Questions Module 3.1

You've learned about common cause and special cause variation. Common cause variation is random variation that is inherent in the process. A process with only common cause variation is predictable.

Special cause variation is external to the process and is not predictable. So, processes with special causes of variation are not predictable.

Systematic variation might also exist. This is a pattern of variation that can repeat in cycles. For example, there can be seasonal patterns.

Think about something that you do regularly in your personal life, and consider how long it takes. For example, pick one of the following tasks: the time it takes to commute to work, to drive to school, to shop for groceries, to cook dinner, or to get dressed in the morning. How long does it take? It likely doesn't always take exactly the same amount of time.

1. What are some examples of common causes of variation in the time it takes?
2. What are some examples of special causes of variation?
3. What is one example of a systematic cause of variation?

Answer for the time to commute to work or drive to school:

1. Common causes: random fluctuations in traffic volumes, randomly hitting traffic lights, time to find a parking space
2. Special cause: a breakdown, a blizzard, an accident blocking traffic for an extended period of time
3. Systematic causes: predictable changes in traffic patterns due to the time of day or seasonal environmental changes

How are the control limits for the individuals chart calculated?

- *a.* using the overall standard deviation of all of the data
- *b.* using the customer specifications
- *c.* using the moving range between consecutive points to estimate the standard deviation

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Incorrect.
The correct answer is **c**. The control limits for the individuals chart are placed at the mean +/- 3 standard deviations, where the standard deviation is estimated using the average moving range.

Consider the Deming Rules of the Funnel. Enter the letter of each rule in the box next to the best example of the rule.

☐ the current operator training the new operator	a. No adjustment
☐ adjusting to zero based on the last production run	b. Exact compensation
☐ monitoring the process using control charts, reacting only if a special cause has occurred	c. Overcompensation
☐ adjusting production schedules based on prices and inventories	d. Consistency

Incorrect.
The correct answers from top to bottom are **d**, **b**, **a**, **c**.

There are eight tests for special causes. What is the value of these tests for a problem-solving team?

- *a.* They can help identify when something has changed in the process.
- *b.* They can help identify trends.
- *c.* They can help identify cycles or patterns.
- *d.* They can identify when something went wrong.
- *e.* They can help identify when the mean of a process shifted.
- *f.* all of the above

Incorrect.
The correct answer is **f**.

Which of the following are characteristics of a rational subgroup? Select all that apply.

- *a.* The observations are from a single process.
- *b.* The observations are randomly selected from a process.
- *c.* The observations are from a stable process.
- *d.* The observations are time-ordered.
- *e.* The observations are independent from one another.

Incorrect.
The correct answer is **a**, **c**, **d**, and **e**. Rational subgroups are not random samples. They are selected so they include only common cause variation.

Which of the following is plotted on a 3-way chart?

- *a.* within-subgroup variation
- *b.* between-subgroup variation
- *c.* subgroup means
- *d.* all of the above
- *e.* none of the above

Incorrect.
The correct answer is **d**.