Friday, October 26, 2012

TISK Problems:

1) Give an example of an experiment, an event for that experiment, and an outcome for that event.
2) Simplify: $3m - 8p - (-2p - 7m)$
3) Evaluate: $\frac{3}{5}\left(\frac{15}{21}\right) - \frac{3}{14}$

There will be NO Mental Math today.

Homework:
Permutations Word Problems worksheet

Homework Check

1) 24
2) 120
3) 2
4) 5,040
5) 720
6) 3,628,800
7) 40,320
8) 720
9) 3
10) 12
11) 1
12) 360
13) 120
14) 504
15) 306
16) 360,360

Graded Work

Your class's average on this quiz was...
1st Period: 80.4%
2nd Period: 82.9%
6th Period: 73.5%

- New!
  - From now on, if you get your parents to sign your graded test or quiz within a week, you will receive an addition 2 bonus points.
  - If you earned less than a C on a test or quiz you are REQUIRED to get it signed. (You still get the 2 bonus points for a signature.)
    - If you don't get it signed, an e-mail to your parents will be sent letting them know you didn't pass that quiz or test!

Word Problems

- How do we decide when it is appropriate to use a permutation?
  - A permutation is when order is important.

Word Problems

- Julia, Sophia and Audrey are running a race. What is the probability that Julia or Audrey will take first place? (Assume all 3 girls are equally talented runners.)
  - First decide: is the order of selections important in this case?
    - Yes!
    - P(Julia or Audrey in first place) $= \frac{\text{number of ways Julia or Audrey in 1st}}{\text{number of ways the race could end}}$
    - Number of ways Julia could end in 1st place:
      - There are 2: If Julia is first, Sophia is 2nd and Audrey is 3rd or if Julia is first, Sophia is 3rd and Audrey is 2nd.
    - Number of ways Audrey could end in 1st place:
      - There are also 2.
    - Number of ways the race could end:
      - ${}_3P_3 = \frac{3!}{(3-3)!} = \frac{3 \cdot 2 \cdot 1}{0!} = \frac{6}{1} = 6$
    - Therefore, the P(Julia or Audrey in 1st) $= \frac{4}{6} = \frac{2}{3}$

Word Problems

- What if we made it harder?
  - Julia, Audrey, and Sophia are running a race along with 27 other runners. What's the probability one of the three girls will come in first? (Assume all 30 participants are equally talented runners.)
    - P(Julia, Audrey, or Sophia in 1st Place) $= \frac{ways\ 3\ girls\ in\ 1st}{ways\ race\ ends}$
      - Ways 3 girls in 1st:
        - How many options for 1st place? 3
        - How many options for 2nd – 30th place? 29!
        - Ways the 3 girls could come in 1st: $3 \cdot 29!$
      - Ways race ends:
        - How many ways could the race end?
          - ${}_{30}P_{30} = \frac{30!}{(30-30)!} = 30!$
      - P(Julia, Audrey or Sophia in 1st Place) $= \frac{3 \cdot 29!}{30!} = \frac{3}{30} = \frac{1}{10}$

Word Problems

- Miss Wiltjer decides to award 5 bonus points to the first three students to walk into class that day. How many different ways are there for her to award the points?
  - Is order important?
    - No. If Alyssa, Parker, and Brenna walk in first that would be the same as if Parker, then Alyssa, then Brenna walk in.
  - Not a permutation!

Word Problems

- How many different ways are there to arrange 7 hats on a shelf that fits 5?
  - Is order important?
    - Yes; we are ***arranging*** the hats, so order is important.
  - There are 7 items and we are choosing 5 so:
    - $_7P_5 = \frac{7!}{(7-5)!} = \frac{7!}{2!} = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 = 2{,}520$
    - Therefore, there are 2,520 different ways to arrange the hats.

Word Problems

- Stephen has a bag of marbles that contains 6 red, 8 yellow, 7 purple, and 5 blue marbles. What is the probability that he draws at least one of each color if he only draws 4 marbles?
  - Is order important?
    - No! If he draws a purple, a blue, a yellow THEN a red, it would be the same as if he drew a blue, a yellow, a purple then a red.
  - Not a permutation!