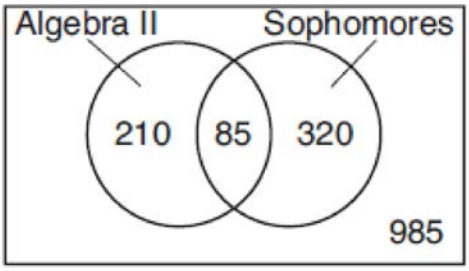
S.CP.A.3: Conditional Probability

1 Which situation best describes conditional probability?
1) finding the probability of an event occurring two or more times
2) finding the probability of an event occurring only once
3) finding the probability of two independent events occurring at the same time
4) finding the probability of an event occurring given another event had already occurred

2 A bag contains five green gumdrops and six red gumdrops. If Kim pulls a green gumdrop out of the bag and eats it, what is the probability that the next gumdrop she pulls out will be red?
1) $\frac{5}{11}$
2) $\frac{5}{10}$
3) $\frac{6}{11}$
4) $\frac{6}{10}$

3 Gabriella has 20 quarters, 15 dimes, 7 nickels, and 8 pennies in a jar. After taking 6 quarters out of the jar, what will be the probability of Gabriella randomly selecting a quarter from the coins left in the jar?
1) $\frac{14}{44}$
2) $\frac{30}{44}$
3) $\frac{14}{50}$
4) $\frac{20}{50}$

4 Data for the students enrolled in a local high school are shown in the Venn diagram below.



If a student from the high school is selected at random, what is the probability that the student is a sophomore given that the student is enrolled in Algebra II?
1) $\frac{85}{210}$
2) $\frac{85}{295}$
3) $\frac{85}{405}$
4) $\frac{85}{1600}$

5 A fast-food restaurant analyzes data to better serve its customers. After its analysis, it discovers that the events D, that a customer uses the drive-thru, and F, that a customer orders French fries, are independent. The following data are given in a report:

$$P(F) = 0.8$$
$$P(F \cap D) = 0.456$$

Given this information, $P(F|D)$ is
1) 0.344
2) 0.3648
3) 0.57
4) 0.8

6 Consider the probability statements regarding events A and B below.

$P(A \text{ or } B) = 0.3$;
$P(A \text{ and } B) = 0.2$; and
$P(A|B) = 0.8$

What is $P(B)$?

1) 0.1
2) 0.25
3) 0.375
4) 0.667

7 Mr. Zachary posts review assignments on the Betamath website for his students. On his last test, 49% of his students used Betamath and passed. Overall, 68% of his students used Betamath. Approximately what percentage of Mr. Zachary's students passed, given that they used Betamath?

1) 19%
2) 32%
3) 33%
4) 72%

8 The probability that Gary and Jane have a child with blue eyes is 0.25, and the probability that they have a child with blond hair is 0.5. The probability that they have a child with both blue eyes and blond hair is 0.125. Given this information, the events blue eyes and blond hair are

I: dependent
II: independent
III: mutually exclusive

1) I, only
2) II, only
3) I and III
4) II and III

9 Sean's team has a baseball game tomorrow. He pitches 50% of the games. There is a 40% chance of rain during the game tomorrow. If the probability that it rains given that Sean pitches is 40%, it can be concluded that these two events are

1) independent
2) dependent
3) mutually exclusive
4) complements

10 Some books are laid on a desk. Two are English, three are mathematics, one is French, and four are social studies. Theresa selects an English book and Isabelle then selects a social studies book. Both girls take their selections to the library to read. If Truman then selects a book at random, what is the probability that he selects an English book?

11 The guidance department has reported that of the senior class, 2.3% are members of key club, K, 8.6% are enrolled in AP Physics, P, and 1.9% are in both. Determine the probability of P given K, to the *nearest tenth of a percent*. The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

12 A study was designed to test the effectiveness of a new drug. Half of the volunteers received the drug. The other half received a sugar pill. The probability of a volunteer receiving the drug and getting well was 40%. What is the probability of a volunteer getting well, given that the volunteer received the drug?

13 The probability that a resident of a housing community opposes spending money for community improvement on plumbing issues is 0.8. The probability that a resident favors spending money on improving walkways given that the resident opposes spending money on plumbing issues is 0.85. Determine the probability that a randomly selected resident opposes spending money on plumbing issues and favors spending money on walkways.

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Answer Section

1 ANS: 4 REF: 012008aii

2 ANS: 4 REF: 011308ia

3 ANS: 1

$$\frac{20-6}{(20-6)+15+7+8}=\frac{14}{44}$$

REF: 061302ia

4 ANS: 2

$$\frac{85}{210+85}$$

REF: 081818aii

5 ANS: 4 REF: 081824aii

6 ANS: 2

$P(B)\cdot P(A|B)=P(A \text{ and } B)$

$P(B)\cdot 0.8=0.2$

$P(B)=0.25$

REF: 081913aii

7 ANS: 4

$P(B)\cdot P(P|B)=P(P \text{ and } B)$

$.68\cdot P(P|B)=.49$

$P(P|B)=.72$

REF: 062416aii

8 ANS: 2

The events are independent because $P(A \text{ and } B)=P(A)\cdot P(B)$.

$$0.125=0.5\cdot 0.25$$

If $P(A \text{ or } B)=P(A)+P(B)-P(A \text{ and } B)=0.25+0.5-.125=0.625$, then the events are not mutually exclusive because $P(A \text{ or } B)=P(A)+P(B)$

$$0.625\neq 0.5+0.25$$

REF: 061714aii

9 ANS: 1

The probability of rain equals the probability of rain, given that Sean pitches.

REF: 061611aii

10 ANS:

$\frac{1}{8}$. After the English and social studies books are taken, 8 books are left and 1 is an English book.

REF: 060933ia

11 ANS:

$P(P/K) = \frac{P(P \wedge K)}{P(K)} = \frac{1.9}{2.3} \approx 82.6\%$ A key club member has an 82.6% probability of being enrolled in AP Physics.

REF: 011735aii

12 ANS:

$P(W/D) = \frac{P(W \wedge D)}{P(D)} = \frac{.4}{.5} = .8$

REF: 081726aii

13 ANS:

$P(A+B) = P(A) \cdot P(B|A) = 0.8 \cdot 0.85 = 0.68$

REF: 011928aii