A normal die (with sides labeled from 1 to 6) is thrown many times. The average result (defined as the sum of all the throws divided by the number of times the die is thrown) should be close to

A) 3

B) 4

C) 3.5

D) I don't know to start working this out

E) I am lucky, I only throw 6's!

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each outcome is equally likely, and the average of numbers 1-6 is 3.5
see lecture notes for more details

D) I don't know to start working this out

E) I am lucky, I only throw 6's!

Instead of using a normal die, you now throw one which has faces labeled: 1,1,1,6,6,6. Compared with the outcomes of a regular die, you get

A) greater average, smaller uncertainty

B) same average, smaller uncertainty

C) same average, greater uncertainty

D) smaller average, greater uncertainty

E) smaller average, smaller uncertainty

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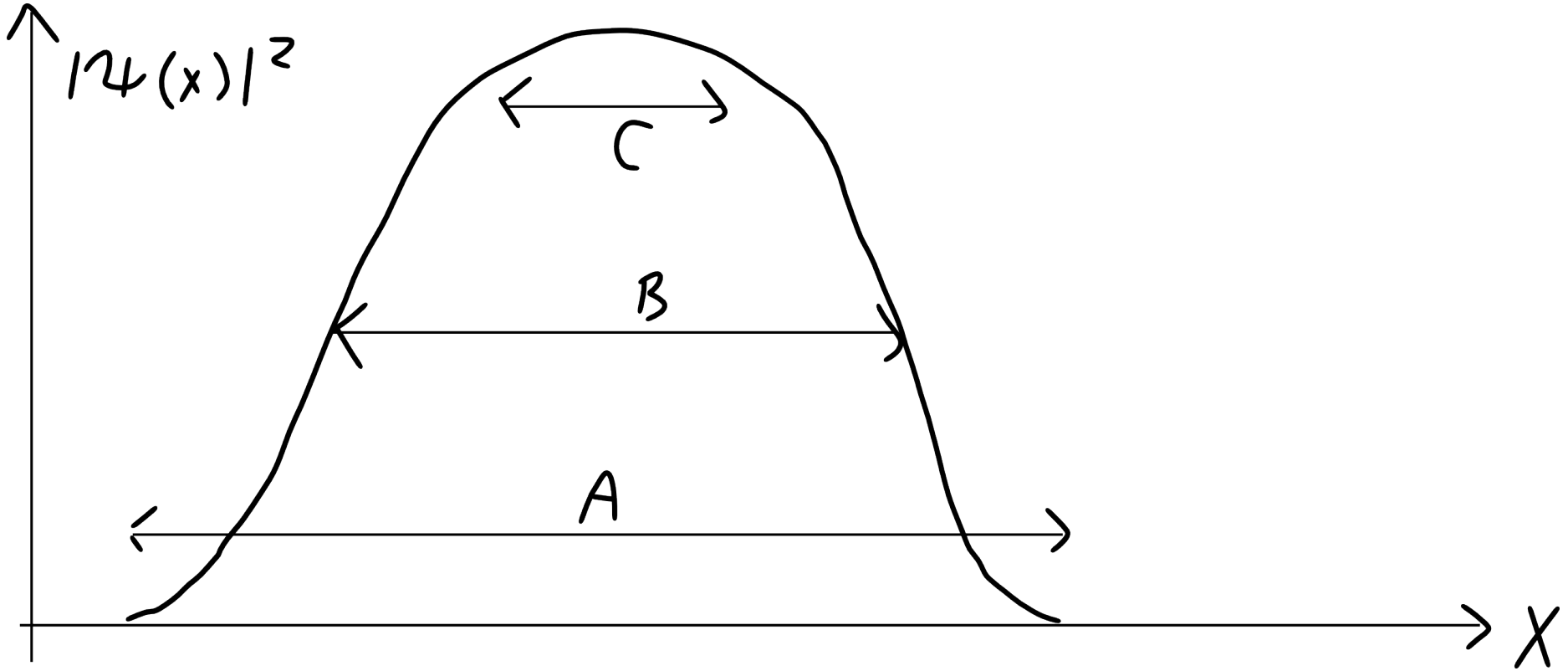
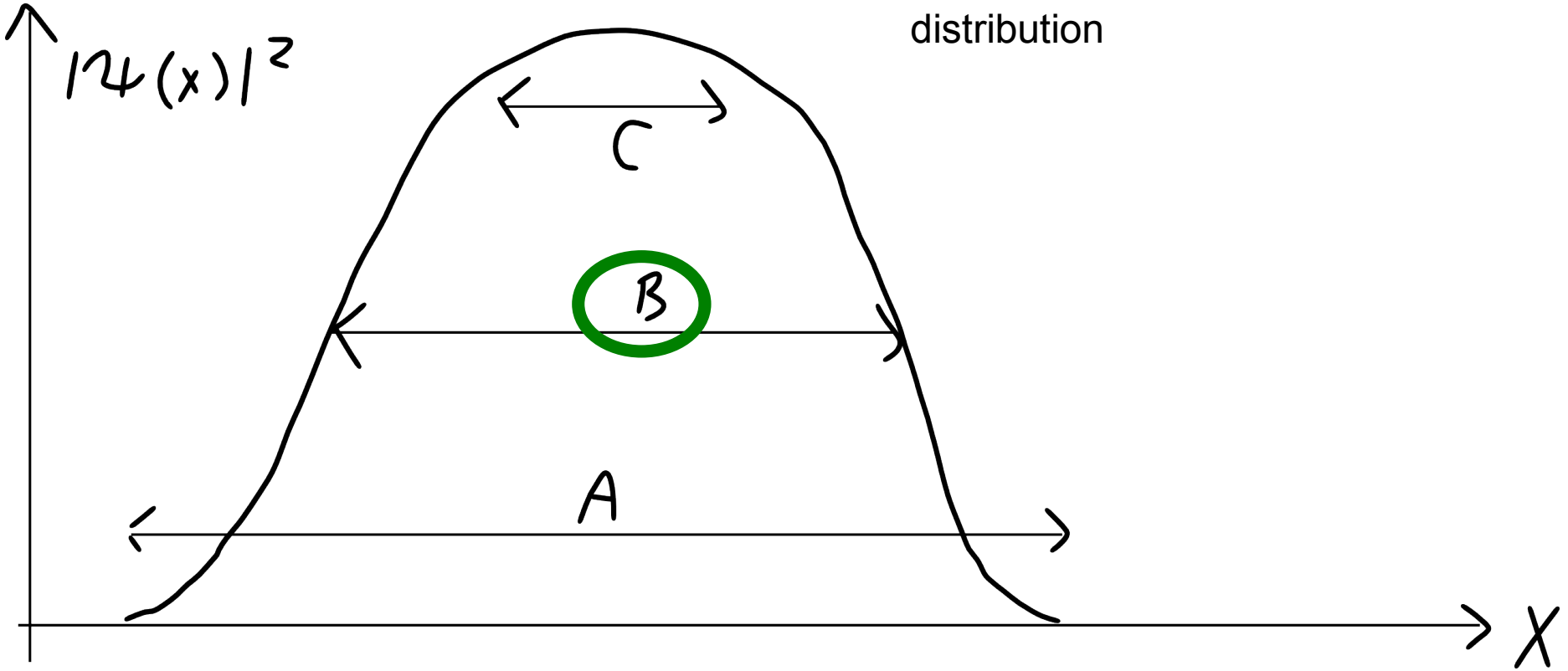
the uncertainty is greater because we have thrown out all the outcomes close to the average (like 3 and 4) and kept the ones further from the average (1 and 6)
the mean deviation is 2.5 > 1.7 for a regular die

On the picture below, which width do you think will most accurately represent the mean deviation in position?



On the picture below, which width do you think will most accurately represent the mean deviation in position?

the interval +- mean deviation should contain most but not all the distribution



I have three wavepackets, with

$\Delta x_1 < \Delta x_2 = \Delta x_3$ and

$\langle p_1 \rangle = \langle p_2 \rangle < \langle p_3 \rangle$

Assuming the uncertainty relation is nearly saturated for each, for which of these wavepackets will Δx increase the fastest?

A) number 3

B) number 1

C) both 2 and 3

D) both 1 and 2

E) number 2

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D) both 1 and 2

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small uncertainty in x -> large uncertainty in p
so there are some components in the wavepacket which have large momenta and some which have small momenta. This will lead to the wavepacket spreading faster than in the other cases, where the x uncertainty is larger and therefore the p uncertainty is smaller