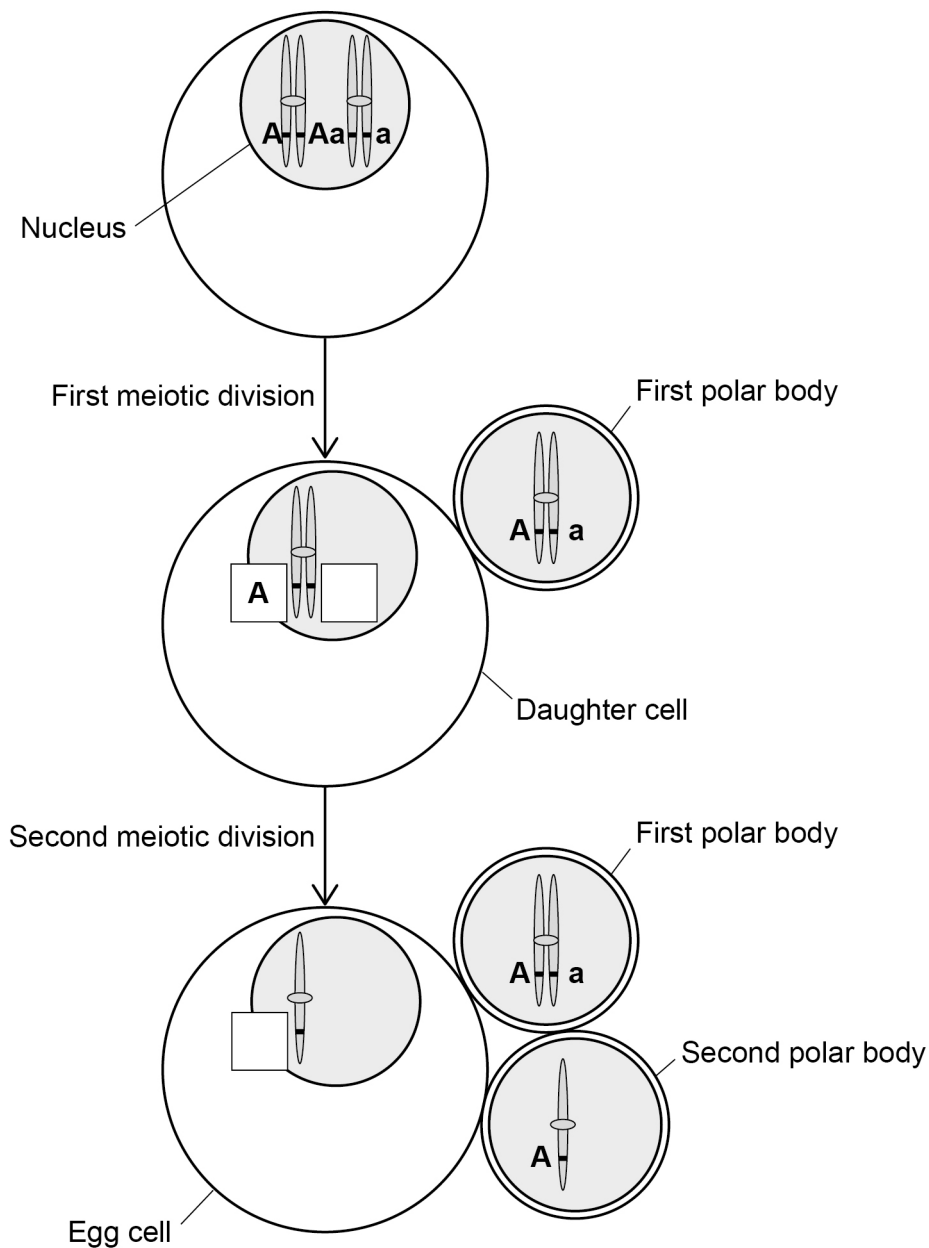


0 3

In women, the first division of meiosis produces one daughter cell that has almost all of the cytoplasm. The other daughter cell consists of a nucleus surrounded by a very small amount of cytoplasm and a cell-surface membrane. This very small daughter cell is called a polar body. Polar bodies do not usually divide. The same process occurs in the second division of meiosis, resulting in one egg cell and two polar bodies.

The diagram in **Figure 3** shows the formation of an egg cell and two polar bodies during meiosis. It also shows what happens to one pair of homologous chromosomes. This pair carries two alleles of gene A.

Figure 3



0 3 . 1 Complete **Figure 3** by putting **A** or **a** in the boxes. One box has been completed for you with **A**.

[1 mark]

0 3 . 2 Put a tick (✓) in the box next to the name of the process that produced the combination of alleles on the chromosome in the first polar body in **Figure 3**.

[1 mark]

Anaphase

Crossing over

Independent assortment

Semi-conservative replication

0 3 . 3 A scientist measured the diameter of a polar body and the diameter of the nucleus inside it. The diameter of the polar body was 10.4 μm and the diameter of the nucleus was 7.0 μm . The density of mitochondria in the cytoplasm of the polar body (outside of the nucleus) was 0.08 mitochondria per μm^3 .

Calculate the number of mitochondria in the polar body. You should assume polar bodies and nuclei are spherical.

The formula for the volume of a sphere is $\frac{4}{3}\pi r^3$ where $\pi = 3.14$

Show your working.

[2 marks]

Number of mitochondria = _____

Turn over ►



