12 Black Ice

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Challenge

Last year's sporting highlight was certainly the *Iron Gnome 2021*, the traditional annual Iron Gnome competition. In the ninth part of the Iron Gnome competition, Ruprecht had to run across a snowfield from A to B. Figure 1 shows us the two points A and B in the snowfield together with a blue icy surface in the lower left corner, which was smooth as glass and extended hundreds of kilometers to the south and to the west. The northern edge and the eastern edge of the ice surface each form a perfectly straight line.

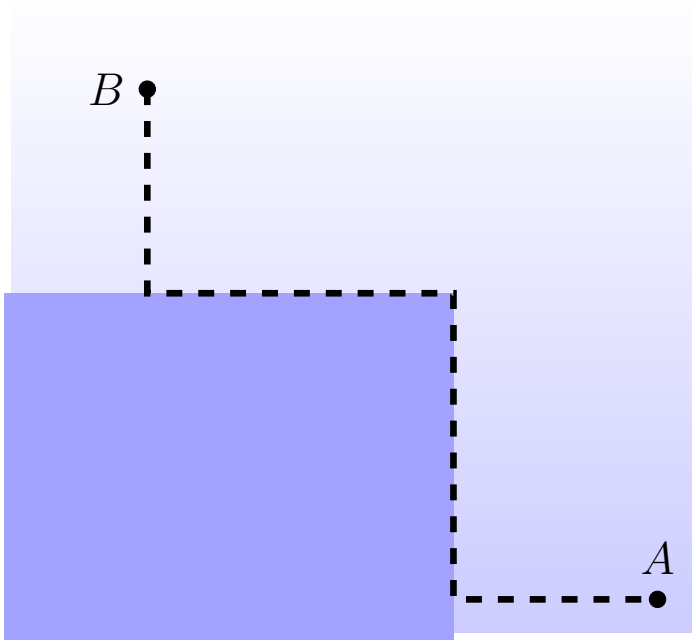

Figure 1: The snowfield, the icy surface, and a possible path from A to B.

Figure 1 also shows a possible path that Ruprecht can take from A to B. The path goes from A first 6 km straight west until it reaches the eastern edge of the ice surface. Then, 9 km along the eastern edge to the north. Then, 9 km along the northern edge to the west. And finally, 6 km straight north to the point B.

On the icy surface, Ruprecht slides at a velocity of 10 km per hour. Walking across the snowfield is more arduous, and Ruprecht only manages to advance at $\sqrt{40}$ km per hour. How much time does Ruprecht need for the *fastest possible* way from A to B?

Artwork: Friederike Hofmann

Possible answers:

1. Between 140 and 145 minutes.
2. Between 145 and 150 minutes.
3. Between 150 and 155 minutes.
4. Between 155 and 160 minutes.
5. Between 160 and 165 minutes.
6. Between 165 and 170 minutes.
7. Between 170 and 175 minutes.
8. Between 175 and 180 minutes.
9. Between 180 and 185 minutes.
10. Between 185 and 190 minutes.