Lecture 14

Q1: why line integrals of vector fields $= \int_C \vec{F} \cdot d\vec{r}$ ?

Q2: why we need consider $C_2$, $C_3$ curve ? (worksheet Q2)

Q3: $\int_C \vec{G} \cdot d\vec{r} = V(\vec{r}(b)) - V(\vec{r}(a))$

work done ↑

potential energy

why?

Q4: why $\int_{C_1} \vec{F} \cdot d\vec{r}$ does not depend on $x$ ?

Lecture 14:

① Revise

② Fundamental theorem of line integrals.

$$\int_C \nabla f \cdot d\vec{r} = f(\vec{r}(b)) - f(\vec{r}(a))$$

③ Proof of ②.

④ Gravitational field, potential function

⑤ Exercise of ②

⑥ Independence of path

⑦ proof of ⑥

⑧ $\vec{F}$ conservative $\Rightarrow \frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}$