

# Conditional Probability Worksheet 5 - Answers

In problems 1-5, identify two ways to group a sample (labels for a two-way frequency table) that could answer the question you are given.

1. Do third grade girls prefer chocolate or vanilla pudding when compared to boys?  
Group 1: third grade girls, third grade boys.  
Group 2: prefer chocolate pudding, prefer vanilla pudding
2. Do kiwi birds live longer than sea turtles?  
Group 1: kiwis, sea turtles.  
Group 2: average life span.
3. Do guavas prefer to have rubber bands, paper clips, or paint balls shot at them?  
Group 1: guavas that can respond to a survey, guavas that cannot respond.  
Group 2: prefer rubber bands, prefer paper clips, prefer paint balls.
4. Is there a relationship between high school students that score well in math and those who brush their teeth twice daily?  
Group 1: students who score well in math, students who do not (requires defining "score well").  
Group 2: brush their teeth twice daily, do not brush twice daily.
5. Is there a relationship between people who snore at night and people who enjoy strawberry shortcake?  
Group 1: snorers, non-snorers.  
Group 2: enjoy strawberry shortcake, detest strawberry shortcake.

In problems 6-10, given two-way frequency table groupings, identify a method to answer the question asked. Answers are not necessarily unique.

6. Group 1: Mangos, carrots, pickles. Group 2: driver's license has been suspended, driver's license never suspended. Are people who prefer carrots better drivers than those who prefer mangos or pickles?  
Compare the probability that a person has never had their license suspended and prefers carrots to the probability that a person has never had their license suspended and prefers mangos or pickles.
7. Group 1: Vanilla (V), chocolate (C), tapioca (T). Group 2: prefers Mac (M), prefers PC (PC). Is there a relationship between people who prefer PCs and people who prefer chocolate ice cream? Calculate  $P(C|PC)$  and  $P(PC|C)$ . If  $P(C|PC) = P(PC)$  and  $P(PC|C) = P(C)$ , the study indicates there is no relationship.
8. Group 1: blonde (BL), brown (BR), red (RD), black (BK). Group 2: pizza (P), burgers (B). Is there a relationship between people who like burgers and people with red hair?  
Calculate  $P(B|RD)$  and  $P(RD|B)$ . If  $P(B|RD) = P(RD)$  and  $P(RD|B) = P(B)$ , the study indicates there is no relationship.
9. Group 1: blonde (BL), brown (BR), red (RD), black (BK). Group 2: pizza (P),

burgers (B). Is there a relationship between people with brown hair and people with red hair?

The two events should be independent. To verify, calculate  $P(BR|RD)$  and  $P(RD|BR)$ . If  $P(BR|RD) = P(RD)$  and  $P(RD|BR) = P(BR)$ , the study indicates there is no relationship.

10. Group 1: prefer mangos, prefer carrots,

prefer pickles. Group 2: driver's license has been suspended, driver's license never suspended. Does eating mangos decrease driving skill?

The study cannot address this question directly. The categories ask about food preference, not food that you actually eat. A person that prefers carrots may still eat mangos.