# *Operations Management 1st edition Cachon Test Bank*

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# Chapter 02 Test Bank KEY

1. A flow unit is generally associated with the inputs of a process.

**FALSE**

A flow unit is generally associated with the outputs of a process.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 1 Easy*
*Gradable: automatic*
*Learning Objective: 02-01 Identify an appropriate flow unit for a process.*
*Topic: Process Definition, Scope, and Flow Units*

2. A process with a high-level scope must have different inputs and outputs than the process viewed at a lower scope.

**FALSE**

A process scope at a high level can have the same inputs and outputs as one at the low level.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Analyze*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-01 Identify an appropriate flow unit for a process.*
*Topic: Process Definition, Scope, and Flow Units*

3. Process metrics measure the level of a process.

**FALSE**

Process metrics measure the performance and capability of a process.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 1 Easy*
*Gradable: automatic*
*Learning Objective: 02-02 Distinguish among the three key process metrics (flow rate, flow time, and inventory) and evaluate average flow rate and flow time from departure and arrival data.*
*Topic: Three Key Process Metrics: Inventory, Flow Rate, and Flow Time*

4. The entry rate of inputs and the exit rate of outputs in a process match at every moment.

**FALSE**


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The entry and exit rates do not have to match at every moment, but they do have to match in the long run (i.e., over a long period of time).

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*Blooms: Understand*
*Difficulty: 2 Medium*
*Gradable: automatic*
*Learning Objective: 02-02 Distinguish among the three key process metrics (flow rate, flow time, and inventory) and evaluate average flow rate and flow time from departure and arrival data.*
*Topic: Three Key Process Metrics: Inventory, Flow Rate, and Flow Time*

5. Little's Law can be used to identify the actual time a flow unit spends in a process.

**FALSE**

Little's Law can be used to identify the average time a flow unit spends in the process.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Understand*
*Difficulty: 2 Medium*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

6. C&A Bakery serves 200 customers in 10 hours. On average there are 5 customers in the bakery. This means each customer spends on average 25 minutes in the bakery.

**FALSE**

Inventory = 5 customers. Flow rate = 200 customers/10 hours = 20 customers per hour. Flow time = Inventory/Flow rate = 5/20 = 0.25 hour.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Understand*
*Difficulty: 2 Medium*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

7. Which of the following statements about a process is TRUE?

A. A process cannot be measured.
**B.** A process can be measured.
C. A process cannot be improved.
D. A process can only be represented mathematically.
There are three key process metrics to measure a process.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 1 Easy*
*Gradable: automatic*
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*Topic: Process Definition, Scope, and Flow Units*

8. Which of the following is a definition of the term "process"?

A. A set of activities that combines a collection of units.
B. A set of activities that combines a collection of supplies.
**C.** A set of activities that transforms a collection of inputs into outputs.
D. A set of activities that transforms a collection of outputs into inputs.
A process is a set of activities that transforms a collection of inputs into outputs.

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*Difficulty: 1 Easy*
*Gradable: automatic*
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*Topic: Process Definition, Scope, and Flow Units*

9. A graphical representation of a process is called a:

**A.** process flow diagram.
B. process flow chart.
C. process activity diagram.
D. process activity chart.
A process flow diagram provides a graphical representation of a process.

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*Accessibility: Keyboard Navigation*
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*Difficulty: 1 Easy*
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10. A process scope is:

A. the set of resources used in the process.
B. the set of outputs produced by the process.
C. the set of inputs required by the process.
**D.** the set of activities involved in the process.
A process scope is the set of activities included in the process.

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*Gradable: automatic*
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*Topic: Process Definition, Scope, and Flow Units*

11. A CEO of a firm will be interested in a _____ level of the _____ to know how the entire firm is doing.

**A.** high, process scope
B. high, flow unit
C. low, process scope
D. low, flow unit


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A CEO wants a high-level picture of his/her company to keep track of how the entire company is doing.

