Statistics and Probability

UNIT TEST

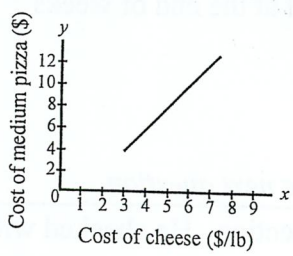
Use the following information to answer the next question.

At a pizza restaurant, the owner increases the cost of a medium pizza whenever there is an increase in the cost of cheese. The given table shows the cost of cheese, measured in dollars per pound, that corresponds to the cost of a medium pizza.

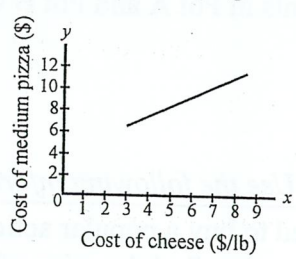
Cost of Cheese ($ per pound)	Cost of Medium Pizza ($)
3	$4
4	$6
5	$8
6	$10
7	$12

1. Which of the following graphs represents the information in the given table?

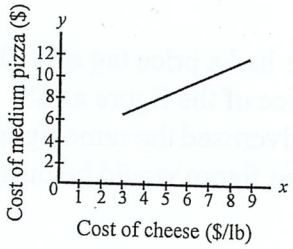
A.



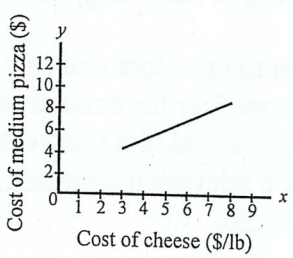
B.



C.



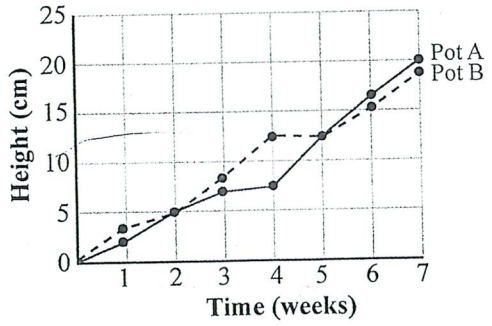
D.



Use the following information to answer the next question.

On the same day, Kim planted one bean seed in Pot A and another bean seed in Pot B. She then placed Pot A on a windowsill and Pot B on the kitchen table. She recorded the heights of the two plants at the end of each week.The given graph plots the growth of each plant for seven weeks.

Kim's Bean Plants



2. The bean plants in Pot A and Pot B were the same height at the end of weeks

A. 1 and 6
B. 2 and 5
C. 5 and 6
D. 5 and 7

Use the following information to answer the next question.

Marco wanted to buy a popular action figure for his collection. He checked with four different sources to find the price of the action figure.

- Marco went to one store and saw that the action figure had a price tag of $10.
- He saw a store flier for another store that listed the price of the figure as $8.
- His friend Jesse told him that yesterday's newspaper advertised the same figure for $12.
- Marco saw a television commercial advertising that the figure would be on sale on Saturday for $6.

3. The source that provides first hand data is the price that Marco

A. read in the flier
B. saw in the store
C. saw on television
D. read in the newspaper advertisement

Use the following information to answer the next question.

For a school project, Nicole wants to find out how many hours a day the students in her Grade 6 class spend watching television. She also wants to know how many hours they spend studying.

4. In order to collect this data **most effectively**, Nicole would probably choose to
   A. design and conduct an experiment
   B. design and use a structured questionnaire
   C. make observations and chart the information
   D. use electronic networks, such as the Internet

Use the following information to answer the next question.

Karen goes to a small school where there is only one class for each grade level from kindergarten to Grade 6. On Valentine's Day, she decides to find out how many students in her school are wearing red shirts or sweaters.

5. Which of the following methods is **most appropriate** to collect this data?
   A. Conducting a survey
   B. Performing an experiment
   C. Using personal observation
   D. Selecting data from a database

Use the following information to answer the next question.

The data in the table shows the average daily temperature in a city over the course of a week.

Day of the Week	Temperature (°C)
Monday	26
Tuesday	36
Wednesday	32
Thursday	34
Friday	36
Saturday	24
Sunday	28

6. The data in the given table is **best** represented using a
   A. bar graph
   B. circle graph
   C. broken-line graph
   D. stem-and-leaf plot

Use the following information to answer the next question.

Price of Gas ($)	
January	0.89
February	0.94
March	0.97
April	1.00
May	1.10
June	1.14
July	1.15
August	1.13
September	1.08
October	1.04
November	0.99
December	0.97

7. Which type of graph would **best** display the information in the given table?

A. Bar graph
B. Line graph
C. Pictograph
D. Circle graph

Use the following information to answer the next question.

DVD Sales by Genre

Genre	Sales (%)
Horror	15
Comedy	25
Romance	25
Children's movies	20
Suspense	15

8. Which of the following types of graphs would **best** display the information in the given table?

A. Bar graph
B. Line graph
C. Pictograph
D. Circle graph

Use the following information to answer the next question.

