23. A cuboid has sides of lengths 22, 2 and 10. It is contained within a sphere of the smallest possible radius. What is the side-length of the largest cube that will fit inside the same sphere?

A 10 B 11 C 12 D 13 E 14

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23. E For the cuboid to be contained within a sphere of smallest possible radius, all eight vertices of the cuboid must lie on the sphere. The radius r of the smallest sphere is then half of the length of the body diagonal of the cuboid, so $r = \sqrt{1^2 + 5^2 + 11^2} = \sqrt{147}$. If the largest cube which will fit inside this sphere has side-length $2x$, then $r = \sqrt{x^2 + x^2 + x^2}$. Thus $3x^2 = 147$, so $x^2 = 49$ and so $x = 7$. The side-length of the largest cube is 14.