

## MATH 6 HOMEWORK 23

May, 2 2021

Review, please review the handouts of the past lessons, if needed, topics are listed on [SchoolNova.org](http://SchoolNova.org)

1. Simplify (First simplify inside parenthesis, then do the powers):

$$(a) \left( \frac{5a^2b^5}{4a^3b^3} \right)^3 = \quad (b) (2z^2 \cdot 3z^3 \cdot z)^2 = \quad (c) \frac{(-ab)^8}{(ab)^2} =$$

$$(d) \left( \frac{3ab^3}{15b} \right)^2 \cdot \frac{75c}{a^2b^6} = \quad (e) \left( \frac{3a^5b^2}{21ab} \right)^2 \cdot \frac{7^4}{a^{16}b^2} =$$

2. You throw a coin 5 times. What is the probability to get TTHTT? HHHTT?
- 3.
- How many ways are there to draw 3 cards from a 52-card deck? (Order matters: drawing first king of spades, then queen of hearts is different from drawing them in opposite order).
  - How many ways are there to draw 3 cards from a 52-card deck if after each drawing we record the card we got, then return the card to the deck and reshuffle the deck? (As before, order matters.)
  - We draw 3 cards from a 52-card deck, and after each drawing we record the card we got, then return the card to the deck and reshuffle the deck. What is the probability that all 3 drawn cards are different?
4. Probability to hit a duck is  $1/3$ . Probability to miss a duck is  $2/3$ . The hunter fires 5 shots. What is probability that he
- Misses all?
  - Hits at least once?
  - 1 hit and 4 misses?
5. You meet two inhabitants: Marge and Zoey. Marge says, 'Zoey and I are both knights or both knaves.' Zoey claims, 'Marge and I are the same.' Can you determine who is a knight and who is a knave?
6. You meet two inhabitants: Ted and Zeke. Ted claims, 'Zeke could say that I am a knave.' Zeke claims that it's not the case that Ted is a knave.
7. On the island of Knights and Knaves, you meet three inhabitants: Bozo, Carl and Joe. Bozo says that Carl is a knave. Carl tells you, 'Of Joe and I, exactly one is a knight.' Joe claims, 'Bozo and I are different.
8. (Optional, we solved it in class, see notes) Alice, Brian, and Charlie are from the island of knights and knaves. Alice claims, "Charlie could tell you that I am a knight." Brian says, "Either Alice is a knave, or I am a knight." Charlie says that the others are either both knaves or both knights. What are Alice, Brian, and Charlie?
9. Recall "if A then B" logic, look at the handouts from that class. Remember that if **A is False,  $A \rightarrow B$  is a true statement**. "If the sky is green then  $2+2=5$ " is a true statement. Write the truth table for  $A \rightarrow B$  and give your own example of  $A \rightarrow B$  statement.