Name_____ Date: _____

Based on the definition of independence, determine if events A and B are independent in each case.

yes! 1. $P(A) = 0.2$ $P(B) = 0.14$ $P(A \cap B) = 0.028$ $0.028 = 0.2 \cdot 0.14$ ✓

no! 2. $P(A) = 0.32$ $P(B) = 0.16$ $P(A \cap B) = 0.48$ $0.48 \neq 0.32 \cdot 0.16$

no! 3. $P(A) = \frac{1}{3}$ $P(B) = \frac{3}{5}$ $P(A \cap B) = \frac{4}{15}$ $\frac{4}{15} \neq \frac{1}{3} \cdot \frac{3}{5}$

yes! 4. $P(A) = \frac{7}{8}$ $P(B) = \frac{2}{5}$ $P(A \cap B) = \frac{7}{20}$ $\frac{7}{20} = \frac{7}{8} \cdot \frac{2}{5}$ ✓

Paola is playing a word game in which she draws letter tiles from a bag without looking. The bag contains 7 tiles: 2 As, 3 Es, and 2 Rs.
Find the probability of getting an E first and getting an E second. In each problem, state whether the events are independent, and find the probabilities.

9/49 5. Paola takes a tile, then replaces it, and then takes a second tile.

Independent $3/7 \cdot 3/7$

1/7 6. Paola takes a tile, does not replace it, and then takes a second tile.

dependent $3/7 \cdot 2/6$

Using the letters in the state ARKANSAS:

3/28 7. Find the probability of picking an S and then an A without replacement.

$2/8 \cdot 3/7$

1/56 8. Find the probability of picking a K and then a N without replacement.

$1/8 \cdot 1/7$

1/28 9. Find the probability of picking a R and then a S without replacement.

$1/8 \cdot 2/7$

1/435   10. Two students are chosen at random from a class of 30. What is the probability that both you and your friend are chosen?

$$2/30 \cdot 1/29$$

1/125   11. A test includes several multiple choice questions, each with 5 choices. Suppose you don't know the answers for three of these questions, so you guess. What is the probability of getting all three correct?

$$1/5 \cdot 1/5 \cdot 1/5$$

The following chart shows favorite subjects of students based on their gender.

	Math	Science	English	History	
Male	46	42	13	25	126
Female	12	21	45	36	114
	58	63	58	61	240

61/240   12. What is the probability that a randomly chosen student likes history the most?

$$61/240$$

19/40   13. What is the probability that a randomly chosen student is a female?

$$114/240$$

23/40   14. What is the probability that a randomly chosen student is a male _or_ likes Math?

$$126/240 + 58/240 - 46/240 = 138/240$$

7/40   15. What is the probability that a randomly chosen student both likes science _and_ is a male?

$$42/240$$

6/19   16. What is the probability that a randomly chosen student likes history _given_ that they are a female?

$$36/114$$

yes   17. Does the probability of liking a subject _depend_ on whether the students are male or female? Use calculations.

male: math; science
female: english; history

male + math
$$46/240 \neq 126/240 \cdot 58/240$$
not independent

male & science
$$42/240 \neq 126/240 \cdot 63/240$$
not independent

female & english
$$45/240 \neq 114/240 \cdot 58/240$$
not independent