

Answers for support worksheet – Chapter 4

1

(7 – ½ mark for each box)

Description of process	Mitosis	Meiosis
involves two nuclear divisions	✗	✓
occurs in a haploid cell	✓	✗
involves the formation of chiasmata	✗	✓
leads to random assortment of chromosomes	✗	✓
occurs during gamete formation in animals	✓	✓
daughter nuclei have identical genetic content	✓	✗
DNA replicates before cell division	✓	✓

2 man – **bb**, man's parents – both **Bb**, wife – **Bb**, child – **bb** (5)

3 a Recessive because unaffected parents can produce a child with the condition. (1)

b Individuals 1, 2, 6 and 7 are definitely heterozygous. (2 – ½ mark for each)

c A point mutation is a change in just one base in a gene so that an incorrect amino acid is inserted during translation. (1)

Another example of a condition that is caused by a point mutation is sickle-cell anemia. (1)

4 a There is a 50% chance that their son will be a hemophiliac. (2)

Son's alleles

		Mother	
		X ^H	X ^h
Father	X ^H		
	Y	X ^H Y	X ^h Y

- b** There is no chance that their daughter will be a hemophiliac but there is a 50% chance that she will be a carrier of the condition.

(2)

Daughter's alleles

		Mother	
		X^H	X^h
Father	X^H	$X^H X^H$	$X^H X^h$
	Y		

- 5 a** Alleged father 2 is the parent of the child because his DNA profile shares several bands with the child. (1)
- b i** The DNA profile of suspect 1 makes him more likely to be involved with the crime as his DNA profile matches the evidence collected. (1)
- ii** The victim's DNA profile is taken so that it can be discounted in any evidence collected and only the suspect's DNA considered at the crime scene. (1)