Name:
Date:
Counting worksheet

1. $12 * 7 =$
2. $8 * 6 =$
3. $16 * 16 =$
4. $\frac{92}{4} =$
5. $\frac{56}{7} =$
6. $2^0 =$
7. $2^1 =$
8. $2^5 =$
9. $2^{-3} =$
10. $2^8 =$
11. $2^{10} =$
12. $2^3 * 2^5 =$
13. $3^4 =$
14. $6^2 * 6^5 =$
15. $6^2 * 7^3 =$
16. $\frac{2^{16}}{2^{12}} =$
17. $\sqrt[3]{x^4} = x^{\frac{y}{z}}$ what are y and z?
18. $(3^2)^4 =$
19. $\frac{3}{4} + \frac{1}{3} =$
20. $\frac{2}{3} * \frac{3}{5} =$
21. $\frac{3}{4} - \frac{2}{3} =$

$\binom{n}{k} = \frac{n!}{k!(n-k)!}$ pronounced as 'n choose k', these are combinations

1. $\binom{2}{1} =$
2. $\binom{2}{2} =$
3. $\binom{4}{4} =$
4. $\binom{4}{3} =$
5. $\binom{4}{2} =$
6. $\binom{4}{1} =$
7. $\binom{4}{0} =$
8. $\binom{7}{2} =$
9. $\binom{7}{5} =$ (should be easy after last question)

${}^nP_k = \frac{n!}{(n-k)!}$ pronounced as 'k-permutations of n'
Note that $\binom{n}{k} = \frac{{}^nP_k}{{}^kP_k}$

1. ${}^2P_1 =$
2. ${}^2P_2 =$
3. ${}^4P_4 =$
4. ${}^4P_3 =$
5. ${}^4P_2 =$
6. ${}^4P_1 =$
7. ${}^4P_0 =$
8. ${}^7P_2 =$
9. ${}^7P_5 =$

Product rule

1. A restaurant has 1 drink option and 2 food options. How many drink-food combinations are there?
2. A restaurant has 3 drink options and 4 food options. How many drink-food combinations are there?

Sum rule

1. A restaurant has 1 drink option and 2 food options. You want to get either a drink or a food item. How many different ways might you order?
2. A restaurant has 3 drink options and 4 food options. You want to get either a drink or a food item. How many different ways might you order?

3. A restaurant has 5 predefined meals, 3 drink options and 4 food options. You want to get either a predefined meal, or a drink and a food option. How many different ways might you order? (reuse your work from earlier problems, break this one into parts)

4. I have 8 shirts, one of which is gray, one of the others is red. I have 3 pairs of pants, one of which is gray. How many shirt-pants combinations can I make?

5. I will either wear a red shirt or a black shirt. How many shirt-pants combinations can I make?

6. I will either wear a red shirt or gray pants. How many shirt-pants combinations can I make?

7. I will wear a gray article of clothing. How many shirt-pants combinations can I make?

In vs Out

1. How many ways can we choose a committee of 5 people from our class of 30?

2. How many ways can we choose 25 people not to be on the committee of 5 people from our class of 30?

3. How many different strings of 2 digits are there?

4. How many strings of 2 digits have a nine in them?

5. How many strings of 2 digits do not have a nine in them?

6. License plates have 3 letters followed by 3 numbers. How many different license plates are there?

7. How many different license plates are there that include a nine?

8. How many different license plates are there that don't include a nine?

9. How many different license plates are there that don't have any letter appear more than once?

10. How many different license plates are there that don't have any letter appear more than once and don't have any digit appear more than once?

11. How many different license plates are there that don't have any letter appear more than once or don't have any digit appear more than once?