$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

B: passes, A: studies

$$= \frac{\frac{17}{20}}{\frac{15}{16}}$$

$$= \frac{17}{\cancel{20}_{5}} \cdot \frac{\cancel{16}^{4}}{15} = \frac{68}{75}$$

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

$$= \frac{.4}{.6}$$

Multiplication Rule

"I wish we hadn't learned probability
'cause I don't think our odds are good."

Multiplication Rule Vocabulary

- independent - two events are said to be independent of each other if the probability that one event occurring in no way affects the probability of the other event occurring.

  ex: rolling a die and flipped a coin

- dependent - two events are dependent if the outcome of the first affects the outcome of the second

  ex: drawing an ace and then a 3 of hearts from a deck of cards, without replacing the first card before drawing the second

Careful!

independent ≠ mutually exclusive

dependent ≠ inclusive

ex 1: A yellow and a blue dice are rolled. Determine if the events are independent or dependent.

a) The yellow die is greater than 5 and the product is greater than 24.

Dependent

b) The yellow die shows an odd number and the blue die shows an even number.

Independent

Multiplication ~~Addition~~ Rule

- Independent Events

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

- Dependent Events

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

$$\frac{P(A \cap B)}{P(A)} = P(B|A)$$

ex 2: There are 5 red, 12 white and 3 blue marbles in a bag. Find each of the probabilities.

a) P(red) $\frac{5}{20}$

b) P(red and red), with replacement

$$\frac{5}{20} \cdot \frac{5}{20} = \frac{1}{4} \cdot \frac{1}{4} = \frac{1}{16}$$

c) P(red and red), without replacement

$$\frac{5}{20} \cdot \frac{4}{19} = \frac{1}{19}$$

ex 3: Two cards are drawn from a deck.

a) What is the probability of selecting two aces when the first card is replaced?

$$\frac{4}{52} \cdot \frac{4}{52} = \frac{1}{13} \cdot \frac{1}{13} = \frac{1}{169}$$

$$= .00592$$

b) What is the probability of selecting a face card and then a 7 when the first card is not replaced?

$$\frac{12}{52} \cdot \frac{4}{51} = \frac{4}{221} = .0181$$

ex 4: Two number cubes are rolled – one yellow and one blue.

a) Find the probability that the yellow cube is greater than 5 and the product is greater than 24. $\frac{1}{6} \cdot \frac{2}{6} = \frac{1}{18}$

Find the probability of rolling a 5 on the yellow cube and an even number on the blue cube.

$\frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12}$

~~b) Find the probability that blue cube is less than 3 and the product is 8.~~

ex 5: What is the probability that a randomly selected person's birthday is on January 1st? Assume it is not a leap year.

$$\frac{1}{365}$$

ex 6: What is the probability that two randomly selected people have their birthday on January 1st? Assume it is not a leap year.

$$\frac{1}{365} \cdot \frac{1}{365} = \frac{1}{133225}$$

ex 7: What is the probability that two randomly selected people have the same birthday? Assume it is not a leap year.

$$1 \cdot \frac{1}{365}$$

EOC REVIEW

1. Evaluate.

$$\log 1 + \ln \sqrt{e}$$

$1/2$

$0 + \ln e$

$0 + \frac{1}{2} \ln e$

$\boxed{\frac{1}{2}}$

EOC REVIEW

2. Condense.

$$3\log_2 a - 2\log_2 b$$

$$\log_2 a^3 - \log_2 b^2$$

$$\log_2 \frac{a^3}{b^2}$$

EOC REVIEW

3. Expand.

$$\log_3\left(\frac{\sqrt{a+1}}{81}\right)$$

$\frac{1}{2}\log_3(a+1) - \log_3 81$

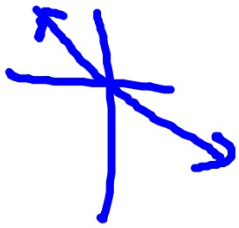
$\frac{1}{2}\log_3(a+1) - 4$

EOC REVIEW

4. State the end behavior.

$$f(x) = -6x^3 + 4x^2 - 1$$

$y = -x$



$x \to -\infty \quad f(x) \to \infty$

$x \to \infty \quad f(x) \to -\infty$

EOC REVIEW

5. Find the zeros.

$$f(x) = 8x^7 + x^4$$

$0 = x^4(8x^3 + 1)$

$0 = x^4(2x+1)(4x^2 - 2x + 1)$

$x = 0 \quad x = -\frac{1}{2}$

$x = \frac{2 \pm \sqrt{4-4(4)(1)}}{2(4)}$

$x = \frac{2 \pm \sqrt{-12}}{8}$

$x = \frac{2 \pm 2i\sqrt{3}}{8}$

EOC REVIEW

6. Evaluate.

$$27^{2/3}$$

$$\left(\sqrt[3]{27}\right)^2$$

$$3^2 = 9$$