$
C