

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Math 10 Honours section 7.3 Probability with Independent and Dependent Events**

1. Which of the following are independent or dependent events?
  - i) Being good in math and being tall
  
  - ii) Smoking and getting lung cancer
  
  - iii) Having a high IQ and being good in Math
  
  - iv) Flipping a coin, getting a heads first and then getting heads again
  
  - v) Flipping a coin 5 times and getting 5 heads in a row, then getting a head again on the next flip
  
  - vi) Rolling a dice twice, getting a 3 on the first roll and getting a sum of 8
  
2. A coin is tossed 3 times, event "A" is getting a heads on the first toss, event "B" is getting a heads on the second toss, and event "C" is getting two heads.
  - a. Are events "A" and "B" independent?
  
  - b. Are events "A" and "C" independent?
  
  - c. Are events "B" and "C" independent?

3. Classify the following events as being mutually exclusive, not mutually exclusive, independent or dependant.
- a) Drawing a red card or a spade
  
  - b) Drawing two aces from a deck of cards without replacement.
  
  - c) Flipping a coin twice and getting heads both times.
  
  - d) Drawing a face card or a jack.
4. Indicate whether event "A" and "B" would be independent or dependent: If  $P(A) = 0.70$  ,  $P(B) = 0.8$  , and  $P(A \text{ and } B) = 0.56$

Tina and Brenda are two members of the Terry Fox Tennis team. Tina wins 70% of her matches and Brenda wins 55% of her matches. Assuming independence, determine the probability that Brenda wins her next match and Tina does not

Juan rolls a fair regular octahedral die marked with numbers 1 through 8. Then Amos rolls a fair six sided die. What is the probability that the product of the two rolls is a multiple of 3? Amc 12 2002

An envelope contains eight bills: 2 ones, 2 fives, 2 tens, and 2 twenties. Two bills are drawn at random without replacement. What is the probability that their sum is \$20 or more? Amc 12 2005

On a standard die one of the dots is removed at random with each dot equally likely to be chosen. The die is then rolled. What is the probability that the top face has an odd number of dots? AMC 12 2005


21. Box 1 contains one gold marble and one black marble. Box 2 contains one gold marble and two black marbles. Box 3 contains one gold marble and three black marbles. Whenever a marble is chosen randomly from one of the boxes, each marble in that box is equally likely to be chosen. A marble is randomly chosen from Box 1 and placed in Box 2. Then a marble is randomly chosen from Box 2 and placed in Box 3. Finally, a marble is randomly chosen from Box 3. What is the probability that the marble chosen from Box 3 is gold?

- (A)  $\frac{11}{40}$       (B)  $\frac{3}{10}$       (C)  $\frac{13}{40}$       (D)  $\frac{7}{20}$       (E)  $\frac{3}{8}$

21. Amina and Bert alternate turns tossing a fair coin. Amina goes first and each player takes three turns. The first player to toss a tail wins. If neither Amina nor Bert tosses a tail, then neither wins. What is the probability that Amina wins?

- (A)  $\frac{21}{32}$       (B)  $\frac{5}{8}$       (C)  $\frac{3}{7}$       (D)  $\frac{11}{16}$       (E)  $\frac{9}{16}$

**Problem 1.** Alan and Beti alternately toss a fair die, with Alan going first. A neutral third party keeps a running tab of the combined sum of all their throws. Whoever first reaches a combined sum divisible by 6 wins. What is the probability that Alan wins?

9.  (a) The string  $AAABBBAAABB$  is a string of ten letters, each of which is  $A$  or  $B$ , that does not include the consecutive letters  $ABBA$ .  
The string  $AAABBBAAABB$  is a string of ten letters, each of which is  $A$  or  $B$ , that does include the consecutive letters  $ABBA$ .  
Determine, with justification, the total number of strings of ten letters, each of which is  $A$  or  $B$ , that do not include the consecutive letters  $ABBA$ .

16. Juan rolls a fair regular octahedral die marked with the numbers 1 through 8. Then Amal rolls a fair six-sided die. What is the probability that the product of the two rolls is a multiple of 3?
- (A)  $\frac{1}{12}$    (B)  $\frac{1}{3}$    (C)  $\frac{1}{2}$    (D)  $\frac{7}{12}$    (E)  $\frac{2}{3}$
14. On a standard die one of the dots is removed at random with each dot equally likely to be chosen. The die is then rolled. What is the probability that the top face has an odd number of dots?
- (A)  $\frac{5}{11}$    (B)  $\frac{10}{21}$    (C)  $\frac{1}{2}$    (D)  $\frac{11}{21}$    (E)  $\frac{6}{11}$
11. An envelope contains eight bills: 2 ones, 2 fives, 2 tens, and 2 twenties. Two bills are drawn at random without replacement. What is the probability that their sum is \$20 or more?
- (A)  $\frac{1}{4}$    (B)  $\frac{2}{7}$    (C)  $\frac{3}{7}$    (D)  $\frac{1}{2}$    (E)  $\frac{2}{3}$