68. (a) We partition the full range into arcs of 3° each: $360°/3° = 120$. Thus, the maximum number of geosynchronous satellites is 120.

(b) Kepler's law of periods, applied to a satellite around Earth, gives

$$T^2 = \left(\frac{4\pi^2}{GM_E}\right) r^3$$

where $T = 24\,\text{h} = 86400\,\text{s}$ for the geosynchronous case. Thus, we obtain $r = 4.23 \times 10^7$ m.

(c) Arclength s is related to angle of arc θ (in radians) by $s = r\theta$. Thus, with $theta = 3(\pi/180) = 0.052$ rad, we find $s = 2.2 \times 10^6$ m.

(d) Points on the surface (which, of course, is not in orbit) are moving toward the east with a period of 24 h. If the satellite is found to be east of its expected position (above some point on the surface for which it used to stay directly overhead), then its period must now be *smaller* than 24 h.

(e) From Kepler's law of periods, it is evident that smaller T requires smaller r. The storm moved the satellite towards Earth.