

## MAT 120

## Quiz 5

Fall 2024

- Here is a partial list of the permutations of the symbols  $a, b, c$ :  $abc, acb, bac$ . How many permutations are missing from this list?  
a) 1                      b) 3                      c) 4                      d) 0                      e) 2  
Correct Answer: 3
- Here is a partial list of the subsets of size two of the set of symbols  $\{a, b, c, d\}$ :  $\{a, b\}, \{a, c\}, \{b, c\}, \{c, d\}$ . How many subsets are missing from this list?  
a) 1                      b) 3                      c) 4                      d) 0                      e) 2  
Correct Answer: 2
- What is the probability that a random roll of two dice will produce at least one 6?  
a)  $\frac{1}{2}$                       b)  $\frac{1}{6}$                       c)  $\frac{11}{36}$                       d)  $\frac{5}{36}$                       e)  $\frac{1}{12}$   
Correct Answer:  $\frac{11}{36}$
- What is the probability that a random roll of two dice will produce a sum on the dice greater than 10?  
a)  $\frac{1}{2}$                       b)  $\frac{1}{6}$                       c)  $\frac{1}{12}$                       d)  $\frac{5}{36}$                       e)  $\frac{11}{36}$   
Correct Answer:  $\frac{1}{12}$
- If a fair coin is flipped three times in sequence, what is the probability that whenever Heads appears in the sequence then it must be followed immediately by Tails?  
a)  $\frac{1}{2}$                       b)  $\frac{1}{4}$                       c)  $\frac{3}{8}$                       d)  $\frac{1}{8}$                       e)  $\frac{5}{8}$   
Correct Answer:  $\frac{3}{8}$
- If a sequence of 3 notes (a melody) uses only the first 3 notes of a C major scale, with repetitions allowed, what is the probability that the sequence will contain exactly two C's?  
a)  $\frac{1}{8}$                       b)  $\frac{3}{8}$                       c)  $\frac{1}{9}$                       d)  $\frac{2}{9}$                       e)  $\frac{5}{27}$   
Correct Answer:  $\frac{2}{9}$
- If an Equal Tempered major scale is chosen at random, what is the probability that it contains the note F $\sharp$ ? (Note: consider major scales an octave apart to be the same, and also major scales which start on the same pitch, regardless of note name like sharp or flat, to be the same.)  
a)  $\frac{1}{2}$                       b)  $\frac{5}{12}$                       c)  $\frac{4}{9}$                       d)  $\frac{7}{12}$                       e)  $\frac{5}{27}$   
Correct Answer:  $\frac{7}{12}$
- If a harmonic seventh chord is played with four harmonic tones, having four fundamental frequencies 400, 500, 600, and 700 Hz, then what is the smallest nonzero number of beats that can occur between any two harmonic partials of these four harmonic tones?  
a) 5                      b) 20                      c) 40                      d) 75                      e) 100  
Correct Answer: 100
- Same question for the four fundamental frequencies 400, 500, 600, and 720 Hz, but restrict to harmonic partials up to the tenth harmonic, or up to the tenth multiple of any of those fundamental frequencies.  
a) 5                      b) 20                      c) 40                      d) 75                      e) 100  
Correct Answer: 40

10. In the previous two problems the highest and lowest notes of the chord are a minor seventh apart. What is the cent value difference between these two minor sevenths to the nearest 5 cents?
- a) 15                      b) 25                      c) 10                      d) 50                      e) 35

Correct Answer: 50