Chapter 10 Genetics Problems

♀ ♂

TT x tt

	t	t
T	Tt	Tt
T	Tt	Tt

♂ ♀

tt x TT

	T	T
t	Tt	Tt
t	Tt	Tt

Makes no difference

2. Alleles: y = yellow, O = orange b = black/white

Yellow scallops produces 1 black & 3 yellow. So... must be heterozygous and black/white is recessive to yellow:

Yb

	y	b
y	yy	yb
b	yb	bb

Black/white produce only black/white so must be homozygous.

	b	b
b	bb	bb
b	bb	bb

Orange produces 3 orange and 1 black/white so must heterozygous w/ the orange dominant.

	O	b
O	OO	Ob
b	Ob	bb

3. Offspring from #1 : Tt x Tt

	T	t
T	TT	Tt
t	Tt	tt

4. If sex-linked: $X^{dp}X^{dp} \times X^{Dp}Y$

	X^{Dp}	Y
X^{dp}	$X^{Dp}X^{dp}$	$X^{Dp}Y$
X^{dp}	$X^{Dp}X^{dp}$	$X^{dp}Y$

If really sex-linked, then you'd expect ALL males to be dumpy winged. Since they weren't, it CAN'T BE sex-linked.

5. If allele is on Y chromosome, then only males can have ~~pink~~ phenotype.

6. PPSwSw x ppswsw

F_1 = all will be heterozygous Pp Swsw

F_2	PSw	Psw	pSw	psw
PSw				
Psw				
pSw				
psw				

Should get 9:3:3:1 if complete Punnet square.

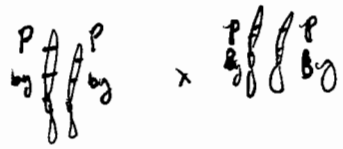
7A p = pink eyes
by = blistery wings

PPByBy x ppbybyby = P

gametes: PBy pby

F_1 all heterozygous Pp Byby

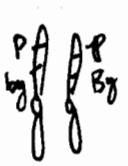
F_2 4 gametes PBy, Pby, ByP, Byp



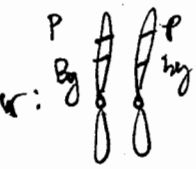
8. 7B. PPbyby × ppByBy

Gametes: PbyPby × pBy

F_1: ~~PpByby~~ ALL! PpBybyby



if x'ing over:



Gametes: Pby • pBy × Pby pBy

.2 : 1 : 1

F_2: PpBybyby ; PPbybyby . ppByBy

7c. If crossing over were allowed to occur you would ppbybyby (Pink blistery).

7d. you can look this up!

9. ♂: PpSwSw × ♀ ppSwSw (alleles are on different chromosomes so no crossing over). Independent assortment.

Gametes: PSw, pSw × pSw pSw

F_1 PpSwSw, PpSwSw, ppSwSw, ppSwSw in a 1:1:1:1 ratio.

9. By looking at the table, you can see that blue only appears when combined with other allele (Black or splashed white). This seems to indicate incomplete dominance.

Let B = Black • W = splashed white

	B	W
B	BB	BW
B	BB	BW

let BW = blue.

Black × ~~Black~~ Blue = Blue • Black 1:1 ratio so:

If Cross Blue x Blue (BW x BW):

	B	W
B	BB	BW
W	BW	WW

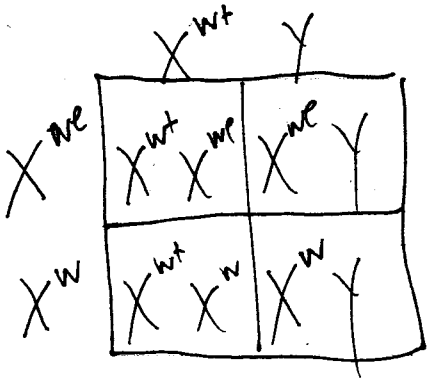
Get Black : Blue : White

1 : 2 : 1

9. If you want all Blue: BB x WW

	W	W
B	BW	BW
B	BW	BW

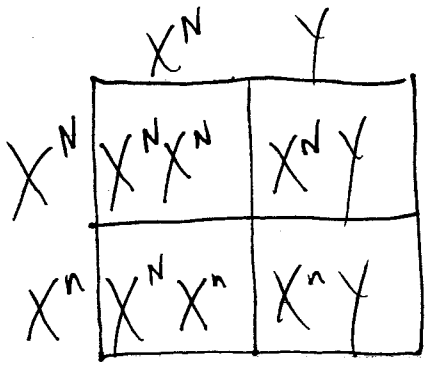
10. ♀ eosin x ♂ red



so dominance order must w^+, w^e, w
b/c ♀ was $X^{we}X^{w}$ and her phenotype was eosin.

11. It doesn't state it in the question but color blindness is due to a recessive allele on X chromosome. So... let N = normal vision & n = color blind

♂ ⊗: must be X^nY & ♀ must be X^NX^n why? B/c it's the only way to have a male w/ color blindness



All daughters will have normal vision.

12. Agouti x albino: A?B? x aabb The only way to have offspring that are albino is for agouti mouse to be heterozygous AaBb

13. If the man had disease, it would have no consequence for offspring b/c mitochondria are inherited from female (from the egg).

If female had disease, all of her offspring would also have it.