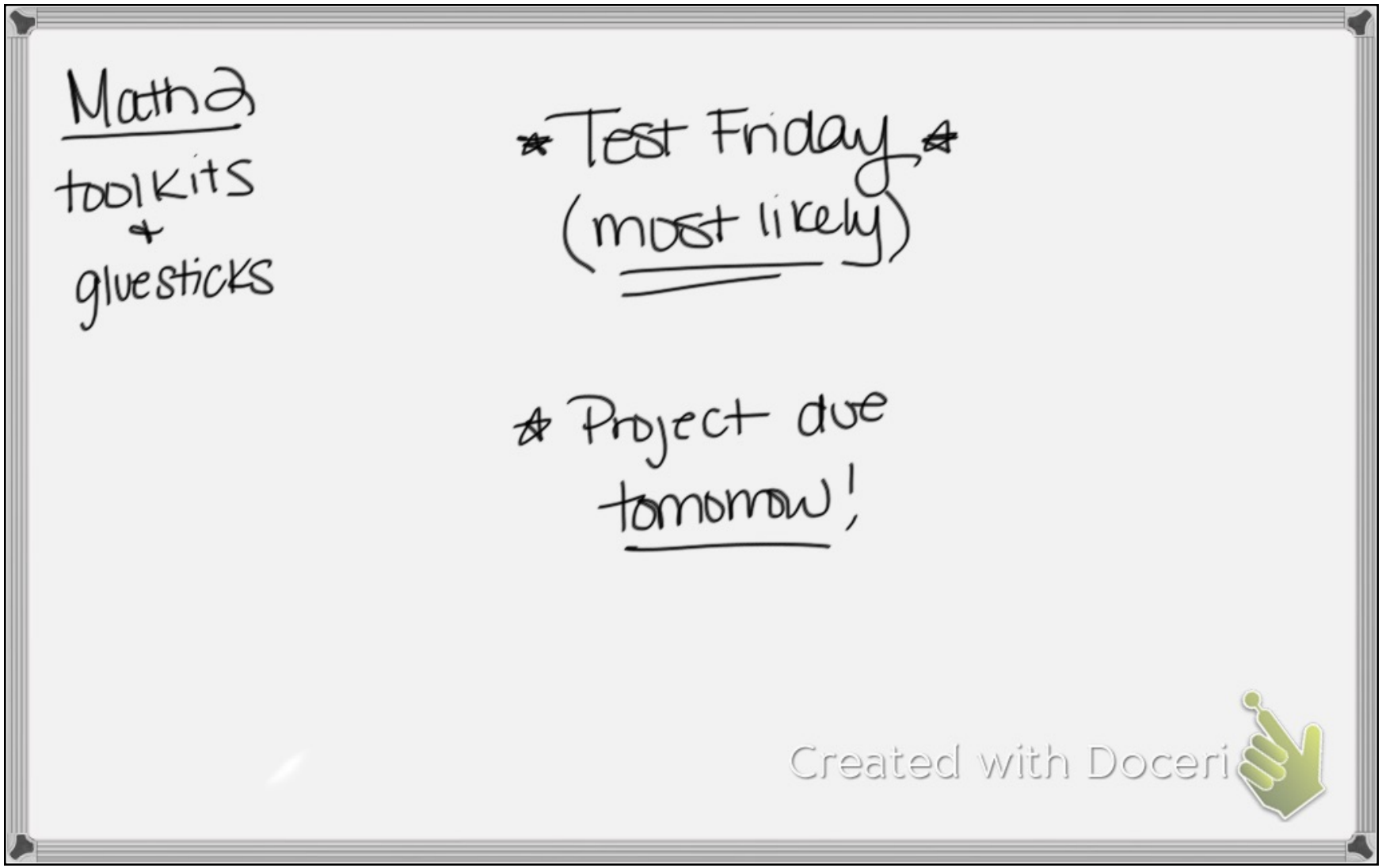

Math 3
toolkits
+
gluesticks
* Test Friday *
(most likely)
* Project due
tomorrow!
Created with Doceri

