

0 5

There are two types of cell division: mitosis and meiosis.

0 5 . 1Describe **three** differences between the processes of mitosis and meiosis.**[3 marks]**

1 _____

2 _____

3 _____

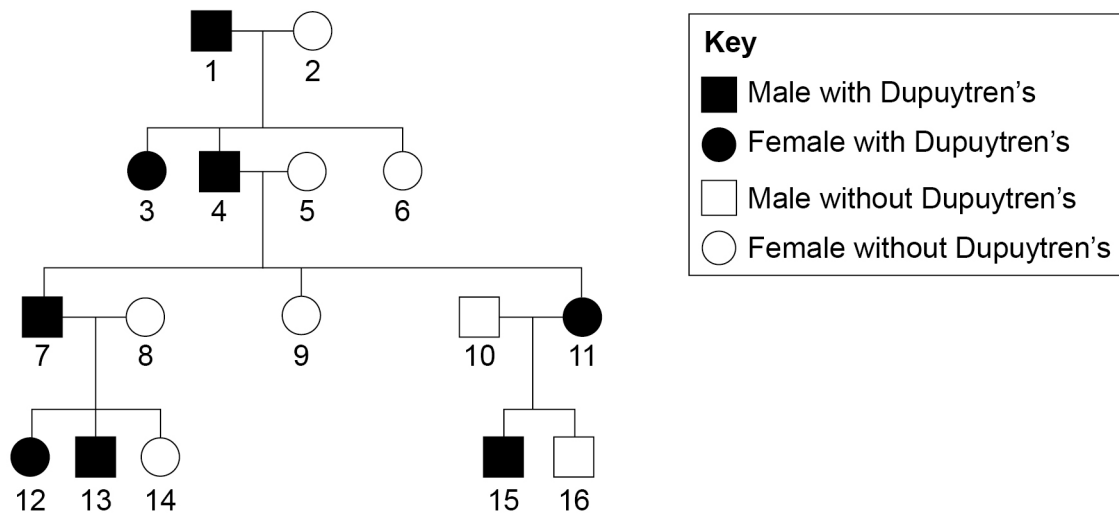
0 5 . 2Describe **one** similarity between the processes of mitosis and meiosis.**[1 mark]**

Question 5 continues on the next page**Turn over ►**

Dupuytren's is a disorder that affects the hands.

Figure 6 shows the inheritance of Dupuytren's in one family.

Figure 6



Dupuytren's is caused by a dominant allele in this family.

D = dominant allele

d = recessive allele

0 5 . 3 Give the genotype of person 1.

Explain your answer.

[2 marks]

Genotype _____



0 5 . 4 Person **7** and person **8** in **Figure 6** are expecting a fourth child.

What is the probability of the child having Dupuytren's?

You should:

- draw a Punnett square diagram
- identify which offspring have Dupuytren's

[5 marks]

Probability = _____

0 5 . 5 Explain how **Figure 6** shows the allele for Dupuytren's is **not** on the Y chromosome.

[2 marks]

13

Turn over for the next question

Turn over ►



Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	<p>any three from:</p> <ul style="list-style-type: none"> • mitosis produces two (daughter) cells but meiosis produces four (daughter) cells • one cell division in mitosis but two cell divisions in meiosis • mitosis produces cells with two of each chromosome, but meiosis produces cells with one of each chromosome • mitosis produces genetically identical cells, but meiosis produced genetically different cells 	<p>answers must be comparative</p> <p>allow mitosis produces diploid cells but meiosis produces haploid cells</p> <p>allow mitosis maintains the number of chromosomes or mass of DNA or mass of genetic material but meiosis halves the number / mass</p> <p>allow mitosis produces cells with 23 pairs or 46 chromosomes but meiosis produces cells with 23 chromosomes</p> <p>allow other correct differences between the processes of mitosis and meiosis</p>	3	<p>AO1</p> <p>4.6.1.1</p> <p>4.6.1.2</p> <p>4.1.2.2</p>

<p>05.2</p>	<p>any one from:</p> <ul style="list-style-type: none"> • DNA doubles / copies / replicates (once) • increase in the number of mitochondria / ribosomes / sub-cellular structures 	<p>allow chromosomes or genetic material or genetic information double / replicate / are copied</p> <p>ignore mitochondria / ribosomes are copied / duplicated</p> <p>allow chromosomes / chromatids pulled to side (of cell)</p> <p>allow other correct similarities between the processes of mitosis and meiosis</p>	<p>1</p>	<p>AO1 4.6.1.1 4.6.1.2 4.1.2.2</p>
<p>05.3</p>	<p>Dd / dD</p> <p>has D because has Dupuytren's and has d because child / person 6 is homozygous recessive or does not have Dupuytren's or is dd</p>	<p>allow heterozygous</p> <p>allow has D because has Dupuytren's and person 1 and person 2 both passed d to child / person 6</p> <p>allow has D because has Dupuytren's and cannot be homozygous / DD or all the children would have Dupuytren's</p>	<p>1</p> <p>1</p>	<p>AO3 4.6.1.6 4.6.1.7</p>
<p>05.4</p>	<p>male / person 7 gametes correct: D and d</p> <p>female / person 8 gametes correct: d and d</p> <p>correct derivation of offspring genotypes: Dd Dd dd dd</p> <p>offspring with Dupuytren's identified</p> <p>probability correct from the correct identification given</p>	<p>} allow 1 mark for both sets of gametes correct if parents not identified</p> <p>allow correct derivation of offspring genotypes from incorrect gametes</p> <p>allow correct for genotypes stated in mp3</p> <p>allow probability correct from offspring genotypes if identification not given</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>4.6.1.6 4.6.1.7 AO2 AO2</p> <p>AO2</p> <p>AO2</p> <p>AO3</p>

05.5	female(s) / person(s) 3 / 11 / 12 have Dupuytren's	allow some females have Dupuytren's	1	AO3 4.6.1.6 4.6.1.7 4.6.1.8
	females don't have Y chromosome or Dupuytren's is passed from fathers / 1 / 7 to daughters / 3 / 12, (so is not on the Y chromosome)	allow only males have Y chromosomes allow females are XX allow Dupuytren's is passed from mothers / 11 to children / 15, (so is not on the Y chromosome)	1	
Total			13	