

Probability Test Review Guide

Name: _____

Date: _____

Level 1

Probability
 P(rolling a 5 on a 6 sided die)
 $\frac{\text{ways of success}}{\text{ways of total}} = \frac{\text{ways to get 5}}{\text{total ways to roll}} = \frac{1}{6}$

Multiples
 P(rolling a multiple of 3 number on a 12 sided die)
 $\frac{\text{ways to get multiple of 3}}{\text{total ways}} = \frac{4}{12} = \frac{1}{3}$
 anything the number can go into, more of the number

2. How many ways can 24 students win 1st, 2nd, and 3rd place in the Blooket game?

1) count/determine amount of events write and describe places
 2) write amount of options for each event
 3) multiply options
 $24 \cdot 23 \cdot 22 = 12,144$ ways

3. How many 5 letter words (real and not real) can you make by rearranging the letters in BREAK?

Factorial "!"
 a number multiplied by every number less than itself down to 1
 5 letter options w/o replacement
 $5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 5!$
 120 ways

4. There are 18 yellow chips, 20 blue chips, and 12 red chips. You are picking one chip.

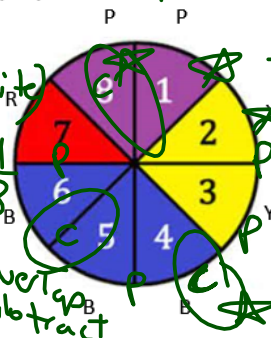
P(pick a chip that is yellow or blue) $\frac{18}{50} + \frac{20}{50} = \frac{38}{50} = \frac{19}{25}$
 P(pick a chip that is red) $\frac{12}{50} = \frac{6}{25}$
 P(pick yellow and red) $\frac{0}{50} = 0$
 Total: 50 chips
 Single event? Overlap
 No chips that are both yellow and red.

5. A drawer has 18 pairs of socks in it; 10 black, 5 gray, and 3 white. What are the odds of you... drawing a black pair of socks? ... drawing a gray pair of socks?

Ways to get black socks $\frac{10}{8} = \frac{5}{4}$
 Ways to get gray or white $5 + 3 = 8$
 Odds: 5:4
 get gray sock / get not gray black or white $10 + 3 = 13$
 Odds: 5:13
 Success / Failure / Success: Failure

6. 3 spots on the spinner below are blue, 1 is red, 2 are yellow, and 2 are purple.

P(spin blue twice) $\frac{3}{8} \cdot \frac{3}{8} = \frac{9}{64}$
 P(spin a 5 or a composite number) $\frac{1}{8} + \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$
 P(spin a yellow or a factor of 8) $\frac{2}{8} + \frac{4}{8} - \frac{1}{8} = \frac{5}{8}$
 Composite: composed of more than 2 factors
 Prime: only factors are 1 and itself



Factors
 numbers that multiply together to make the number
 add → look for overlaps
 $\frac{2}{8} + \frac{4}{8} - \frac{1}{8} = \frac{5}{8}$

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7. If there are 18 yellow chips, 20 blue chips, and 12 red chips.

Whole - "is/are" - Not need common denominator
 Compliment
 $P(\text{pick a chip that is Not blue}) = 100\% - \text{blue} = \text{Not blue}$
 $1 - \frac{20}{50} = \frac{30}{50} = \frac{3}{5}$

Total: 50 chips
 50 chips - 12 red = 38 not red
 $P(\text{pick 3 chips none are red w/o replacement}) = P(\text{1st chip not red}) \cdot P(\text{2nd chip not red}) \cdot P(\text{3rd chip not red})$
 $\frac{38}{50} \cdot \frac{37}{49} \cdot \frac{36}{48} = \frac{50616}{117600}$

anything \div by itself = 1
 Level 3
 $1 - \frac{2109}{4900} = \frac{4900 - 2109}{4900} = \frac{2791}{4900}$

$P(\text{pick 2 yellow chips with replacement})$
 multiply so events happen together
 $P(\text{1st Y}) \cdot P(\text{2nd Y})$
 $\frac{18}{50} \cdot \frac{18}{50} = \frac{324}{2500} = \frac{81}{625}$

The table shows the number of one doctor's patients who caught a cold one week and whether or not they exercised regularly.

	Caught a cold	Did not catch a cold	Total
Exercised	8	30	38
Did not exercise	10	2	12
Total	18	32	50

Must fill in Totals

8. a. Find $P(\text{did not exercise} | \text{did not catch a cold})$

overlap total ppl in column not Exercise
 $\frac{2}{32} = \frac{1}{16}$

b. Find $P(\text{did not catch a cold} | \text{did not exercise})$

look in same row Find ppl not CC
 $\frac{2}{12} = \frac{1}{6}$

c. Find $P(\text{exercised OR caught a cold})$

no bar not conditional
 $P(E) + P(CC) - P(E \text{ and } CC)$
 $\frac{38}{50} + \frac{18}{50} - \frac{8}{50} = \frac{48}{50} = \frac{24}{25}$

d. Find $P(\text{exercised AND did not catch a cold})$

Overlap 1 person who exercised did both
 $\frac{30}{50} = \frac{3}{5}$

9. A softball game has an 80% chance of being canceled if it rains and a 30% chance of being canceled if there is fog when there is no rain. There is a 70% chance of fog with no rain and a 30% chance of rain. If the probability that the game will be canceled is 45%, what is the probability that the game is canceled even if it does not rain nor is foggy? Fill in the Tree Diagram provided to help you.



Must fill in missing branches, adds to 100%

$P(\text{game get cancelled})$
 $P(\text{Rain} \cap C) + P(\text{NR, Fog} \cap C) + P(\text{NR, No Fog} \cap C)$
 $0.3 \cdot 0.8 + 0.7 \cdot 0.7 \cdot 0.3 + 0.7 \cdot 0.3 \cdot 0$
 $0.240 + 0.147 + 0$

0.387
 38.7%
 $+ 0.240$
 $+ 0.147$
 line up decimal