OR

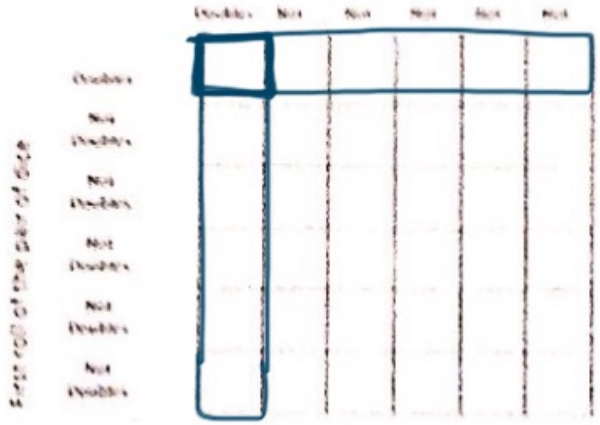
And

↓

Both

Rolling a pair of dice twice

Second roll of the pair of dice



a) Do your copy of the area model, shade the squares that represent the event of not getting doubles on the first roll and getting doubles on the second roll

b) What is the probabilty of not getting doubles on the first roll and then getting doubles on the second roll?

5/36

c) Use the area model to find the probability that you will get doubles both times

$P(D1) = \frac{6}{36}$ or $\frac{1}{6}$ $P(D2) = \frac{6}{36} = \frac{1}{6}$ $= \frac{1}{36} \rightarrow \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

d) Use you model to find the probability that you will not get doubles either time

$P(NoD1) = \frac{30}{36} = \frac{5}{6}$ $P(NoD2) = \frac{30}{36}$ or $\frac{5}{6}$ $\frac{5}{6} \cdot \frac{5}{6} = \boxed{\frac{25}{36}}$

MULTIPLICATION RULE

$P(A \cap B)$

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

What is the probability of taking exactly two tries to roll doubles?

P(don't roll doubles on the first try AND do roll doubles on the second try) =

Short cuts for probability formulas:

★ OR

P(A or B) Mutually exclusive

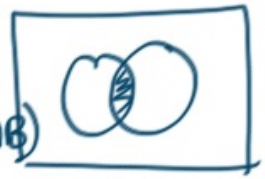
$P(A \cup B) = P(A) + P(B)$

P(A or B) not mutually exclusive

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

$\downarrow$

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



★ AND

P(A and B)

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

★ intersection is the solution ★

Independent and Dependent Events Notes Name: _____

Independent Event: when two or more events have no effect on the occurrence of each other

ex: Rolling a 5 & drawing an Ace

Dependent Event: when the occurrence of one event has an effect on the other

ex: King & another King Consecutively → one after the other

Independent Events:

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

Ex 1:

a. What is the probability that a coin is flipped and lands heads up and then a face card is pulled from a standard deck of 52 cards?

$P(H) = \frac{1}{2}$

$P(\text{Face}) = \frac{12}{52}$

$\frac{1}{2} \cdot \frac{12}{52} = .115 \rightarrow 11.5\%$

b. If a 4 is rolled with a single six-sided die, what is the probability of all three events occurring?

$P(H) = \frac{1}{2}$

$P(\text{Face}) = \frac{12}{52}$

$P(4) = \frac{1}{6}$

$\frac{1}{2} \cdot \frac{12}{52} \cdot \frac{1}{6} = .019 \rightarrow 1.9\%$

Dependent Events:

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

$P(B|A)$ is a conditional probability – probability that B will occur given that A has already occurred

Ex 2:

a. What is the probability of two aces being drawn consecutively from a deck of 52 cards?

$P(1A) = \frac{4}{52}$

$P(2A) = \frac{3}{51}$

$\frac{4}{52} \cdot \frac{3}{51} = .005$ or .5%

b. What is the probability of the third card drawn is also an ace?

$P(1A) = \frac{4}{52}$

$P(2A) = \frac{3}{51}$

$P(3A) = \frac{2}{50}$

$\frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50} = .00018$ or .018%

Independent VS Dependent Events

Ex 3: Suppose you have a bag of marbles. There are 8 red, 4 Blue, 2 yellow, and 6 orange.

a. What is the probability that you draw a red, a Blue **and** another blue in that order **with replacement**

$P(R) = \frac{8}{20}$

$P(B1) = \frac{4}{20}$

$P(B2) = \frac{4}{20}$

$\frac{8}{20} \cdot \frac{4}{20} \cdot \frac{4}{20} = .016 = 1.6\%$

b. What is the probability that you draw a red, a Blue **and** another blue in that order **without replacement?**

$P(R) = \frac{8}{20}$

$P(B1) = \frac{4}{19}$

$P(B2) = \frac{3}{18}$

$\frac{8}{20} \cdot \frac{4}{19} \cdot \frac{3}{18} = .019$ or 1.9%

What can you conclude from this comparison?

Key Words

With replacement

Without replacement