

CHAPTER 19**ANSWER KEY**

Populations in Hardy-Weinberg Equilibrium

Answer Key

BLM 19.1.9A

1. Genotype frequencies: (tt) $q^2 = 0.20$; (Tt) $2pq = 0.4944$ (0.49 to correct significant digits); (TT) $p^2 = 0.3056$ (0.31 to correct significant digits)

Allele frequencies: (t) $q = 0.4472$ (0.45 to correct significant digits); (T) $p = 0.5528$ (0.55 to correct significant digits)

2. Genotype frequencies: (cc) $q^2 = 0.16$; (Cc) $2pq = 0.48$; (CC) $p^2 = 0.36$
Allele frequencies: (c) $q = 0.40$; (C) $p = 0.60$

Male Gene Pool

Female Gene Pool

	$C(p=0.60)$	$c(q=0.40)$
$C(p=0.60)$	CC $(0.60)(0.60) = 0.36$ $(p)(p) = p^2$	Cc $(0.60)(0.40) = 0.24$ $(p)(q) = pq$
$c(q=0.40)$	Cc $(0.60)(0.40) = 0.24$ $(p)(q) = pq$	cc $(0.40)(0.40) = 0.16$ $(q)(q) = q^2$

3. a) (ZZ) $p^2 = 0.1369$ (0.14 to correct significant digits)
b) (Zz) $2pq = 0.4662$ (0.47 to correct significant digits)
c) (zz) $q^2 = 0.3969$ (0.40 to correct significant digits)
4. a) (Rr) $2pq = 0.0156$ (0.016 to correct significant digits)
b) Yes, there would be a change in allele frequencies because the second condition required to maintain Hardy-Weinberg equilibrium (mates are chosen on a random basis) would no longer hold true.
5. No. In order for Hardy-Weinberg equilibrium to be maintained, the population must be large enough that chance events will not alter allele frequencies. In the case of a small population, this condition does not hold true.
6. Dominant allele frequency: $p = 0.329$ (0.33 to correct significant digits)