

READINESS TEST

In order to participate in the PQPS course and correctly understand its content, a basic knowledge of statistics and the fundamental concepts of quality control are required. **This readiness test is to estimate such knowledge and will be used as part of the reference materials for the screening.** Please read the following sentences carefully and select the right answer on the answer sheet. **(If you cannot achieve a score of at least 70% on this test, it will be difficult for you to understand the content of the course or to benefit from its full effects.)**

Question 1 : CONCEPT

Answer "C" (Correct) if the statement is correct, or "F" (Fault) if it is incorrect.

- (1) "Quality assurance" means satisfying customers with "free repairs" or "change to a new one" when a customer complains.
- (2) In order to avoid customer complaints about defective products, it is necessary for a company to implement 100% inspection.
- (3) PDCA is a profound principle in TQM and stands for "Please Don't Change Anything."
- (4) In Total Quality Management (TQM) "quality" represents not only quality of function of products but also quality of service and other areas.
- (5) TQM activities are executed at production sections and are thus not the concern of the sales or administrative sections.
- (6) In TQM, quality is the main focus, so that delivery, cost and other economic factors are not necessarily of concern.
- (7) As QC Circle activities are autonomous activities, they must be done outside of working hours and the company doesn't need to pay for them.
- (8) The person in charge of the "QC Program" should be the Quality Control Manager and not the Factory Manager.
- (9) Past data are not useful in the problem-solving process.
- (10) All factual information, even that which is not numerically expressible, like linguistic data, is potentially useful data in the problem-solving process.

Question 2: Ability to Draw Up Diagrams

The following table is a computation table used when drawing up a Pareto Diagram which is one of the QC tools. Select the correct numbers in cells (1) – (5) in the table.

Data Sheet for Pareto Diagram

Type of Defect	Number of Defects	Cumulative Total	Percentage of Overall Total	Cumulative Percentage
A	72	72	36	36
B	38	110	19	55
C	26	136	(1)	68
D	14	150	(2)	(3)
E	10	(4)	5	(5)
Others	40	200	20	100
Total	200	200	100	100

[a:7 b:13 c: 75 d:80 e: 160 f:165]

Question 3 : Basic Computational Ability which is required to utilize QC tools

Calculate the following and select the right answer.

$$1) \frac{(13.42 + 13.62 + 13.66 + 13.48 + 13.52 + 13.57)}{6} =$$

$$2) \frac{2.523 + 0.005 \times \frac{30}{90}}{90} =$$

$$3) \frac{\frac{1}{100^2} (1917 - \frac{1}{7} \times 103^2)}{7} =$$

$$4) \frac{29.86 + 0.577 \times 27.44}{27.44} =$$

$$5) \frac{29.86 - 0.577 \times 27.44}{27.44} =$$

$$6) \frac{\sqrt{0.669 \times 10^{-2}}}{10^{-2}} =$$

$$7) \frac{0.005 \times \sqrt{(302 - \frac{30^2}{90}) \div (90 - 1)}}{90 - 1} =$$

$$8) \frac{2312.02 - \frac{263.2^2}{30}}{30} =$$

$$9) \frac{0.0913}{\sqrt{2.88 \times 0.00840}} =$$

[a: 0.00906 b: 4.01×10^{-2} c: 0.082 d: 0.59 e: 2.52467 f: 2.88 g: 13.545 h: 14.03 i: 45.69 j: 50.00]

Question 4: Mean & Standard Deviation

Calculate the mean and standard deviation of the next set of data, and select the right answer.

1) 2 5 1 3 4

$$\bar{x} = \underline{\hspace{2cm}} \quad s = \underline{\hspace{2cm}}$$

(1) (2)

2) 22 25 21 23 24

$$\bar{x} = \underline{\hspace{2cm}} \quad s = \underline{\hspace{2cm}}$$

(3) (4)

3) 234562 234565 234561 234563 234564

$$\bar{x} = \underline{\hspace{2cm}} \quad s = \underline{\hspace{2cm}}$$

(5) (6)

[a: 1.56 b: 1.57 c: 1.58 d:3.0 e: 23.0 f: 234563.0]

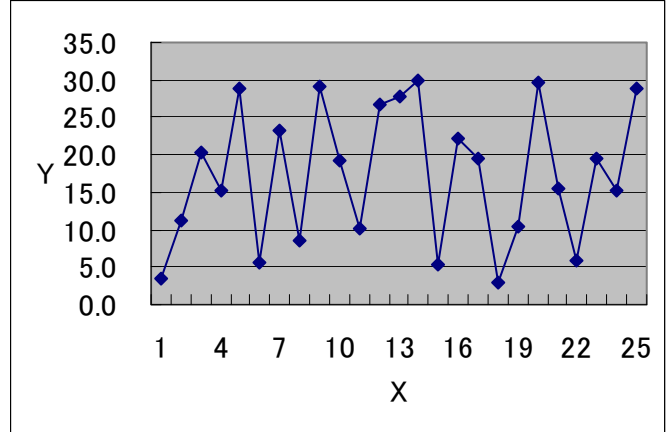
Question 5: Ability to Draw a Graph

Create the same type of graph shown below on the right as “Format” on the “Readiness Test Answer Sheet” by using the given data shown below on the left.

