

## Answers to selected problems

1. -
2. -
3. (a) Four combinations of parental genotypes:
  1. Mother (1,3) and Father (2,4)
  2. Mother (1,4) and Father (2,3)
  3. Mother (2,3) and Father (1,4)
  4. Mother (2,4) and Father (1,3)(b)  $P(IBD = 0) = \frac{5}{28}$ ;  $P(IBD = 1) = \frac{10}{28}$ ;  $P(IBD = 2) = \frac{13}{28}$   
(c) Yes, the brothers share 2 alleles IBS.  
(d)  $NPL = 4$  (suggestive linkage).
4. -
5. (a) 0.21  
(b) approx. 0.202  
(c) 69 generations
6. (a) 0.01 and 0.99, respectively  
(b) 0.0198  
(c) -  
(d) 0.0033
7. -
8. (a) -  
(b) 2 (or  $\frac{1}{2}$ )  
(c) -

9. Coefficient of relatedness = 0.5  
Coefficient of identity = 0.25
10. (a)  $a = 4, d = 2$ .  
(b) -
11. (a)  $E(a) = E(b) = 37.5$  and  $E(c) = E(d) = 12.5$ .  
(b)  $\chi^2 = 12$  with 3 degrees of freedom; The null hypothesis is rejected at the 1% level.
12. (a)  $\hat{\theta} = \frac{1}{4}$   
(b) 0.23  
(c)  $-\infty$   
(d) 0  
(e)  $\hat{\theta} = 0$   
(f) 0.9
13. (a) -  
(b) TDT = 9.8;  $p < 0.005$ .