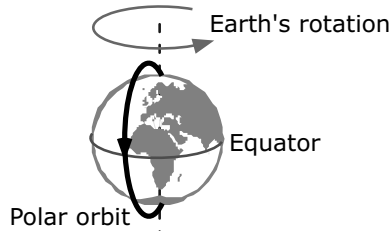


# Satellites 1

Name & Set

- 1 (a) Satellites are often placed in polar orbit or in geostationary orbit around the Earth. A polar orbit is shown on the diagram (which is not to scale.)



- (i) Add a geostationary orbit to the diagram. [2]  
 (ii) Give ONE use for each type of satellite.

(a) Polar orbit satellite \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

(b) Geostationary orbit satellite \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

The table below gives data for a polar and a geostationary satellite.

<i>Satellite Type</i>	<i>Radius of orbit (km)</i>	<i>Mass (kg)</i>
Geostationary	42000	2000
Polar	6700	2000

- (iii) State the type of force the Earth exerts on these satellites. \_\_\_\_\_ [1]  
 (iv) How, if at all, does the size of the force that the Earth exerts on the two satellites differ. State which force is the smaller.

\_\_\_\_\_ [2]

(v) The mass of the polar orbit satellite is 2000 kg. It is transferred to a geostationary orbit. How, if at all, does its mass change?  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

(b) Microwaves are used to communicate with a polar orbiting satellite. The satellite orbits the Earth once every 90 minutes.

(i) Explain why sound waves cannot be used for satellite communication.

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[2]

(ii) A ground station cannot receive signals from a polar orbiting satellite at all times. Explain why

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[2]

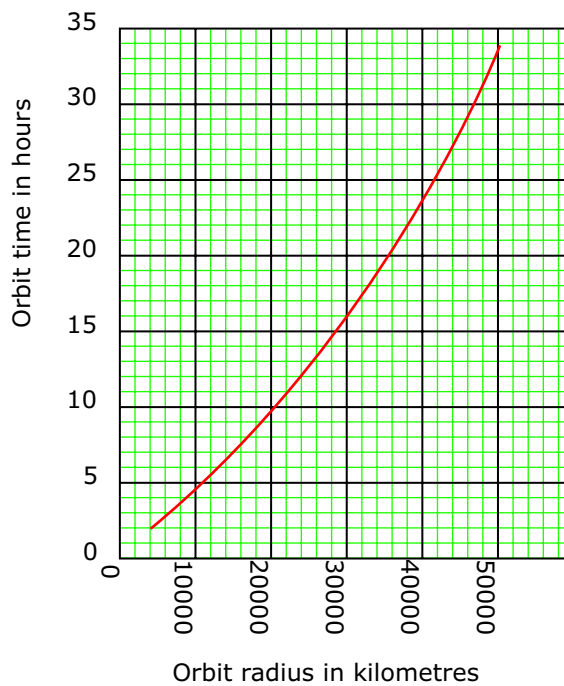
(iii) The distance round the *polar* orbit is 42,000 km. Calculate the speed of the satellite in km/h.

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[2]

(iv) The graph shows how the time taken by a satellite to orbit the Earth changes with the radius of the orbit.



Use the graph to estimate a value for the radius of a geosynchronous orbit.

Radius of orbit = \_\_\_\_\_ [2]

(v) Calculate the speed of a geosynchronous satellite in km/h.

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[3]