1) Data

X	Y	X	Y
1	35.6	14	29.8
2	29.2	15	31.6
3	20.2	16	22.2
4	39.4	17	31.2
5	29.2	18	28.8
6	31.4	19	31.4
7	23.2	20	29.6
8	32.0	21	39.0
9	29.0	22	19.4
10	32.6	23	34.2
11	32.2	24	32.6
12	26.8	25	28.2
13	27.8		

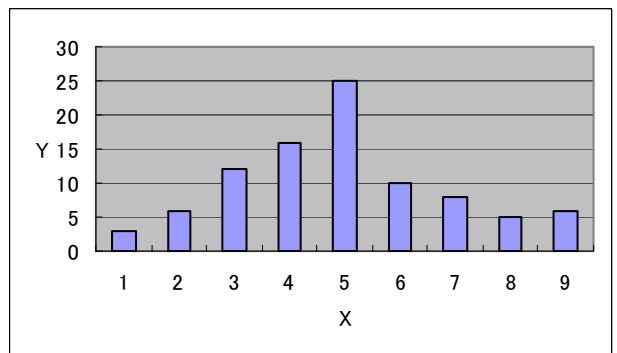
Format



2) Data

x	Y
1	1
2	4
3	9
4	14
5	22
6	19
7	10
8	5
9	6

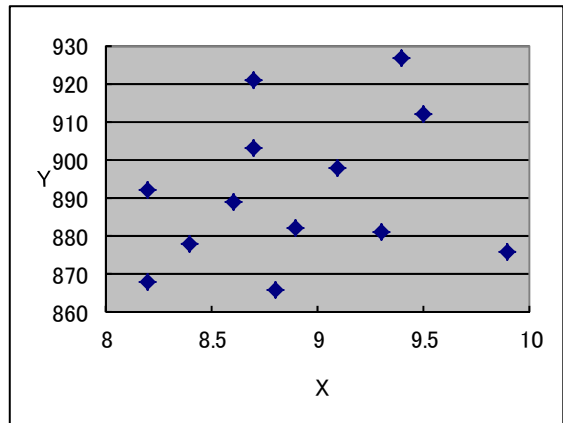
Format



3) Data

X	Y	X	Y
8.6	889	8.7	896
8.9	884	8.4	894
8.8	874	8.2	864
8.8	891	9.2	922
8.4	874	8.7	909
8.7	886	9.4	905
9.2	911		
8.6	912		
9.2	895		

Format



Question 6: English Check Sheet

Complete the following sentences with suitable words.

<Populations and Samples>

In quality control, we try to discover facts by collecting data and then take necessary action based on those facts. The data is not collected as an end in itself, but as a means of finding out the facts behind the data.

For example, consider a sampling inspection. We take a sample from a lot, carry out measurements on it, and then decide whether we should accept the whole lot or not. Here our concern is not the sample itself, but the quality of the whole lot. As another example, consider the control of a manufacturing process using an \bar{x} -R

control chart. Our purpose is not to determine the characteristics of the sample taken for drawing the \bar{x} -R chart, but to find out what state the process is in.

The totality of items under consideration is called the *population*. In the first example above, the population is the [(1)], and in the second it is the [(2)].

Some people may feel it difficult to regard a “process” as a “population” because while a “lot” is indeed a group of finite individual objects, a “process” itself is not a product at all, but is made up of the 5M’s (man, machine, material, method, and measurement).

When we turn our attention to product-making function, we will recognize that the “process” produces unmistakably a group of products. Moreover, the number of products is infinite unless the “process” stops producing them, and for this reason, a process is considered to be an infinite [(3)].

One or more items taken from a population intended to provide information on the population is called *sample*. Since a [(4)] is used for estimating the characteristics of the entire population, it should be chosen in such a way as to reflect the characteristics of the population. A commonly-used sampling method is to choose any member of the population with equal probability. This method is called *random sampling*, and a sample taken by random sampling is called a *random sample*.

We obtain [(5)] by measuring the characteristics of a sample. Using this data, we draw an inference about the population, and then take some remedial action. However, the measured value of a sample will vary according to the sample taken, making it difficult to decide what action is necessary. Statistical analysis will tell us how to interpret such data.

[a: data b: lot c: population d: process e: sample]

Readiness Test Answer Sheets

Question1-4, 6: Please circle the correct answer. Question5: Please make graphs on the sheet.

<u>Question 1</u>	(1)	F	C								
	(2)	F	C								
	(3)	F	C								
	(4)	F	C								
	(5)	F	C								
	(6)	F	C								
	(7)	F	C								
	(8)	F	C								
	(9)	F	C								
	(10)	F	C								
Question 2	(1)	a	b	c	d	e	f				
	(2)	a	b	c	d	e	f				
	(3)	a	b	c	d	e	f				
	(4)	a	b	c	d	e	f				
	(5)	a	b	c	d	e	f				
Question 3	(1)	a	b	c	d	e	f	g	h	i	j
	(2)	a	b	c	d	e	f	g	h	i	j
	(3)	a	b	c	d	e	f	g	h	i	j
	(4)	a	b	c	d	e	f	g	h	i	j
	(5)	a	b	c	d	e	f	g	h	i	j
	(6)	a	b	c	d	e	f	g	h	i	j
	(7)	a	b	c	d	e	f	g	h	i	j
	(8)	a	b	c	d	e	f	g	h	i	j
	(9)	a	b	c	d	e	f	g	h	i	j
Question 4	(1)	a	b	c	d	e	f				
	(2)	a	b	c	d	e	f				
	(3)	a	b	c	d	e	f				
	(4)	a	b	c	d	e	f				
	(5)	a	b	c	d	e	f				
	(6)	a	b	c	d	e	f				

Readiness Test Answer Sheets

Question 5	(1)									
	(2)									
	(3)									
Question 6	(1)	a	b	c	d	e				
	(2)	a	b	c	d	e				
	(3)	a	b	c	d	e				
	(4)	a	b	c	d	e				
	(5)	a	b	c	d	e				