Anna and her friend Karina both love shoes.

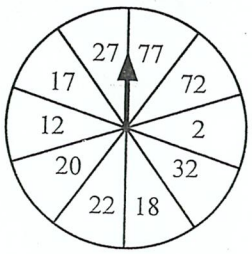
- Anna has 18 different coloured pairs of flip flops, 11 pairs of boots, 12 pairs of high heels, and 9 different kinds of sneakers.
- Karina has 20 different coloured pairs of flip flops, 9 pairs of boots, 9 pairs of high heels, and 11 different kinds of sneakers.

Written Response

9. Explain the type of graph that would be **most appropriate** to use to record the kinds of shoes that Anna and Karina own.

Use the following information to answer the next question.

The spinner shown is divided into 10 equal sections.



10. If Eileen spins the spinner once, what is the probability that the spinner will land on a number that has a 2 in it?

A. $\frac{1}{2}$ **B.** $\frac{3}{5}$ **C.** $\frac{7}{10}$ **D.** $\frac{4}{5}$

11. Jackie has a bag containing 2 red marbles, 4 green marbles, and 6 blue marbles. Jackie did an experiment and found that she chose a red marble 4 out of 10 times. Which of the following tables shows the results of Jackie's experiment?

A.

Experimental Probability	Theoretical Probability
0.40	$\frac{1}{6}$

B.

Experimental Probability	Theoretical Probability
0.12	$\frac{1}{12}$

C.

Experimental Probability	Theoretical Probability
0.04	$\frac{2}{5}$

D.

Experimental Probability	Theoretical Probability
0.02	$\frac{5}{12}$

Use the following information to answer the next question.

Two six-sided dice are rolled at the same time. The sum of the two numbers is 9.

12. Which of the following sets of numbers represents all the possible outcomes of rolling a sum of 9?

A. (4, 5), (3, 6)

B. (4, 5), (3, 6), (2, 7)

C. (4, 5), (5, 4), (3, 6), (6, 3)

D. (4, 5), (3, 6), (3, 3), (5, 4)

13. When Natalie tosses a twelve-sided number cube five times and finds that the number six comes up four times, she is demonstrating

A. an experimental probability

B. a theoretical probability

C. an impossible event

D. a certain event

Answers and Solutions – Unit Test

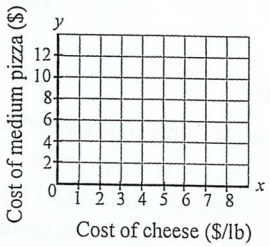
1. A	5. C	9. WR	13. A
2. B	6. C	10. C	
3. B	7. B	11. A	
4. B	8. D	12. C	

1. A

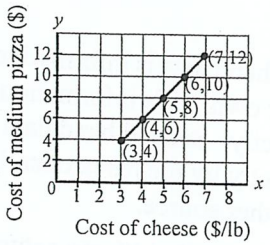
Step 1
Write a set of ordered pairs.
Create ordered pairs with the independent value (cost of cheese) first and the dependent value (cost of medium pizza) second.

Cost of Cheese	Cost of Medium Pizza	Ordered Pair
3	4	(3, 4)
4	6	(4, 6)
5	8	(5, 8)
6	10	(6, 10)
7	12	(7, 12)

Step 2
Draw and label a grid with the x-axis and the y-axis, using appropriate increments and a title.
The independent variable is cost of cheese, so it is placed along the x-axis. The dependent variable is the cost of the medium pizza, so it is placed along the y-axis.



Step 3
Plot the ordered pairs on the graph.
For each ordered pair, start at the origin, move along the x-axis to find the value of the x-coordinate, then, move up vertically to the value of the y-coordinate.



The graph in alternative A is correct.

2. B

Step 1
Compare the heights of the plants at the end of each week.
If the dot on the straight line that represents the height of the plant in Pot A and the dot on the dotted line that represents the height of the plant in Pot B have a space between them, the plants are not the same height.

- In weeks 1, 3, and 4, the plant in Pot A is shorter than the plant in Pot B.
- In weeks 6 and 7, the plant in Pot A is taller than the plant in Pot B.

Step 2
If the two lines meet and the dot is shared, the coordinates for the heights of both plants will be the same. This means that the two plants are the same height.

- In week 2, Pot A and Pot B have the same coordinates of (2, 5). The two lines share the same dot.
- In week 5, Pot A and Pot B have the same coordinates of (5, 12). The two lines share the same dot.

The bean plants in Pot A and Pot B were the same height at the end of weeks 2 and 5.

3. B

Firsthand data is information that you collect on your own. It is information that is collected directly. Second hand data is not collected directly by the researcher, but is obtained from another source.

The price that Marco actually saw in the store is an example of firsthand data.

