orderings §8.4 #s 4, 6, 12, 14, 16, 18, 20, 38, 54

Subsets §8.5 #s 6, 12, 16, 18, 20, 36*

*Mississippi "Labeling Theorem"

$r = 5\%$
$t = 3$ yrs
$m = 12$ periods per year. } Applies to #s 1, 2

(1) you can afford \$300/mo.
Pmts @ the end of the month.
How much did the banker lend you?

(2) The banker lends you \$20,000. How much are your monthly payments? Pmts @ end of the mo.
Amortization

(3) $t = 18$ yrs. All else the same.
Want to save \$250,000 (Pmts @ end of mo.)
for kid's college. What are the monthly pmts?

Numeracy Issues:

#1 $(300)(12)(3) = 10{,}800$
What do you expect for the loan amt?

$10{,}800 + (10{,}800)(.05) = ?$ Doesn't make sense.
Banker loaned you a lot less.

#2 $\frac{20000}{(12)(3)} \approx \$555.56$ Monthly pmts higher.

#3 $\frac{250000}{(12)(18)} \approx \$1157.41$ Monthly pmts LESS
(Interest works in your favor)

$250000/(12 * 18) = 250000/12/18$

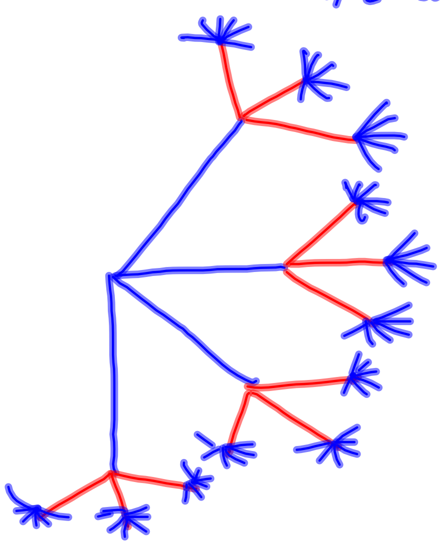
Counting

A menu has 4 appetizers, 3 entrees, 6 desserts.
How many 3-course meals can you order?

$4 \cdot 3 \cdot 6 = 72$ possible ways.

4 roads to Longmont,
3 " from Longmont to Hays, OK.
6 " " Hays to KC, MO.

72 ways.



72 twigs on the tree

Nov 26-10:28 AM

How many local phone #s are possible?

$\underline{10}\,\underline{10}\,\underline{10}\quad \underline{10}\,\underline{10}\,\underline{10}\,\underline{10}$

Actually 555 is out.

To handle this, I'd subtract off all the 555 #s.

$\underline{1}\ \underline{1}\ \underline{1}\ \underline{10}\ \underline{10}\ \underline{10}\ \underline{10}$

$10^7 - 10^4$ handles "no 555's"

1st can't be zero:

$9 \cdot 10^6 - 10^4$

How many ways can you arrange 4 chairs?

$\underline{4}\quad \underline{3}\quad \underline{2}\quad \underline{1}$

$4 \cdot 3 \cdot 2 \cdot 1 = 4!$

How many ways can 4 people out of 10 get the last 4 seats in musical chairs?

$10\cdot 9\cdot 8\cdot 7 = {}_{10}P_4 = P(10,4) = P_{10}^{4} \overset{?}{=} P_{4}^{10}$ or something!

$$= \frac{10!}{(10-4)!} = \frac{10!}{6!} = \frac{10\cdot 9\cdot 8\cdot 7\cdot \cancel{6\cdot 5\cdot 4\cdot 3\cdot 2\cdot 1}}{\cancel{6\cdot 5\cdot 4\cdot 3\cdot 2\cdot 1}}$$

$$= \frac{10\cdot 9\cdot 8\cdot 7\cdot \cancel{6!}}{\cancel{6!}}$$

we're picking the 4 people & deciding where they sit.

Permutations on 10 things taken 4 @ a time.

what if we're just picking winners & don't care what seat they get?

This is $\dfrac{P(10,4)}{\text{the \# of rearrangements of the 4 winners.}} = \dfrac{P(10,4)}{4!}$

$$= \frac{\frac{10!}{(10-4)!}}{4!} = \frac{10!}{(10-4)!\,4!} = \frac{10!}{4!\,(10-4)!} = \frac{n!}{r!\,(n-r)!}$$

$= C(10,4) =$ the # of 4-member subsets taken from a set of 10. $= \binom{n}{r}$

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        1157.407407
10 nPr 4
               5040
10 nCr 4
                210
(10 nPr 4)/4!
                210
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How many subsets? $\{1,2,3\}$

$\{\ \}, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\}$

$\{1,2\} = \{2,1\}$ They're the same.

8 of 'em.

One way to think of this:

$\{\_\ \_\ \_\}$ Build a subset.

Either include or not include each element

$\underline{2} \cdot \underline{2} \cdot \underline{2} = 2^3 = 8$