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12. From the perspective of a cashier in a supermarket, the appropriate level for the process scope is:

**A.** the customer checkout process.
B. the supermarket.
C. the grocery business.
D. the food industry.
A cashier deals with a customer service-related process. *AACSB: Analytical Thinking*

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*Blooms: Understand*
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*Gradable: automatic*
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13. A flow unit is:

A. the basic unit that activates a process.
B. the basic unit that goes in a process.
C. the basic unit that bypasses a process.
**D.** the basic unit that moves through a process.
A flow unit is the basic unit that moves through a process.

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14. An example of a flow unit at a fast-food restaurant is:

A. the cashiers.
B. the kitchen.
**C.** the customers.
D. the suppliers.
Customers move through a fast-food restaurant. The others are inputs and resources of the fast-food service.

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15. For the purpose of process analysis, which of the following is measured in an appropriate flow unit for analyzing the main operation of a department store?

A. Number of hours the store is open each day
B. Square footage of the store
**C.** Weekly sales figure
D. Number of cash registers
Weekly sales figure is measured in sales dollars, which is an appropriate flow unit

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16. For the purpose of process analysis, which of the following is NOT measured in an appropriate flow unit for analyzing the operation of a hair salon?

A. Number of customers served per day
B. Monthly sales figures
C. The dollar value of haircare products sold per day
**D.** Number of stylists working each day
Stylists are input resources of a hair salon.

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17. Which of the following statements about a process flow diagram is FALSE?

**A.** It cannot have multiple resources.
B. It includes three components: inputs, resources, and outputs.C. It has inputs flowing into a process.
D. It has outputs flowing out of a process.
A process flow diagram can have multiple resources with the output of some resources used as inputs to other resources.

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18. Which of the following statements about resources of a process flow diagram is TRUE?

A. Resources are outputs of a process.
B. Resources are represented as arrows pointing to a process.
C. Resources are not relevant to a process.
**D.** Outputs of some resources can be used as inputs to other resources.


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A process flow diagram can have multiple resources with the output of some resources used as inputs to other resources.

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19. Which of the following is an appropriate output of a refreshment stand at a cinema?

A. Corn
**B.** Popcorn
C. Ticket sales
D. Movies
A refreshment stand in a cinema transforms corn (inputs) into popcorn (outputs).

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20. Which of the following is the most appropriate output of a cinema?

A. Corn
B. Movie screens
**C.** Ticket sales
D. Candy bars
A cinema sells tickets to moviegoers.

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21. Which of the following is an appropriate input of a bakery?

A. Steel beam
B. Baked goods
C. Oven
**D.** Flour
A bakery takes in flour, milk, eggs, etc. (inputs) and produces baked goods (outputs).

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22. Which of the following is an appropriate output of a bakery?


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A. Steel beam
**B.** Baked goods
C. Oven
D. Flour
A bakery takes in flour, milk, eggs, etc. (inputs) and produces baked goods (outputs).

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23. Which of the following is an appropriate resource of a bakery?

A. Steel beam
B. Baked goods
**C.** Oven
D. Flour
An oven is a piece of equipment (resource) in a bakery.

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*Gradable: automatic*
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24. Which of the following is measured in an appropriate flow unit for a cinema?

A. Corn
B. Popcorn
**C.** Ticket sales
D. Candy bars
Ticket sales is measured in sales dollars, which is an appropriate flow unit for a cinema.

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25. Which of the following is an appropriate resource of a cinema?

**A.** Movie projector
B. Popcorn
C. Ticket sales
D. Number of customers
A movie projector is a piece of equipment in a cinema.

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*Topic: Process Definition, Scope, and Flow Units*

26. Which of the following is NOT a rule to define a flow unit?

A. A flow unit should correspond to what an operations manager wants to track and measure with respect to a process.
B. A flow unit should be measured consistently in the unit for which it is defined.
C. A flow unit should be used to measure all activities within a process.
**D.** A flow unit should be used to measure the number of resources in a process.
A flow unit should be used to measure all activities within a process in the unit for which it is defined.

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*Difficulty: 1 Easy*
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27. Which of the following measures is an appropriate flow unit for analyzing the main operation of a supermarket?

