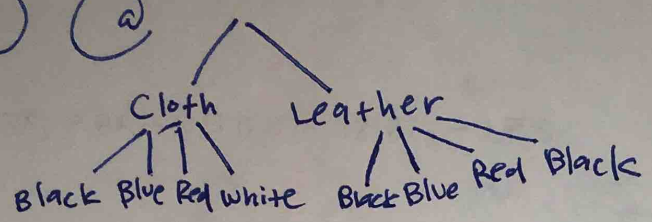
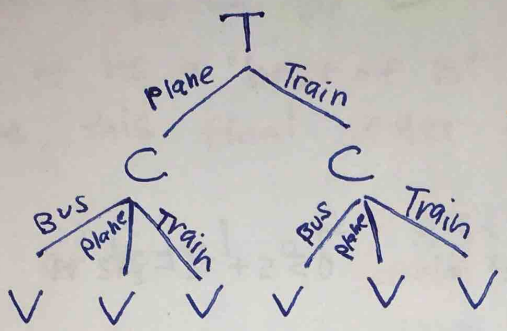
AFM Unit 6 HW 1 - FCP

① (a)



(b) 8 total choices

②



6 ways

③

$\underbrace{7}_{\text{Pitchers}} \cdot \underbrace{3}_{\text{Catchers}} = 21$ possible pairs

④ 0, 1, 2, 3, 4, 5 — 6 total #s

(a) $\underline{5} \cdot \underline{6} = 30$

Can't be zero!

(b) $\underline{5} \cdot \underline{5} = 25$

Can't be zero

Can't be the 1st #

⑤ 0 1 2 3 4 5 6 7 8 9 10 total #s

*to create an odd number only the final digit must be odd!

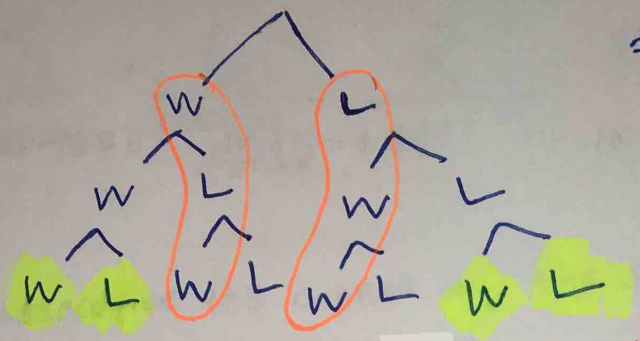
$\underline{9} \cdot \underline{10} \cdot \underline{5} = 450$

Can't be zero

Can be anything!

Must be odd (1, 3, 5, 7, 9)

(6) Best Two-out-of-3 Series



ways to win despite losing one game:

2 ways

technically if its a "best of 3" series you wouldn't need to include this final letter on the "branch"

(7) Lee has a total of $35+20+12 = 67$ albums
(classical, rock, country)

and Larry likes classical & country... so just get rid of rock music! 47 ways

(8)
- 1 student from 9 or 10 { 5 interested in 9, 2 in 10
- 2 students from 11 { 2 interested
- 1 student from 12 { 4 interested

$$\frac{7}{9/10} \cdot \frac{1}{11} \cdot \frac{4}{12} = 28 \text{ ways}$$

↑ only 1 b/c we're picking both of the interested students!

(9)

$$\frac{6}{\text{Dice 1}} \cdot \frac{6}{\text{Dice 2}} \cdot \frac{6}{\text{Dice 3}} \cdot \frac{6}{\text{Dice 4}} = 6^4 = 1296$$

$\underset{\#\text{ of bedrooms}}{3} \cdot \underset{\text{exterior finish}}{6} \cdot \underset{\text{pool}}{2} = 36$ selections

(11) *consecutive #s cannot be the same*

$60 \cdot 59 \cdot 59 = 208{,}860$

- 60: can't be the first
- 59: can't be the second but could be the first!

(12) (a) 4

1 in each suit (Hearts, Diamonds, Spades, Clubs)

(b) # card less than 5 → 4, 3, 2

12

*there is no "1" in cards!

1 in each suit!

(c) 4 + 12 = 16

(13)

1st child: M F

2nd child: M F M F

3rd child: M F M F M F M F

(a) exactly 2 girls → 3

(b) either a boy as eldest or boys as eldest and middle

4

(14) $\frac{8!}{5!}$ $\quad \frac{8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{\cancel{5!}}$ $\quad 8 \cdot 7 \cdot 6 = 336$

(15) $\frac{21!}{17!\,4!}$ $\quad \frac{7\cancel{21} \cdot \overset{5}{\cancel{20}} \cdot 19 \cdot \overset{9}{\cancel{18}} \cdot \cancel{17!}}{\cancel{17!}\ \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot 1}$ $\quad 7 \cdot 5 \cdot 19 \cdot 9 = 5985$

(16) $\frac{15!}{9!\,6!} + \frac{15!}{10!\,5!}$

$\frac{\cancel{3}\ \overset{7}{\cancel{15}} \cdot \cancel{14} \cdot 13 \cdot \overset{2}{\cancel{12}} \cdot 11 \cdot \overset{5}{\cancel{10}} \cdot \cancel{9!}}{\cancel{9!} \cdot \cancel{6} \cdot \cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot 1} + \frac{\cancel{3}\ \overset{7}{\cancel{15}} \cdot 14 \cdot 13 \cdot \overset{3}{\cancel{12}} \cdot 11 \cdot \cancel{10!}}{\cancel{10!}\ \cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot 1}$

$\overset{2}{\cancel{2}}$

$7 \cdot 13 \cdot 11 \cdot 5 + 7 \cdot 13 \cdot 3 \cdot 11$

$5005 + 3003 = 8008$

(17) $\frac{7!}{2!\,5!} + \frac{7!}{3!\,4!}$

$\frac{7 \cdot \overset{3}{\cancel{6}} \cdot \cancel{5!}}{\cancel{2} \cdot 1 \cdot \cancel{5!}} + \frac{7 \cdot \overset{2}{\cancel{6}} \cdot 5 \cdot \cancel{4!}}{\cancel{3} \cdot \cancel{2} \cdot 1 \cdot \cancel{4!}}$

$7 \cdot 3 + 7 \cdot 5$

$21 + 35 = 56$

(18) $n(n-1)!$

$n!$

(19) $n!(n+1)$

$(n+1)!$

(20) $(n-1)!(n^2+n)$

$(n-1)!\, n(n+1)$

$(n+1)!$

(21) $(n+2)!(n^2+7n+12)$

$(n+2)!(n+3)(n+4)$

$(n+4)!$

(22) $\frac{(n+1)!}{n!} = 9$

$\frac{(n+1)\cancel{n!}}{\cancel{n!}} = 9$

$n+1=9$

$n=8$

(23) $\frac{(n+1)!}{(n-1)!} = 6$

$\frac{(n+1)\cdot n\cdot \cancel{(n-1)!}}{\cancel{(n-1)!}} = 6$

$(n+1)n = 6$

$n^2+n = 6$

$n^2+n-6 = 0$

$(n+3)(n-2)$

$\cancel{n=-3}$ $\quad n=2$