Math II

Name_____ ID: 1
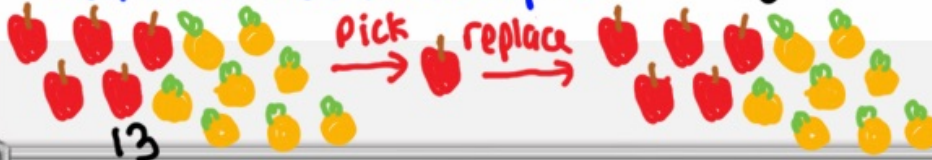
Independent and Dependent Events

Date_____ Period_____

Determine whether the scenario involves independent or dependent events.

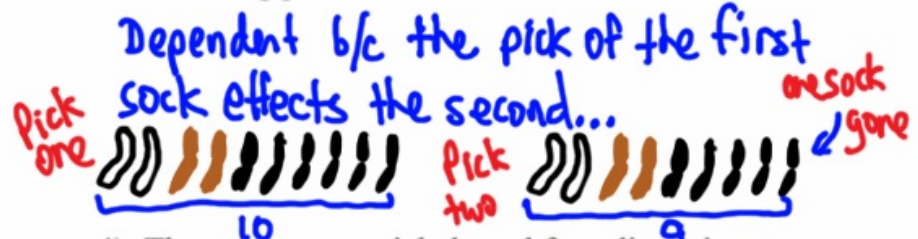1) You flip a coin and then roll a fair six-sided die. The coin lands heads-up and the die shows an even number.

Independent b/c the coin and die have no effect on each others outcome.

2) Your sock drawer has two white socks, two brown socks, and six black socks. You randomly pick two socks and get a matching pair of black socks.

Dependent b/c the pick of the first sock effects the second...

Pick one *Pick two* *one sock gone*

10 *9*

3) A basket contains five apples and eight peaches. You randomly select a piece of fruit and then return it to the basket. Then you randomly select another piece of fruit. Both pieces of fruit are apples.

Independent b/c the fruit from the first pick is replaced. Same # of fruit is available for both picks
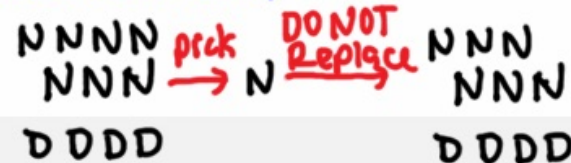
Pick *replace*

13 *13*

4) There are seven nickels and four dimes in your pocket. You randomly pick a coin out of your pocket and place it on a counter. Then you randomly pick another coin. Both coins are nickels.

Dependent b/c the pick of the first coin effects the second

N N N N
N N N → *N* *DO NOT Replace* *N N N*
N N N
D D D D *D D D D*

if A and B are independent, then $P(A \cap B) = P(A) \cdot P(B)$

Determine if events A and B are independent.

5) $P(A) = \dfrac{9}{20}$ $P(B) = \dfrac{3}{5}$ $P(A \cap B) = \dfrac{9}{40}$

$P(A \cap B) = P(A) \cdot P(B) \rightarrow \dfrac{9}{40} = \dfrac{9}{20} \cdot \dfrac{3}{5}$ $\dfrac{9}{40} \ne \dfrac{27}{100}$

SO A and B are not independent

6) $P(A) = \dfrac{1}{2}$ $P(B) = \dfrac{3}{5}$ $P(A \cap B) = \dfrac{3}{10}$

$P(A \cap B) = P(A) \cdot P(B) \rightarrow \dfrac{3}{10} = \dfrac{1}{2} \cdot \dfrac{3}{5}$

$\dfrac{3}{10} = \dfrac{3}{10}$ So A and B are independent

Events A and B are independent. Find the missing probability.

7) $P(B) = \dfrac{7}{10}$ $P(A \cap B) = \dfrac{7}{20}$ $P(A) = ?$

$P(A \cap B) = P(A) \cdot P(B)$

$\dfrac{7}{20} = P(A) \cdot \dfrac{7}{10}$

$\left(\dfrac{10}{7}\right) \dfrac{7}{20} = P(A) \cdot \dfrac{7}{10} \left(\dfrac{10}{7}\right)$

$P(A) = \dfrac{1}{2}$

8) $P(B) = \dfrac{1}{2}$ $P(A \cap B) = \dfrac{1}{5}$ $P(A) = ?$

$P(A \cap B) = P(A) \cdot P(B)$ $(2)\dfrac{1}{5} = P(A) \cdot \dfrac{1}{2}(2)$

$\dfrac{1}{5} = P(A) \cdot \dfrac{1}{2}$

$P(A) = \dfrac{2}{5}$

9) $P(A) = \dfrac{2}{5}$ $P(A \cup B) = \dfrac{16}{25}$ $P(B) = ?$

$P(A \cup B) = P(A) + P(B) - P(A) \cdot P(B)$

$\dfrac{16}{25} = \dfrac{2}{5} + P(B) - \dfrac{2}{5} \cdot P(B)$

$-\dfrac{2}{5} \quad -\dfrac{2}{5}$

$\dfrac{6}{25} = P(B) - \dfrac{2}{5} P(B)$

$\dfrac{6}{25} = \dfrac{3}{5} P(B)$

$P(B) = \dfrac{6}{25} \cdot \dfrac{5}{3} = \dfrac{2}{5}$

10) $P(A) = \dfrac{2}{5}$ $P(B) = \dfrac{11}{20}$ $P(A \cup B) = ?$

$P(A \cup B) = P(A) + P(B) - P(A) \cdot P(B)$

$P(A \cup B) = \dfrac{2}{5} + \dfrac{11}{20} - \dfrac{2}{5} \cdot \dfrac{11}{20}$

$\dfrac{19}{20} - \dfrac{22}{100} \rightarrow \dfrac{73}{100}$