Wednesday, October 24, 2012

TISK Problems

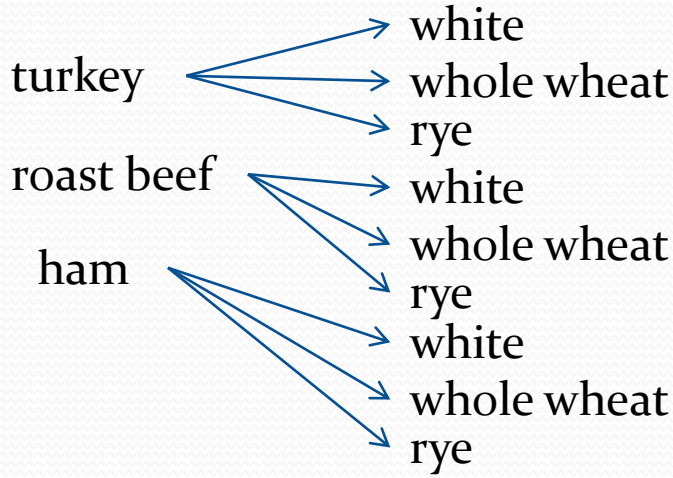
1. Simplify: $3x - 9y - (4x + 7y)$
2. Simplify: $-5(3x - 8)$
3. Find the 6^{th} term in this sequence:
   6, -8, 7, -9, …

There will be 2 Mental Math questions today.

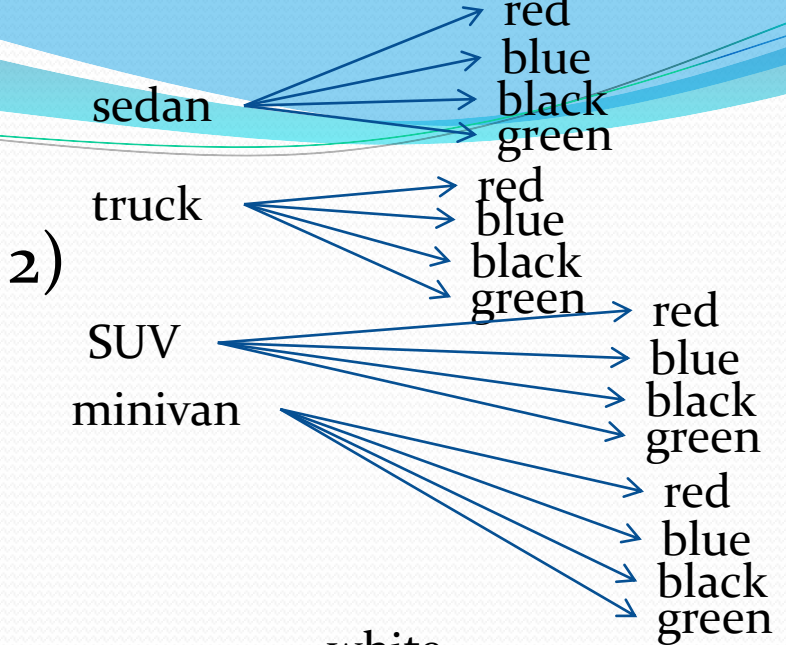
Homework: Permutations & Factorials practice worksheet

Homework Check

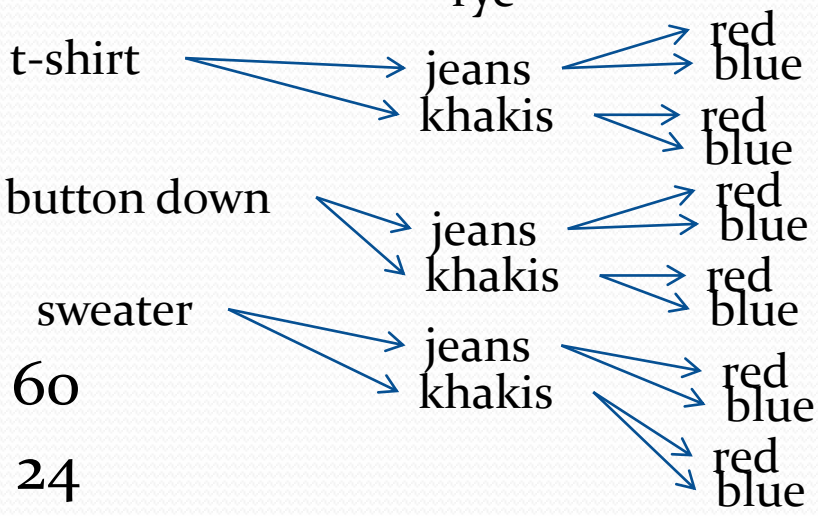
1)



