6 **(a)** State what is meant by *diffraction* and by *interference*.

diffraction: .....

.....

interference: .....

.....

[3]

(b) Light from a source S_1 is incident on a diffraction grating, as illustrated in Fig. 6.1.

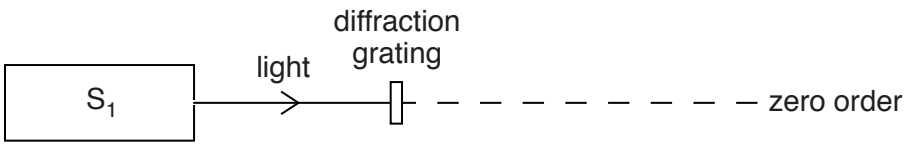

Fig. 6.1 (not to scale)

The light has a single frequency of 7.06×10^{14} Hz. The diffraction grating has 650 lines per millimetre.

Calculate the number of orders of diffracted light produced by the grating. Do not include the zero order.
Show your working.

number = ... [3]

(c) A second source S_2 is used in place of S_1. The light from S_2 has a single frequency lower than that of the light from S_1.

State and explain whether more orders are seen with the light from S_2.

.....

.....[1]