NAME _____

DATE _____

Module 20 Solving Problems Using Probability,
Statistics, and Discrete Math
Lesson 1 Finding Permutations and Combinations

independent
practice

Create a tree diagram to illustrate each.

1. Five things A-B-C-D-E taken two at a time

2. Four things A-B-C-D taken four at a time

Simplify each permutation and combination.

3. $_{12}P_6$

_____

4. $_{12}C_6$

_____

5. $_9C_9$

_____

6. $_9P_9$

_____

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Solve each problem. Indicate whether you used a permutation or combination.

7. Maggie has eight different colored beads. She will pick six beads to thread with string for a necklace. How many different necklaces can she make in which the order of the beads matters?

_____

8. George has twelve good friends but can only invite four friends to see a rock concert with him. In how many ways can he select the four friends to invite?

_____

9. How many five-digit password numbers can be created using the digits 1, 3, 4, 6, 7, and 9? Assume you can use each digit only once.

_____

10. A total of 14 people are running for seats on the city council. Exactly five will win. How many different councils can be created?

_____

11. Coach Hernandez can select seven of the 10 girls trying out for the varsity soccer team. In how many ways can he pick his new team members?

_____

12. DJ Boom Boom will create a new CD using eight original songs. In how many different ways can she arrange the songs on the CD?

_____

Journal

1. Explain to a friend when to use permutations and when to use combinations.

2. Ron says that to determine the number of ways six people can stand in line is to find the number of permutations of six things taken six at a time, $_6P_6$. Amanda says it is the number of combinations of six things taken six at a time, $_6C_6$. Who is correct? Why?

3. Will $_nC_n$ always equal one, where n is a positive integer? Why or why not?

4. Which is larger $_5C_3$ or $_5C_2$? Why?

Cumulative Review

Solve.

1. $\frac{x}{6} = \frac{10}{15}$

_____

2. $\frac{12}{k} = \frac{8}{4}$

_____

3. $\frac{y}{y + 2} = \frac{2}{3}$

_____

4. $\frac{w}{7} = \frac{w - 5}{2}$

_____

Use the set {0, 0.5, 1, 5, 0.75, 2, 0.25, 3} for problems 5–7.

5. Find the mean.

_____

6. Find the median.

_____

7. Find the mode.

_____

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Graphing Calculator Problem

Use your calculator to evaluate 11!.
1. Type the number 11 on the home screen.
2. Press MATH. Notice that the top of the screen gives the names of four different sub-menus- **MATH, NUM, CPX,** and **PRB.**
3. Use the right arrow key to move the cursor over **PRB.** A new set of choices will appear below the screen, including the factorial symbol, "!."
4. Use the down arrow key to move the cursor over the number 4, press ENTER. You have now returned to the home screen and the factorial symbol is in the correct place.
5. Press ENTER to evaluate. 11! = 39,916,800

Use your calculator to evaluate $_{20}C_{12}$.
1. Type the number 20 on the home screen.
2. Press MATH. Notice that the top of the screen gives the names of four different sub-menus- **MATH, NUM, CPX,** and **PRB**.
3. Use the right arrow key to move the cursor over **PRB.** A new set of choices will appear below the screen, including the combination symbol, "nCr."
4. Use the down arrow key to move the cursor over the number 3, press ENTER. You have now returned to the home screen and the combination symbol is in the correct place.
5. Type the number 12 on the home screen.
6. Press ENTER to evaluate. $_{20}C_{12}$ = 125,970
7. You will use the same steps to evaluate a permutation, but you will choose number 2 in step four instead of number 3.

Evaluate.

1. 8!

2. $_{19}C_7$

3. $_{14}P_{10}$

4. $_{12}P_{11}$

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