**A.** Number of customers served
B. Number of square feet in the store
C. Number of checkout lines
D. Number of employees
Customers flow through the process of a supermarket.

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28. Which of the following is NOT measured in an appropriate flow unit for analyzing the main operation of a supermarket?

A. Customers served
B. The number of employees working per day
C. Sales dollars
**D.** Number of cash registers
Number of registers is an input resource but not a flow unit of a supermarket.

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*Difficulty: 1 Easy*
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29. A flow unit is generally associated with the _____ of a process.

A. inputs


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B. resources
**C.** outputs
D. activities
A flow unit is generally associated with the outputs of a process.

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30. A process metric is something that can be _____ to reveal the _____ and _____ of a process.

A. measured, inputs, outputs
**B.** measured, performance, capability
C. speculated, inputs, outputs
D. speculated, performance, capability
A process metric is something that can be measured to reveal the performance and capability of a process.

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*Difficulty: 1 Easy*
*Gradable: automatic*
*Learning Objective: 02-02 Distinguish among the three key process metrics (flow rate, flow time, and inventory) and evaluate average flow rate and flow time from departure and arrival data.*
*Topic: Three Key Process Metrics: Inventory, Flow Rate, and Flow Time*

31. Which of the following is a key process metric?

**A.** Flow rate
B. Flow unit
C. Base unit
D. Base rate
Flow rate is one of the three key process metrics.

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*Blooms: Remember*
*Difficulty: 1 Easy*
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32. Which of the following is a key process metric?

A. Raw materials
B. Inputs
**C.** Inventory
D. Outputs
Inventory is one of the three key process metrics.

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*Difficulty: 1 Easy*


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33. Which of the following is a key process metric?

A. Activity time
B. Process time
C. Completion time
**D.** Flow time
Flow time is one of the three key process metrics.

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34. Which of the following is NOT a key process metric?

**A.** Flow unit
B. Flow time
C. Flow rate
D. Inventory
The three key process metrics are inventory, flow rate, and flow time.

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*Difficulty: 1 Easy*
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35. Flow rate tells us:

A. how much stuff is in the process.
**B.** how much stuff moves through the process per unit of time.
C. how much time stuff spends in the process.
D. how much stuff is needed for the process.
Flow rate tells us how much stuff moves through the process per unit of time.

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36. Flow time tells us:

A. the number of flow units within a process.
B. the rate at which a flow unit moves through a process.


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**C.** the time a flow unit spends in a process.
D. the time a flow unit starts a process.
Flow time tells us how much time stuff spends in the process.

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37. Inventory tells us:

**A.** the number of flow units within a process.
B. the rate at which flow units move through a process.
C. the time a flow unit spends in a process.
D. the time a flow unit starts a process.
Inventory tells us how much stuff is in the process.

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38. Which of the following data are needed to compute the flow time process metric at a dentist's office?

A. Traveling time of patients
B. Scheduling time of patients
**C.** Arrival time of patients
D. Arrival time of staff
Arrival and departure times are needed to compute the flow time.

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39. Arrivals and departures to C&A Optometrist are collected and reported below:

| Patient | Arrival | Departure |
|---|---|---|
| 1 | 7:45 | 8:45 |
| 2 | 8:00 | 9:00 |
| 3 | 10:00 | 10:30 |
| 4 | 10:15 | 11:45 |


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| | | |
|---|---|---|
| 5 | 10:35 | 12:00 |

What is the average flow time of its patients in minutes?

A. 90
**B.** 65
C. 63
D. 60
Subtract each customer's departure time and arrival time to give the flow time of each customer. For example, patient 1 spends 60 minutes. The flow times for the five patients are 60, 60, 30, 90, and 85. The average flow time is found by taking the average across five patients and is 65 minutes.

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40. Arrivals and departures to C&A Optometrist are collected and reported below:

| Patient | Arrival | Departure |
|---|---|---|
| 1 | 7:45 | 8:45 |
| 2 | 8:00 | 9:00 |
| 3 | 10:00 | 10:30 |
| 4 | 10:15 | 11:45 |
| 5 | 10:35 | 12:00 |

Assume C&A Optometrist is open from 7:45 a.m. to noon. What is the flow rate of patients in C&A Optometrist per hour?

