Honors PreCalculus

Name Key ID: 1

Probability Test Review

Date _____ Period ____

Represent the sample space using set notation.

1) A basket contains two apples and a peach. You randomly pick a piece of fruit to eat. Then you pick another piece to eat later.

$\{AA, PA, AP\}$

2) A spinner can land on either red or blue. You spin and then roll a six-sided die.

$\{B1, B2, B3, B4, B5, B6, R1, R2, R3, R4, R5, R6\}$

Find the number of possible outcomes in the sample space.

3) When a button is pressed, a computer program outputs a random odd number greater than 1 and less than 13. You press the button six times.

$5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^6 = 15625$

4) The chess club must decide when and where to meet for a practice. The possible days are Monday, Tuesday, Wednesday, or Thursday. The possible times are 3, 4, or 5 p.m. There are eight classrooms available.

$4 \times 3 \times 8 = 96$

Find the probability of each event.

5) A gardener has nine identical-looking tulip bulbs, of which each will produce a different color tulip. Six of the colors are unknown, however one will become white, one will become yellow, and one will become pink. She plants them abitrarily in a row. When the flowers start to bloom, what is the probability that the yellow one is first in the row, the white one is second, and the pink one is at the end of the row?

$S = 9!$ or $9P_9 = 362880$

$E = 1 \times 1 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 \times 1 = 720$

$\frac{720}{9!} \approx 0.002$

6) A gambler places a bet on a horse race. To win, he must pick the top three finishers in order. Ten horses of equal ability are entered in the race. Assuming the horses finish in a random order, what is the probability that the gambler will win his bet?

$S = {}_{10}P_3$

$E = 1$

$\frac{1}{{}_{10}P_3} = 0.0014$

7) You are dealt five cards from a standard and shuffled deck of playing cards. Note that a standard deck has 52 cards and four of those are kings. What is the probability that you'll have exactly two kings in your hand?

$S = {}_{52}C_5 = 2598960$

$E = {}_4C_2 \cdot {}_{48}C_3 = 103776$

$\frac{103776}{2598960} \approx 0.0399$

8) A small pond contains eight catfish and seven bluegill. If nine fish are caught at random, what is the probability that exactly five catfish have been caught?

$S = {}_{15}C_9 = 5005$

$E = {}_8C_5 \cdot {}_7C_4 = 1960$

$\frac{1960}{5005} = 0.392$

9) A gardener has eleven identical-looking tulip bulbs, of which five will produce yellow tulips and six will become pink. She randomly selects and plants six of them and then gives the rest away. When the flowers start to bloom, what is the probability that at most three of them are yellow?

(Hint: either 1, 2, or 3 yellow)

0.825

$C_6 = 462$

$\frac{30}{462} + \frac{150}{462} + \frac{200}{462} + \frac{1}{462}$

$5C_0 \cdot 6C_6$ or $5C_1 \cdot 6C_5$ or $5C_2 \cdot 6C_4$ or $5C_3 \cdot 6C_3$

10) You are dealt five cards from a standard and shuffled deck of playing cards. Note that a standard deck has 52 cards and four of those are kings. What is the probability that you'll have at least two kings in your hand?

$S = {}_{52}C_5 = 2598960$

$1 - P(\text{one or no king})$

$1 - \left(\frac{1712304}{2598960} + \frac{778320}{2598960}\right)$

≈ 0.0417

$4C_0 \cdot 48C_5$ or $4C_1 \cdot 48C_4$

Determine if the scenario involves mutually exclusive events. Then find the probability.

11) A bag contains three yellow tennis balls numbered one to three. The bag also contains six green tennis balls numbered one to six. You randomly pick a tennis ball. It is yellow or has a number less than five.

Not M.E.

$\frac{3}{9} + \frac{4}{9} = \frac{7}{9}$

12) A bag contains five red marbles, five blue marbles, and three yellow marbles. You randomly pick a marble. The marble is red or blue.

Mutually Exclusively

$\frac{5}{13} + \frac{5}{13} = \frac{10}{13}$

13) A box contains six red playing cards numbered one to six. The box also contains six black playing cards numbered one to six. You randomly pick a playing card. It is red or has a number greater than five.

Not M.E.

$\frac{6}{12} + \frac{2}{12} - \frac{1}{12} = \frac{7}{12}$

14) A magazine contains thirteen pages. You open to a random page. The page number is eight or twelve.

Mutually Exc.

$\frac{1}{13} + \frac{1}{13} = \frac{2}{13}$

Determine whether the scenario involves independent or dependent events. Then find the probability.

15) A bag contains three red marbles, three blue marbles, and four yellow marbles. You randomly pick three marbles without replacement. The first marble is red, the second marble is blue, and the third marble is red.

dependent

$\frac{3}{10} \cdot \frac{3}{9} \cdot \frac{2}{8} = \frac{18}{720}$

16) A bag contains seven red marbles and eight blue marbles. You randomly pick a marble and then return it to the bag before picking another marble. The first marble is red and the second marble is blue.

Independent

$\frac{7}{15} \cdot \frac{8}{15} = \frac{56}{225}$

17) You flip a coin three times and then roll a fair six-sided die once. The coin lands tails-up every time and the die shows a four.

independent

$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{6}$

$= \frac{1}{48}$

18) Your sock drawer has six white socks, four brown socks, and six black socks. You randomly pick a sock and put it on your left foot and then pick another sock and put it on your right foot. You leave the house with a white sock on your left foot and a brown sock on your right foot.

dependent

$\frac{6}{16} \cdot \frac{4}{15} = \frac{24}{240} = \frac{1}{10}$