

Name: \_\_\_\_\_

Section: **4pm** **6pm** (circle one)

### Quiz #1: Process Analysis

1. Suppose all data in the Kristen's Cookie Company case study remains the same except for only one change: the oven baking activity now takes 6 minutes (instead of 9 minutes). Assume that there is a single oven and orders are baked one dozen at a time. Also, assume that no activities are performed in parallel, i.e., your roommate accepts payment for the order at the end of the process, as originally discussed in class.

a. (20 points) Which resource is now the bottleneck, assuming a sequence of one-batch orders?

Answer: **You** (i.e., mixing + loading)

b. (20 points) What is now the throughput time for these one-batch orders?

Answer: **23 minutes**

c. (20 points) What is the hourly capacity of the process?

Answer: The bottleneck's processing time is  $6+2 = 8$  minutes. Therefore, the capacity of the process is  $60/8 = 7.5$  dozens per hour.

2. On average, 45 customers enter Izzy's Ice Cream each hour. Also, on average, it takes each customer a total of six minutes to get his or her ice cream.

a. (20 points) How many customers, on average, are there at Izzy's Ice Cream?

Answer: Customers at Izzy's Ice Cream = WIP = Throughput Rate  $\times$  Throughput Time =  
 $= 45$  customers/hour  $\times 6$  minutes = **4.5 customers**

b. (20 points) Izzy has invested in additional advertising in order to increase his customer traffic to 60 per hour, on average. Moreover, Izzy wants to have only four customers, on average, in his store. How much less time, on average, would it then need to take a customer to get his or her ice-cream?

Answer: Time to get his/her ice cream = Throughput Time =  $\frac{\text{WIP}}{\text{Throughput Rate}} =$   
 $= \frac{4 \text{ customers}}{60 \text{ customers/hour}} = 4$  minutes, or **two minutes** faster.