

19 A human muscle cell contains 46 chromosomes.

How many centromeres will be present in a cell during the stages of the mitotic cell cycle?

	early prophase	metaphase	anaphase
A	46	46	92
B	46	92	92
C	46	46	46
D	92	46	46

20 Telomeres become shorter during each cell cycle of a specialised cell.

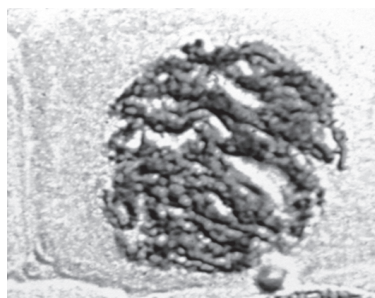
In which phase of the cell cycle do telomeres shorten?

- A** cytokinesis
- B** G₁
- C** S
- D** G₂

21 The photomicrographs show stages of mitosis.



1



2



3



4



5

What is the correct order for the stages of mitosis?

- A** 2 → 3 → 5 → 1 → 4
B 2 → 4 → 1 → 5 → 3
C 3 → 2 → 5 → 4 → 1
D 5 → 1 → 4 → 3 → 2

21 Telomeres prevent the loss of genes during DNA replication.

Which row correctly shows cell types that contain telomeres?

	typical animal cell	typical plant cell	typical bacterial cell
A	✓	✓	✓
B	✓	✓	x
C	x	x	✓
D	✓	x	x

key

✓ = present

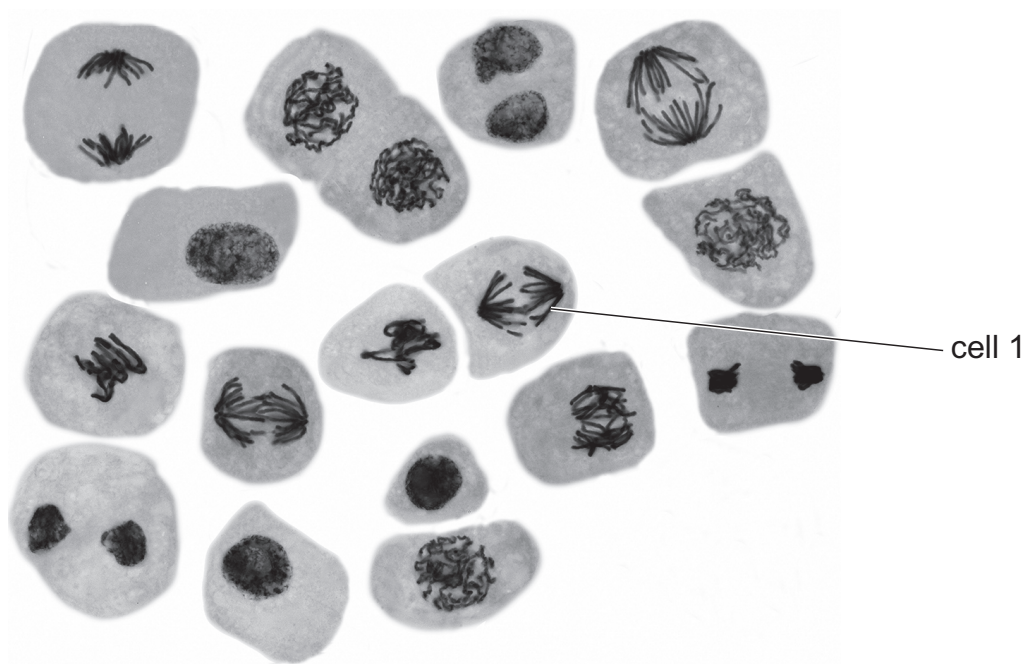
x = **not** present

22 Which events listed are part of mitosis?

- 1 interphase
- 2 prophase
- 3 cytokinesis

A 1, 2 and 3 **B** 1 and 2 only **C** 1 only **D** 2 only

23 The photomicrograph shows 17 cells in different stages of the mitotic cell cycle.



Which row is correct for this photomicrograph?

	the role of a centromere in cell 1	the proportion of the cells in the photomicrograph in telophase
A	attaches daughter chromosomes to spindle fibres	> 0.2
B	holds sister chromatids together	> 0.2
C	attaches daughter chromosomes to spindle fibres	< 0.2
D	holds sister chromatids together	< 0.2

21 What are roles of adult stem cells in humans?

- 1 repair other cells by mitosis
- 2 divide to replace cells in tissues
- 3 differentiate into a new organism

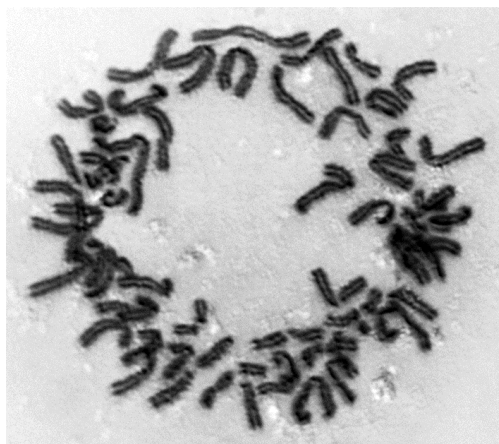
A 1 and 3 **B** 1 only **C** 2 and 3 **D** 2 only

22 Which statements are correct for the mitotic cell cycle?

- 1 DNA is replicated semi-conservatively during mitosis.
- 2 DNA is never changed from one generation of cells to the next generation.
- 3 The daughter cells at the end of a mitotic cell division have the potential to produce the same enzymes as the parent cell.
- 4 The same quantity of DNA is distributed to the nuclei of two new cells at the end of a mitotic cell division.

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

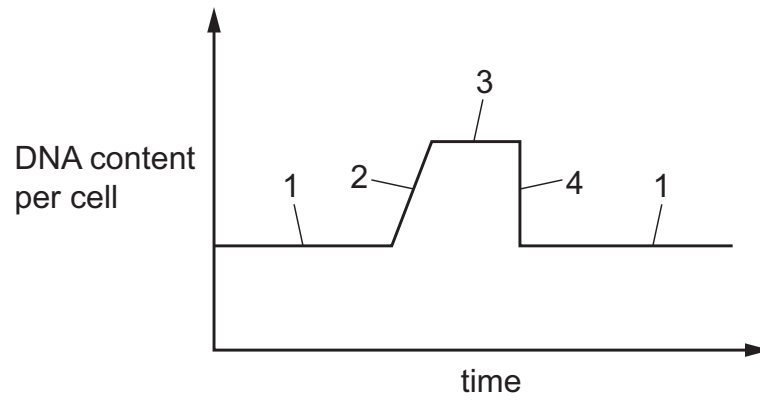
23 The photomicrograph shows a stage of the cell cycle.



Which stage is shown in the photomicrograph?

- A** anaphase
B interphase
C metaphase
D telophase

19 The DNA content of a cell changes as the mitotic cell cycle proceeds through a series of stages.



Which row correctly identifies when DNA replicates and when the nuclear envelope breaks down?

	DNA replicates	nuclear envelope breaks down
A	1	3
B	1	4
C	2	3
D	2	4