Name: _____

Date: _____

Review for Grade 9 June Exam - Unit 9 - Probability and Statistics

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. The last three days Alexa had a test and ate an energy bar on her way to school that morning, she did well on the test. Today she had a test, so she ate an energy bar on her way to school.
Was her decision based on theoretical probability, experimental probability, or subjective judgment?
a. A combination of theoretical probability and subjective judgment
b. Theoretical probability
c. Subjective judgment
d. Experimental probability

____ 2. Jon's coworkers pool their money so they can buy more lottery tickets and increase their chance of winning.
Is their decision based on theoretical probability, experimental probability, or subjective judgment?
a. A combination of theoretical and experimental probability
b. Theoretical probability
c. Experimental probability
d. Subjective judgment

____ 3. Haley will not go on a cruise because the boat may sink even though cruise ships are very rarely involved in accidents.
Is her decision based on theoretical probability, experimental probability, or subjective judgment?
a. Subjective judgment
b. Experimental probability
c. A combination of theoretical and experimental probability
d. Theoretical probability

____ 4. According to the weather forecast, there is a 90% chance of rain.
Martin had planned to go running but decides to go to the gym instead so he doesn't get wet.
Is his decision based on theoretical probability, experimental probability, or subjective judgment?
a. Experimental probability
b. Theoretical probability
c. A combination of theoretical probability and subjective judgment
d. Subjective judgment

____ 5. According to the weather forecast, there is a 90% chance of snow, with accumulations of up to 10 cm.
Andrew drives out to see his friends because he thinks the weather will not be as bad as it is forecasted to be.
Is his decision based on theoretical probability, experimental probability, or subjective judgment?
a. Subjective judgment
b. A combination of experimental probability and subjective judgment
c. Theoretical probability
d. Experimental probability

____ 6. On a hot sunny day in June, teenagers were surveyed to find out how they feel about the city building a new outdoor ice skating rink. In this survey, which of the following might be a problem?
i) Cultural sensitivity
ii) Timing
iii) Use of Language
iv) Privacy
a. i b. ii c. iii d. iv

____ 7. In an anonymous survey, students were asked:
"Do you agree that everyone should become a vegetarian?"
In this survey, which of the following might be a problem?
i) Cultural sensitivity
ii) Ethics
iii) Privacy
iv) Use of Language
a. iv b. i c. ii d. iii

____ 8. Ms. Coplick interviewed her students and asked each one how much he or she was given each week as an allowance. In this survey, which of the following might be a problem?
i) Privacy
ii) Timing
iii) Use of Language
iv) Cost
a. iv b. ii c. iii d. i

____ 9. In late November Anita surveyed every student in her class to find out their favourite Christmas carols. Which of the following might be a problem?
i) Timing
ii) Use of Language
iii) Cultural sensitivity
iv) Cost
a. i b. iii c. iv d. ii

____ 10. Omar asked his classmates the following question.
"Don't you think apartment buildings should allow residents to have cats?"
Which of the following might be a problem with his survey?
i) Timing
ii) Bias
iii) Privacy
iv) Cost
a. i b. iv c. ii d. iii

____ 11. Which of the following data collection methods would provide the most accurate information about grade 9 students' lunch choices at a school?
i) Survey a sample of students who eat lunch in the cafeteria
ii) Survey all the students who eat lunch in the cafeteria
iii) Survey a sample of all students in grade 9 in the school
iv) Survey all grade 9 students in the school
a. ii b. iii c. iv d. i

____ 12. A baker wants to check the quality of the muffins he bakes each day.
Which of the following data collection methods would provide the most accurate information?
i) Test one muffin from each batch
ii) Test all the muffins in the first batch
iii) Test all the muffins in a random batch
iv) Test all the muffins in the last batch
a. i b. iv c. ii d. iii

____ 13. To determine the favourite TV shows of grade 9 students at a school, which of the following data collection methods would provide the most accurate information?

i) Survey a sample of students in one grade 9 class
ii) Survey all students in one grade 9 class
iii) Survey a sample of students from each grade 9 class
iv) Survey all students in each grade 9 class

a. iv b. ii c. i d. iii

____ 14. A company makes granola bars in batches of 1200. The quality control inspector tests 5 randomly selected bars from each batch. Which sampling method does the inspector use?

a. Convenience sampling
b. Simple random sampling
c. Cluster sampling
d. Stratified random sampling

____ 15. A specialty craft store wants to know if customers are satisfied with the product selection. To find out, they interview every 20th person leaving the store for 1 week. Which sampling method does the store use?

a. Simple random sampling
b. Systematic sampling
c. Cluster sampling
d. Self-selected sampling

____ 16. A school's cafeteria manager wants to know whether changing the cafeteria menu will increase its the number of lunch specials it sells. On Wednesday, the manager surveys as many people in the cafeteria as he can to find out. Which sampling method did he use?

a. Simple random sampling
b. Cluster sampling
c. Convenience sampling
d. Systematic sampling

____ 17. A local political party wants to know what people think about a new by-law banning certain types of dogs. It sends out a newsletter to everyone in the district. The newsletter contains a questionnaire and readers are asked to return their responses by mail or email. Which sampling method was used?

a. Self-selected sampling
b. Systematic Sampling
c. Simple random sampling
d. Cluster sampling

Problem

18. Morag watched her teenage daughter play soccer at the same time every Saturday morning. She noticed that 6 out of every 10 spectators were women. She later told her husband that more women than men watch teenage soccer games.
State at least three assumptions Morag made.

