ısider a simple frictionless roller coaster. It begins from rest at x = t a height of y = H. Then it drops into a dip, reaching a minimum at ∶ 100, with zero height (y = 0). Finally, it goes back up and reaches crest of a small hill of height y = H/2 at x = 200. What can you about the kinetic energy and gravitational potential energy of the er coaster during its trip? Assume that the zero level of potential rgy is taken to be y = 0.

Choices: **x = 0, x = 100, x = 200.**

ı. this is where the kinetic energy equals the TOTAL energy
3. this is where the gravitational PE equals the kinetic energy
Ɔ. this is where the kinetic energy is a minimum
). this is where the gravitational PE is a minimum
Ɛ. this is where the gravitational PE is a maximum

es 0/99

nswer r Part:	• x = 100 • x = 200 • x = 0 • x = 100 • x = 0

ıe never

ngee Jumper

ɜ1.0 kg bungee jumper jumps from a bridge. She is tied to a 11.4 .ong bungee cord and falls a total of 33.2 m. Calculate the spring .stant k of the bungee cord.

es 0/99

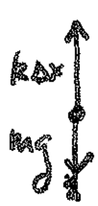
.culate the maximum acceleration experienced by the jumper.

es 0/99

.culate the ~~maximum~~ min imum acceleration experienced by the jumper.

es 0/99

nswer r Part: l	• 8.36E+01 [81.9369908256881 85.2813577981651] Sig 0 - 15 • Unit: N/m
nswer r Part: 3	• 20.1 [19.076 21.084] Sig 0 - 15 • Unit: m/s^2
nswer r Part: ɔ	• -9.8 [-9.31 -10.29] Sig 0 - 15 • Unit: m/s^2



G) Conservation of energy
$E_{Top} = E_{Bottom}$

estimate
stretch = 22 m for 61 kg

$k > \frac{mg}{\Delta x} = \frac{61 \times 10}{22} \approx 30$

D)
Before $K=0, U=mgh$

33.2 ≡ h

$E_T = const =$

After $K=0, U=\frac{1}{2}k\Delta x^2$

A) $E_B = E_A \Rightarrow mgh = \frac{1}{2}k\Delta x^2$

$k = \frac{2mgh}{\Delta x^2} = \frac{2(61\,kg)\,9.8\,\frac{m}{s^2}\,33.2\,m}{(33.2-11.4)^2\,m^2}$

$k = 83.6\,\frac{N}{m}$

L) over the estimate, but the initial energy was not considered
units check

B) max a is at the bottom b/c bungee is stretched the most, giving $a = F/m$ the largest + value

$a = \frac{k\Delta x}{m} - g = \frac{83.6\,\frac{N}{m} \times (33.2-11.4)\,m}{61\,kg} - 9.8$

$a_{max} = 20.1\,m/s^2$

C) min is anywhere the cord is not stretched, from 0 to 11.4 m, $a = -g$

$a_{min} = -9.8\,m/s^2$