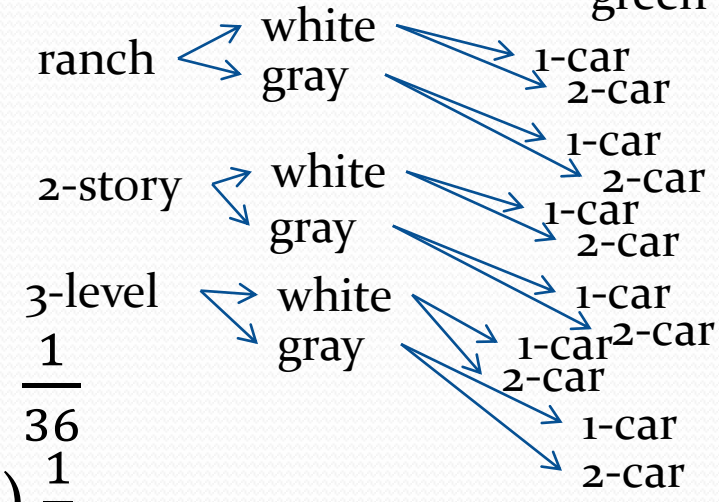
2)



3)



4)



5) 60

6) 24

7) a. 10,000 b. 8,000 c. 1,000

8) a. 17,576,000 b. 11,232,000

9) $\frac{1}{36}$

10) $\frac{1}{6}$

11) $\frac{1}{16}$

12) a. 5,200,000 b. $\frac{1}{40,000}$

Factorials & Permutations

- A factorial is a special type of multiplication.
  - Notation: 5! is read as "Five Factorial"
  - It means: $5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$
- Practice. Evaluate the factorial:
  - 2! $2 \cdot 1 = 2$
  - 6! $6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 30 \cdot 12 \cdot 2 = 360 \cdot 2 = 720$
  - 7! $7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 7 \cdot 6! = 7 \cdot 720 = 5040$

Note:

0! = 1

Permutations

- Permutations find out how many ways you can arrange a number of objects.
  - For example, if I wanted to know how many ways there are to select a first, second, and third place winner from this class, I would use a permutation to figure that out.
  - Or, if I wanted to make a password out of the letters of my last name, WILTJER, I could use a permutation to tell me how many different passwords are possible.

Permutations

- There is a formula for calculating the number of permutations an arrangement has.
- The formula is:

$$ {}_{n}P_{r} = \frac{n!}{(n-r)!} $$

- Where *n* stands for the **n**umber of things you're arranging
  - and *r* stands for how many of the items you're picking each time.

Example 1

- How many different 4-letter passwords could you make from the letters of Miss Wiltjer's last name?

$$ {}_nP_r = \frac{n!}{(n-r)!} $$

$n =$ **How many letters can we choose from?** 7

$r =$ **How many letters can we choose at a time?** 4

$$ {}_7P_4 = \frac{7!}{(7-4)!} = \frac{7\cdot 6\cdot 5\cdot 4\cdot \cancel{3}\cdot \cancel{2}\cdot \cancel{1}}{\cancel{3}\cdot \cancel{2}\cdot \cancel{1}} = 7\cdot 6\cdot 5\cdot 4 = 42\cdot 20 = 840 $$

Example 2

- Alyssa is visiting Hawaii and plans to stay for 3 days. She wants to go to the beach, see Mauna Loa, and shop in Honolulu. How many ways can she arrange her schedule for the 3 days so that she does 1 activity each day?

$$ {}_nP_r = \frac{n!}{(n-r)!} $$

$n = 3$ **How many activities can we choose from?**

$r = 3$ **How many activities are we choosing altogether?**

$$ {}_3P_3 = \frac{3!}{(3-3)!} = \frac{3\cdot 2\cdot 1}{0!} = \frac{6}{1} = 6 $$

What's the probability that if she randomly decides on a schedule , she will end up shopping, going to Mauna Loa, then to the beach?

$$ P(shop, ML, beach) = \frac{1}{6} $$

Homework

- Permutations & Factorials Practice worksheet