**A.** 1.18
B. 1
C. 2
D. 3
The optometrist is open from 7:45 a.m. to noon, or 4.25 hours. There are five patients during that time. Flow rate in patients per hour = 5/4.25 = 1.18.

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41. C&A Bakery serves 100 customers over the course of an 8-hour day. What is the flow rate of customers in this bakery per hour?

A. 10
B. 12
**C.** 12.5
D. 13
Flow rate = 100 customers/8 hours = 12.5 customers per hour.

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42. Ten customers visit C&A Bakery from 8 a.m. to 10 a.m. The customers spend 10, 15, 20, 11, 8, 12, 5, 18, 29, and 32 minutes in the bakery. What is the average flow time (in minutes) of a customer at this bakery?

A. 1600
B. 160
C. 80
**D.** 16
Average flow time is (10 + 15 + 20 + 11 + 8 + 12 + 5 + 18 + 29 + 32)/10 = 16 minutes.

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43. Ten customers visit C&A Bakery from 8 a.m. to 10 a.m. The customers spend 10, 15, 20, 11, 8, 12, 5, 18, 29, and 32 minutes in the bakery. What is the average flow rate of customers in this bakery per hour?

A. 16
B. 10
C. 8
**D.** 5
Flow rate = 10 customers/2 hours = 5 customers per hour.

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44. The flow rate of customers at a state fair is 100 per hour. The fair is open from 8 a.m. to 8 p.m. How many customers come through the fair during that time?

A. 1000
**B.** 1200
C. 120
D. 100
Number of customers = 100 customers per hour × 12 hours = 1200.

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45. Flow rate is usually measured in the following units EXCEPT:

A. dollars per week.
B. pounds per month.
C. boxes per week.
**D.** dollars per customer.
Flow rate is measured in "flow units per unit of time."

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 1 Easy*
*Gradable: automatic*
*Learning Objective: 02-02 Distinguish among the three key process metrics (flow rate, flow time, and inventory) and evaluate average flow rate and flow time from departure and arrival data.*
*Topic: Three Key Process Metrics: Inventory, Flow Rate, and Flow Time*

46. Inventory is usually measured in the following units EXCEPT:

**A.** miles.
B. dollars.
C. pounds.
D. boxes.
Inventory is measured in the number of flow units within the process.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 1 Easy*
*Gradable: automatic*
*Learning Objective: 02-02 Distinguish among the three key process metrics (flow rate, flow time, and inventory) and evaluate average flow rate and flow time from departure and arrival data.*
*Topic: Three Key Process Metrics: Inventory, Flow Rate, and Flow Time*

47. Arrivals and departures to C&A Optometrist are collected and reported below:

| Patient | Arrival | Departure |
|---|---|---|


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Operations Management 1st edition Cachon Test Bank

| | | |
|---|---|---|
| 1 | 7:45 | 8:45 |
| 2 | 8:00 | 9:00 |
| 3 | 10:00 | 10:30 |
| 4 | 10:15 | 11:45 |
| 5 | 10:35 | 12:00 |

Assume C&A Optometrist is open from 7:45 a.m. to noon. How many patients on average are in C&A Optometrist?

A. 0.85
**B.** 1.27
C. 1.08
D. 4.25
Flow rate in patients per hour = 5/4.25 = 1.18. flow time is 1.08 hours. Average number of patients is 1.08 × 1.18 = 1.27.

*AACSB: Analytical Thinking*
*Blooms: Understand*
*Difficulty: 2 Medium*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

48. Which of the following factors is relevant to Little's Law?

A. Customer arrival times
B. Resource input time
C. Customer sequencing
**D.** Average customer flow time

Because Little's Law is dealing with the average number of units in the process, the only relevant factors are the average flow rate and average flow time.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Understand*
*Difficulty: 2 Medium*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

49. Both the average flow rate and average flow time of a process are increased by 50%. What will be the percentage change in the average number of units in the process?