19. A school principal reads a study with this information.

> Only 40% of teenage boys and 20% of teenage girls consume enough dairy products to maintain good health.

The principal decides to provide students with a free glass of milk each day and to add chocolate milk, cheese, and yogurt to the cafeteria menu.

a) What assumptions has the principal made?
b) Why might there be no change in students' consumption of dairy products?

20. At 10 am, Naïna and Claire arrived at a ticket office to buy tickets for a concert. The lineup was long, so they considered going to the gym and returning at 1 pm.

a) What assumptions would suggest this was a good idea?
b) What assumptions would suggest this was not a good idea?

21. Ms. Freeman is designing a new course. To gather information about how much technology she should use in the course, she asks students in her classes:
"Would you be interested in using cutting-edge technology in the new course?"
    a) What problems might Ms. Freeman encounter related to 2 of these factors: use of language, ethics, cost, time, timing, privacy, or cultural sensitivity?
    b) How could you rewrite the question so it more accurately reflects what Ms. Freeman wants to know?

22. Josh wants to find out how much, on average, grade 9 students spend on food each month.
    a) Identify potential problems he may encounter related to privacy, ethics, language, and timing.
    b) For each potential problem in part a, suggest how Josh could avoid it.

23. Chin Chu wants to collect data about the spending habits of her classmates.
She thinks it will be easiest to use personal interviews to gather the data.
Identify potential problems she might encounter.

24. Suppose you are the principal of a high school.
You want to know where students volunteer most often.
    a) What population are you interested in surveying?
    b) Would you survey a sample or population? Explain.
    c) If you had to use a sample, what would you do to make sure your conclusions are valid?

25. Describe an appropriate sampling method for each situation.
    a) A school principal wants to obtain information on the fitness habits of grade 9 students.
    b) A company wants to know employees' opinions about its new dress code.

Review for Grade 9 June Exam - Unit 9 - Probability and Statistics
Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: Easy REF: 9.1 Probability in Society
   LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
   KEY: Conceptual Understanding
2. ANS: B PTS: 1 DIF: Easy REF: 9.1 Probability in Society
   LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
   KEY: Conceptual Understanding
3. ANS: A PTS: 1 DIF: Easy REF: 9.1 Probability in Society
   LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
   KEY: Conceptual Understanding
4. ANS: A PTS: 1 DIF: Easy REF: 9.1 Probability in Society
   LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
   KEY: Conceptual Understanding
5. ANS: A PTS: 1 DIF: Moderate REF: 9.1 Probability in Society
   LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
   KEY: Conceptual Understanding
6. ANS: B PTS: 1 DIF: Easy
   REF: 9.2 Potential Problems with Collecting Data LOC: 9.SP1
   TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
7. ANS: A PTS: 1 DIF: Easy
   REF: 9.2 Potential Problems with Collecting Data LOC: 9.SP1
   TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
8. ANS: D PTS: 1 DIF: Easy
   REF: 9.2 Potential Problems with Collecting Data LOC: 9.SP1
   TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
9. ANS: B PTS: 1 DIF: Easy
   REF: 9.2 Potential Problems with Collecting Data LOC: 9.SP1
   TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
10. ANS: C PTS: 1 DIF: Easy
    REF: 9.2 Potential Problems with Collecting Data LOC: 9.SP1
    TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
11. ANS: C PTS: 1 DIF: Easy
    REF: 9.3 Using Samples and Populations to Collect Data LOC: 9.SP2
    TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
12. ANS: A PTS: 1 DIF: Easy
    REF: 9.3 Using Samples and Populations to Collect Data LOC: 9.SP2
    TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
13. ANS: A PTS: 1 DIF: Easy
    REF: 9.3 Using Samples and Populations to Collect Data LOC: 9.SP2
    TOP: Statistics and Probability (Data Analysis) KEY: Conceptual Understanding
14. ANS: D PTS: 1 DIF: Easy REF: 9.4 Selecting a Sample
    LOC: 9.SP2 TOP: Statistics and Probability (Data Analysis)
    KEY: Conceptual Understanding

