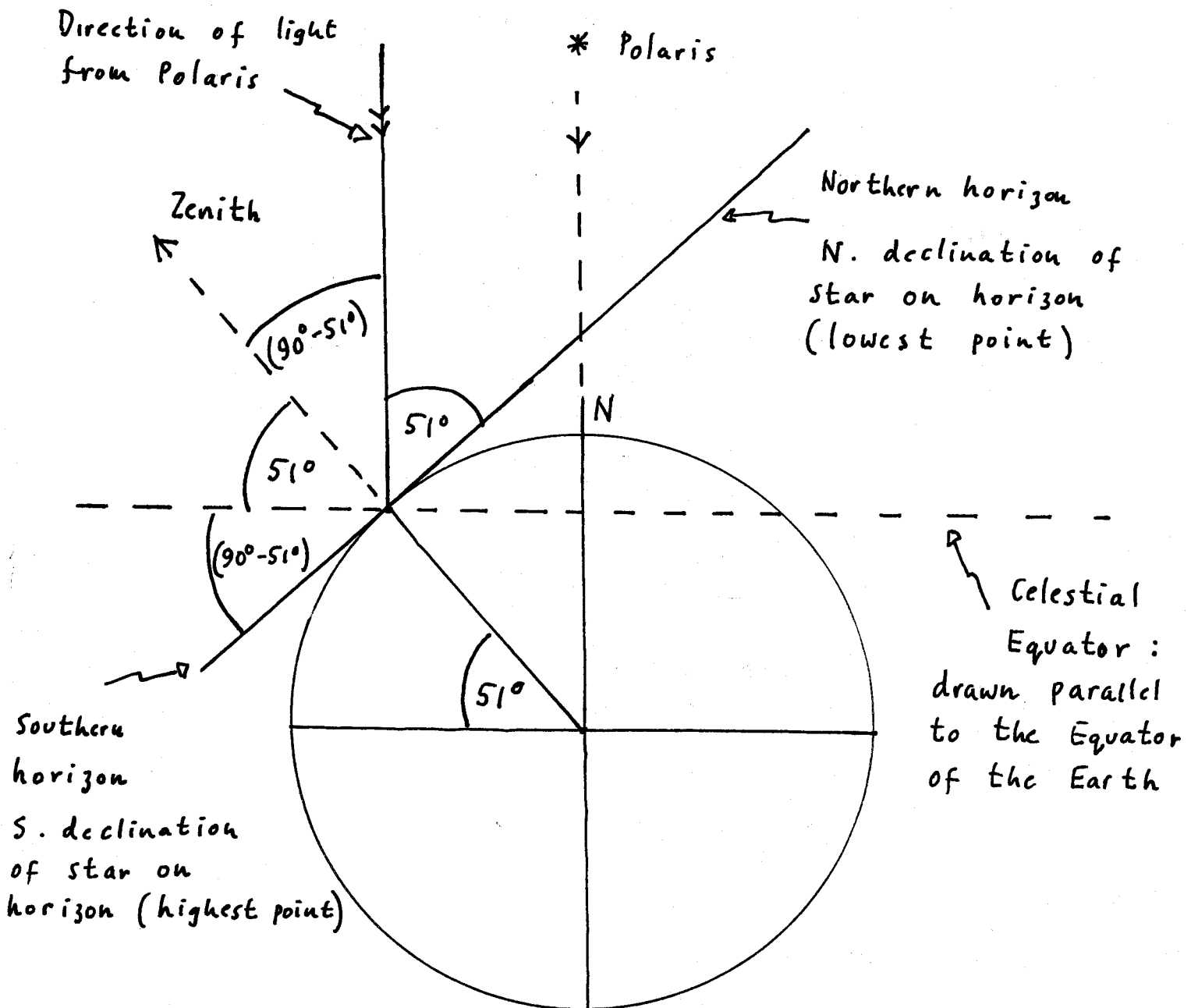


The Celestial Sphere for an observer at 51°N



We can find out which stars will be circumpolar and which will not. If we are observing from a latitude of (say) 51° , Polaris will be 51° above our horizon (neglecting its slight displacement from the celestial pole)

It follows that the distance (angular) between Polaris and our zenith is $(90^\circ - 51^\circ) = 39^\circ$. To an observer in the Northern hemisphere of the Earth, a star is at its lowest point in the sky when it lies due North (it is at its highest point when it lies due South — its culmination point).

Any star which is "below" the pole by the angular amount of one's latitude will just scrape the

northern horizon at its lowest point. If it is nearer the pole than that, it will never set, and will be circumpolar. As Declination is measured from the Equator towards the Pole, we can calculate the limiting declination for a circumpolar star by subtracting our latitude from 90° , which gives us the angle downwards from the Pole.

From latitude 51° N, then, a star will be circumpolar if its Declination is $(90^\circ - 51^\circ) = 39^\circ$, or greater. The brilliant star Capella, with its Declination $+45^\circ 57'$, is circumpolar from a latitude of 51° ; Betelgeuse (α Orionis), at a Declination of $+7^\circ 24'$, is not.

Similarly, a star which lies at any Declination south of -39° will never rise from a latitude of 51° .

To sum up: to an observer at latitude 51° N ($+51^\circ$) a star with a Declination $>+39^\circ$ will never set; a star with Declination below -39° will never rise. Similar calculations can be made for any other latitude. From Lerwick, in the Shetland Islands, where the latitude is just over 60° , the limiting Declination will be 30° , so that a star the Declination of which is $>+30^\circ$, will be circumpolar.

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