A. 225%
**B.** 125%
C. 50%


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D. Cannot be determined
Assume inventory before the change is one (or any other number that you prefer). Inventory after the change = 1.5 × 1.5 = 2.25. Therefore, inventory increases by 1.25 units, which is 1.25/1 = 125% of the original amount.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Analyze*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

50. Little's Law describes the relationship between the following metrics EXCEPT:

A. flow rate.
**B.** flow unit.
C. flow time.
D. inventory.
Little's Law relates inventory as the product of flow rate and flow time.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 1 Easy*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

51. Little's Law relates inventory, flow rate, and flow time as:

A. Inventory = Flow rate + Flow time.
B. Inventory = Flow rate – Flow time.
**C.** Inventory = Flow rate × Flow time.
D. Inventory = Flow rate/Flow time.
Little's Law gives the relationship as Inventory = Flow rate × Flow time.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 1 Easy*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

52. Ten customers visit C&A Bakery from 8 a.m. to 10 a.m. The customers spend 10, 15, 20, 11, 8, 12, 25, 18, 29, and 32 minutes in the bakery. On average, how many customers are in the bakery from 8 a.m. to 10 a.m.?

A. 90
B. 10
**C.** 1.5
D. Cannot be determined
Average flow time is (10 + 15 + 20 + 11 + 8 + 12 + 25 + 18 + 29 + 32)/10 = 18 minutes. Average flow rate = 10 customers/120 minutes = 1/12 customer per minute. Inventory = 1.5 customers.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*


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*Blooms: Understand*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

53. On average, a patient spends 5 minutes waiting and 15 minutes being treated at C&A Clinic. Given the average number of patients waiting and being treated at the clinic is 50, what is the average number of patients coming through the clinic per minute on a typical day?

**A.** 2.5
B. 20
C. 50
D. Cannot be determined
Average flow rate = 50 patients/(5+15) minutes = 2.5 patients per minute.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Understand*
*Difficulty: 2 Medium*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

54. A drive-through at C&A Fast Food serves 300 customers over a 10-hour day. On average, a customer spends 2 minutes waiting in line, 3 minutes placing the order, and 5 minutes completing the order before leaving the drive-through. How many customers on average are "in" the drive-through (i.e., from the time they enter to the time they exit the drive-through) on a typical day?

A. 10
B. 300
C. 30
**D.** 5
Flow rate = 300 customers/(10 × 60) minutes = 0.5 customer per minute. Flow time = (2 + 3 + 5) minutes = 10 minutes. Inventory = 0.5 customer per minute × 10 minutes = 5 customers.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Analyze*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

55. C&A Cruise owns 10 ships and wants to serve 2000 passengers each week. Each cruise ship can carry 500 passengers on each voyage. What is the longest average travel time on a voyage that allows C&A Cruise to meet its goal of serving 2000 passengers per week if its ships always travel fully loaded?


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A. 4 weeks
**B.** 2.5 weeks
C. 1 week
D. Cannot be determined
Inventory on a typical voyage = 10 × 500 passengers = 5000 passengers. Flow rate = 2000 passengers per week. Flow time = 5000 passengers/2000 passengers per week = 2.5 weeks.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Analyze*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

56. C&A purchases 1200 pounds of milk per day to make ice cream. On average, C&A uses 12 pounds of milk to make one gallon of ice cream in 4 hours. How many gallons of ice cream are being made on average at any one time if C&A operates for 8 hours a day?

A. 25
**B.** 50
C. 100
D. 120
Flow rate = 1200 pounds per day/12 pounds of milk per gallon = 100 gallons of ice cream per day. Flow time = 4 hours/8 hours a day = 0.5 day. Inventory = 100 gallons × 0.5 day = 50 gallons.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Analyze*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

57. C&A purchases 1200 pounds of milk per day to make ice cream. On average, C&A uses 12 pounds of milk to make one gallon of ice cream. The production process takes 2 hours of mixing and 2 hours of cooling. How many gallons of ice cream does the cooler hold on average at any one time if C&A operates for 8 hours a day (i.e., count only the cooling process)?