15. ANS: B PTS: 1 DIF: Easy REF: 9.4 Selecting a Sample
LOC: 9.SP2 TOP: Statistics and Probability (Data Analysis)
KEY: Conceptual Understanding
16. ANS: C PTS: 1 DIF: Easy REF: 9.4 Selecting a Sample
LOC: 9.SP2 TOP: Statistics and Probability (Data Analysis)
KEY: Conceptual Understanding
17. ANS: A PTS: 1 DIF: Easy REF: 9.4 Selecting a Sample
LOC: 9.SP2 TOP: Statistics and Probability (Data Analysis)
KEY: Conceptual Understanding

PROBLEM

18. ANS:
Answers will vary. For example:
The proportion of men and women at a game is the same for a regular game as for a playoff game.
The proportion of men and women at a game does not depend on the day or the time of day
The proportion of men and women at a game does not depend on the weather.
The proportion of men and women who watch boys' soccer is the same as for girls' soccer

PTS: 1 DIF: Moderate REF: 9.1 Probability in Society
LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
KEY: Communication

19. ANS:
Answers will vary. For example:
a) The principal has assumed:
   - The students at his school are similar to the teenagers in the study.
   - Students who do not currently consume enough dairy products will consume more if it's free and easily available.

b) Students may be unwilling to change their eating habits.
Not all students eat in the cafeteria.
Students may not see the need to consume more dairy products.

PTS: 1 DIF: Moderate REF: 9.1 Probability in Society
LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
KEY: Problem-Solving Skills | Communication

20. ANS:
Answers will vary. For example:
a) The line up would be shorter at 1 pm than at 10 am.
The tickets would not be sold out by 1 pm.
The ticket office would still be open at 1 pm.
Good seats would still be available at 1 pm.

b) Tickets might be sold out before 1 pm.
The ticket office may close before 1 pm.
The line up may not be shorter.
The seats they wanted may not be available.

PTS: 1 DIF: Difficult REF: 9.1 Probability in Society
LOC: 9.SP4 TOP: Statistics and Probability (Chance and Uncertainty)
KEY: Problem-Solving Skills | Communication

21. ANS:

Answers will vary. For example:

a) Cultural Sensitivity - Students may not have access to the Internet outside of school
Use of Language - The wording of the question leads students to answer "Yes" because it presents the technology in an attractive way as being "cutting-edge."
Timing - Student responses may differ depending on whether they've already used the technology in another class.

b) A better set of questions might be:

Do you have Internet access at home? Y / N How likely are you: - to do research on the Internet? Unlikely / Somewhat Likely / Likely - to contribute to a class web page? Unlikely / Somewhat Likely / Likely - to participate in an online discussion board? Unlikely / Somewhat Likely / Likely

PTS: 1 DIF: Moderate REF: 9.2 Potential Problems with Collecting Data
LOC: 9.SP1 TOP: Statistics and Probability (Data Analysis)
KEY: Problem-Solving Skills | Communication

22. ANS:

Answers will vary. For example:

a) Privacy - Students may not want to disclose information about their spending habits.
Ethics - Students may want to know why they are being asked such a question.
Language - Students may not be sure whether "food" also includes snacks.
Timing - At the end of the month students may have less cash, so their responses may be lower than earlier in the month.

b) Privacy - Josh could use an anonymous questionnaire.
Ethics - Josh could explain why he is collecting the data and how he will use it.
Language - Josh could clarify what is being asked: whether "food" mean snacks only, snacks and lunches, or the total cost of all meals.
Timing - Josh could have students respond in the middle of the month.

PTS: 1 DIF: Moderate REF: 9.2 Potential Problems with Collecting Data
LOC: 9.SP1 TOP: Statistics and Probability (Data Analysis)
KEY: Problem-Solving Skills | Communication

23. ANS:

Answers will vary. For example:
Personal interviews are time-consuming.
Students may not answer honestly since there would be a lack of privacy.
Chin Chu could bias the questions by the tone of her voice, body language, or hints.

PTS: 1 DIF: Moderate REF: 9.2 Potential Problems with Collecting Data
LOC: 9.SP1 TOP: Statistics and Probability (Data Analysis)
KEY: Problem-Solving Skills | Communication

24. ANS:

a) The population is all the students in the school.
b) I would survey a sample. It would likely be very difficult and time-consuming to get survey responses from every student.
c) I would make sure my sample included males and females from each grade, and students in different cliques.

PTS: 1 DIF: Moderate REF: 9.3 Using Samples and Populations to Collect Data

LOC: 9.SP2 TOP: Statistics and Probability (Data Analysis)
KEY: Problem-Solving Skills | Communication

25. ANS:

Answers may vary. For example:

a) Put the names of all grade 9 students in a hat and select 25-30% of the names.
Select every 10th student from an alphabetical list of all grade 9 students.
Randomly select 5 students from each grade 9 class.

b) Use a computer to randomly select employee numbers.
Select every 15th person in the company directory.

PTS: 1 DIF: Moderate REF: 9.4 Selecting a Sample
LOC: 9.SP2 TOP: Statistics and Probability (Data Analysis)
KEY: Problem-Solving Skills | Communication