TUMBLR SHIT

DIDIGODOT

(1) $K = -\frac{1}{2}U_g$

Proof.

$$\begin{aligned} K &= \frac{1}{2}mv^2 \\ &= \frac{1}{2}m(\frac{2\pi r}{T})^2 \\ &= \frac{1}{2}m(\frac{2\pi r}{2\pi r\sqrt{\frac{r}{GM}}})^2 \\ &= \frac{1}{2}\frac{GMm}{r} \\ &= -\frac{1}{2}(-\frac{GMm}{r}) \\ &= -\frac{1}{2}U_g \end{aligned}$$

$\square$

(2) Vector triple product:
$(a \times b) \times c = b(a \cdot c) - c(a \cdot b)$

Proof.

$$(r^{'} \times r^{''}) \times r^{'} = (r^{'} \cdot r^{'})r^{''} - (r^{'} \cdot r^{''}) \times r^{'}$$

$\square$

(3) "Integration by Differentiation"

Proof.
$$\int x^n ln^2(x)dx$$
$$\frac{\partial}{\partial n}x^n = x^n ln(x)$$
$$\int x^n dx = \frac{1}{n+1}$$
$$\int x^n ln(x)dx = -\frac{1}{(n+1)^2}$$
$$\int x^n ln^2(x)dx = \frac{2}{(n+1)^3}$$

□

$\frac{\infty}{\infty}$

$\frac{0}{0}$

$\infty - \infty$

0^0

∞^0

$0 \cdot \infty$

1^∞

$$= lim_{x\to 0}\frac{\lim_{n\to\infty}\frac{n!n^{ax}}{ax(ax+1)(ax+2)...(ax+n)}}{\lim_{n\to\infty}\frac{n!n^{x}}{x(x+1)(x+2)...(x+n)}}$$