**A.** 25
B. 50
C. 100
D. 120
Flow rate = 1200 pounds per day/12 pounds of milk per gallon = 100 gallons of ice cream per day. Flow time = 2 hours/8 hours a day = 0.25 day. Inventory = 100 gallons × 0.25 day = 25 gallons.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Analyze*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*


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58. Twenty new members are elected to an agency every two years. The agency has 100 members on average overall. How long does a member hold his/her position at the agency?

A. 50 years
B. 20 years
**C.** 10 years
D. 5 years
Inventory = 100 members. Flow rate = 20/2 = 10 new members per year. Flow time = 100/10 = 10 years.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Understand*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

59. C&A Museum has three million visitors per year. Each visitor spends an average of 1 hour in the museum. What is the average number of visitors in the museum on a given day if the museum is open 300 days a year from 9 a.m. to 5 p.m.?

**A.** 1250
B. 2400
C. 7500
D. 8000
Flow time = 1 hour. Flow rate = 3,000,000 visitors/(300 × 8) hours = 1250 visitors per hour. Inventory = 1 × 1250 = 1250 visitors.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Understand*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

60. A clinical trial accepts 3000 new patients each month. Half of the patients are taking a placebo for 6 months. How many patients are taking the placebo on average at any given time?

A. 18,000
**B.** 9000
C. 3000
D. 1500
Flow time = 6 months. Flow rate = 3000/2 = 1500. Inventory = 1500 × 6 = 9000.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Understand*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

61. A popular roller coaster ride lasts 10 minutes. There are 20 people on average on the roller coaster during peak time. How many people are stepping onto the roller coaster per minute at peak time?


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**A.** 2
B. 5
C. 10
D. 20
Flow time = 10 minutes. Inventory = 20. Flow rate = 20/10 = 2.

*AACSB: Analytical Thinking*
*Accessibility: Keyboard Navigation*
*Blooms: Remember*
*Difficulty: 2 Medium*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

62. McKinley, a large consulting firm in the UK, has a consulting staff consisting of 400 consultants at the rank of "associate." On average, a consultant remains at the associate level for 2 years. After this time, 30% of the consultants are promoted to the rank of "engagement manager"; the other 70% have to leave the company. In order to maintain the consulting staff at an average level of 400 associates, how many new consultants does McKinley have to hire each year at the associate level?

A. 100 associates/year
**B.** 200 associates/year
C. 300 associates/year
D. 400 associates/year
Use $I = R \times T$. $I$, or inventory, is 400. $T$, or flow time, is 2 years. Solving for $R$, or flow rate, McKinley should hire 400/2 = 200 associates per year.

*AACSB: Reflective Thinking*
*Blooms: Apply*
*Difficulty: 3 Hard*
*Gradable: automatic*
*Learning Objective: 02-03 Use Little's Law to evaluate the three key process metrics.*
*Topic: Littles Law—Linking Process Metrics Together*

# Chapter 02 Test Bank Summary

| Category | # of Questions |
|---|---|
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| AACSB: Reflective Thinking | 1 |
| Accessibility: Keyboard Navigation | 58 |
| Blooms: Analyze | 6 |
| Blooms: Apply | 1 |
| Blooms: Remember | 33 |
| Blooms: Understand | 22 |
| Difficulty: 1 Easy | 32 |
| Difficulty: 2 Medium | 19 |
| Difficulty: 3 Hard | 11 |


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| | |
|---|---|
| Gradable: automatic | 62 |
| Learning Objective: 02-01 Identify an appropriate flow unit for a process. | 25 |
| Learning Objective: 02-02 Distinguish among the three key process metrics (flow rate, flow time, and inventory) and evaluate average flow rate and flow time from departure and arrival data. | 19 |
| Learning Objective: 02-03 Use Little’s Law to evaluate the three key process metrics. | 18 |
| Topic: Littles Law—Linking Process Metrics Together | 18 |
| Topic: Process Definition, Scope, and Flow Units | 25 |
| Topic: Three Key Process Metrics: Inventory, Flow Rate, and Flow Time | 19 |


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