The prices that Marco read in the flier, saw on the television advertisement, and heard about in the newspaper advertisement are examples of secondhand data.

4. B

Nicole wants to find out how many hours a day students in her Grade 6 class spend watching television and how many hours they spend studying. In order to gather data for her project, she must decide which method of collecting the information will best suit her needs. The best way for Nicole to gather the information she needs would be for her to design and use a structured questionnaire. In this way, she would be able to gather the personal data from each of her classmates that she requires.

Designing an experiment to collect this data would not be appropriate because an experiment could not provide the information Nicole needs. It would also be very difficult to gather this information through observation. The time spent watching television and studying is personal to each student and is not information that would be found on the Internet.

5. C

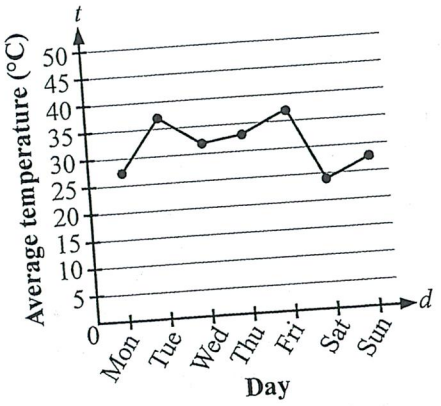
Observation is the best way to collect data when it is possible to count things that can be seen, such as the number of red shirts or sweaters the students are wearing. Since the school is small, Karen can easily observe each class by herself (with the teachers' permission) and count the number of students wearing red shirts or sweaters.

Karen could also appoint one student from each class to observe and record the number of red shirts worn in that class. Then, Karen could collect these numbers in order to determine a total count.

6. C

A broken-line graph is used to show the change in a quantity over time. Since the data illustrates how the average temperature is changing on a daily basis, the data is best represented by using a broken-line graph.

Average Temperature over One Week



7. B

A line graph plots continuous data as points and then joins them with a line. The data collected is usually measured against time, which allows you to observe the change that occurs in the data over a period of time.

8. D

Step 1
Make observations about the data.
The sales of the DVDs are given as percentages. That means that the parts, the different genres, are being compared to the whole, their total sales as a group.

Step 2
Determine the best graph to use, and justify your answer.
Circle graphs are best for illustrating the relationship between parts of a whole.
Since the sales of different genres of DVDs are being compared to their sales as a whole in percentages, a circle graph best displays the data.

9. WR

Step 1
Determine the most appropriate type of graph.
The most appropriate type of graph to use is a double bar graph.

Step 2
Justify your answer.
A double bar graph is best to show two sets of similar data, making it easy to compare the data.
In this question, the similar data is the four kinds of shoes that the two girls own (flip flops, boots, high heels, and sneakers). One set of data is the number of each kind of shoes Anna owns.
The other set of data is the number of kinds of shoes Karina owns. Each set of side-by-side bars will show a comparison of each particular kind of shoe that both Anna and Karina own.

10. C

Step 1
Determine the number of favourable outcomes.
The favourable outcome is a number with a 2 in it.
The numbers 72, 2, 32, 22, 20, 12, and 27 have the digit 2 in them.
There are 7 favourable outcomes.

Step 2
Determine the total possible outcomes.
The possible outcomes for spinning the spinner are 17, 27, 77, 72, 2, 32, 18, 22, 20, and 12.
There are 10 possible outcomes.

Step 3
Calculate the probability of the desired event.
Substitute the values into the probability formula.

$$P_{\text{favourable outcome}} = \frac{\text{number of favourable outcomes}}{\text{total possible outcomes}}$$

$$P_{\text{number with a 2}} = \frac{7}{10}$$

11. A

To calculate the experimental probability as shown in the table, convert the probability from ratio form to decimal form:

$$4{:}10 \rightarrow \frac{4}{10} = 4 \div 10 = 0.40$$

To calculate the theoretical probability, use the probability formula:

$$P(\text{red}) = \frac{\text{number of red marbles}}{\text{total number of marbles}}$$

$$P(\text{red}) = \frac{2}{12} = \frac{1}{6}$$

12. C

Step 1
Determine which numbers will result in a sum of 9.
One combination of numbers that will result in a sum of 9 is 4 and 5.
Another combination of numbers that will result in a sum of 9 is 3 and 6.

Step 2
Determine the total number of possible combinations.

1. You can roll a 4 on the first die and a 5 on the second die.
2. You can roll a 5 on the first die and a 4 on the second die.
3. You can roll a 3 on the first die and a 6 on the second die.
4. You can roll a 6 on the first die and a 3 on the second die.

The set of numbers that represents all the possible combinations is (4, 5), (5, 4), (3, 6), (6, 3).

13. A

Natalie is conducting an experiment to obtain the given results, which is an example of an experimental probability.

Theoretical probability is a mathematical calculation of the probability that an event will occur in an ideal situation.

An impossible event will *never* occur and has a probability of 0.

A certain event will *always* happen and has a probability of 1.