

# MATH 120: Quantitative Reasoning

Quiz 2  
Summer I 2011

Name: KEY

Clearly indicate your final answer(s) and follow all instructions. Explain your reasoning where appropriate. Partial credit may be awarded for answers containing only minor mistakes.

1. [5 points] A shipment of ten items is tested for quality control purposes at a local factory by randomly picking three of the ten items to test. From past experience every shipment of ten contains two defective items and eight working items. To pass testing a shipment can have **at most one** (meaning one or none) defective items spotted during testing. Given this information, how many ways are there for a shipment to pass testing?



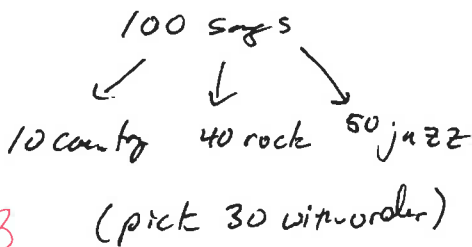
give +2 for any combination of below values, must be a combination used

+5

# shipments having at most one defective item =  $\underbrace{\binom{8}{3} \cdot \binom{2}{0}}_{0 \text{ defective}} + \underbrace{\binom{8}{2} \binom{2}{1}}_{1 \text{ defective}} = 112$

2. [5 points] Suppose you have 100 songs on your iPod from which you wish to make a play list containing 30 songs. The songs on your iPod are split amongst three types: 10 country songs, 40 rock songs, and 50 jazz songs. Creating a playlist involves not only selecting which songs to play, but also the order in which they are played.

- (a) How many different play lists can you create that include only rock songs?



+3

$P(40, 30) = 2.248 \times 10^{41}$   
 ↑  
 pick only from rock songs

answer can be given this way

+2 if they answer only 2.248 w/o scientific notation  
 +2 if they use  $C(40, 30)$

- (b) How many different play lists can you create that include 15 rock songs, 5 country songs, and 10 jazz songs?

+2

$\underbrace{\binom{40}{15} \binom{10}{5} \binom{50}{10}}_{\text{permutations though}} = P(40, 15) \cdot P(10, 5) \cdot P(50, 10)$   
 $= 5.26 \times 10^{22} \cdot 30240 \cdot 3.72 \times 10^{16}$   
 $= 5.917 \times 10^{43}$

this is fine for final answer