Name: Date: Period:

Probability Quiz 2b

_____7.3: Use Mathematical and Conceptual Evidence to Determine if two events are independent:

1. A flower shop owner finds that the probability of a person buying a dozen roses on any given day is 20%. He also finds that if it is **February**, probability of a person buying a dozen roses on any given day is 63%.

Based on the information above, are the events, "buying a dozen roses" and "February" independent? Explain:

No, the probability of someone buying flowers is much different depending on the month. Therefore, the probability DEPENDS on the month.

2. In the following three examples, three probabilities are shown. Determine if the events A and B are independent or dependent and **show your calculations for each problem**:

a) $P(A) = .3 \quad P(B) = .9$ and) $P(A \cap B) = .27$ Check: Does $P(A) \cdot P(B) = P(A \& B)$?

$.3 \cdot .9 = .27$ → equal Independent

b) $P(A) = \frac{1}{20} \quad (A|B) = .20$

$= .05$ → Not equal Dependent (given B changes the probability of A)

c) $P(A) = \frac{1}{3} \quad P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{6}$

$\frac{1}{3} \cdot \frac{1}{3} = \frac{1}{9}$ → not equal Dependent

3. The following table shows the number of people out of 500 who got their ears pierced for both males and females:

	Pierced	Not pierced	Total
Male	36	144	180
Female	288	32	320
Total	324	176	500

Find a) through c) using the table:

a) Find the probability of a person being male (as a decimal):

$180/500 = .36$

b) Find the probability of a person having their ears pierced (as a decimal):

$324/500 = .648$

c) Find the probability of a person being male AND having pierced ears (as a decimal).

$36/500 = .072$

d) Use your calculations to determine if "being male" and "having pierced ears" are independent or dependent events. Test: $P(\text{male}) \cdot P(\text{pierced}) \stackrel{?}{=} P(\text{male and pierced})$?

Dependent $.36 \cdot .648 = .233 \neq .072$

e) Which value is greater: The probability that a person is male, or the probability that a person is male GIVEN that the person has pierced ears? Show your calculations. What does this tell you?

$P(\text{male}) = \frac{180}{500} = .36 \quad P(\text{male} \mid \text{pierced}) = \frac{36}{324} = .11$

larger

this means that knowing a person has pierced ears makes them less likely to be