Printout

Math 9   Chapter 8   Statistics and Probability Practice Test   Name: _____

Core Skills #1: Sampling Methods and their influence.
Sampling method: convenience, voluntary response, tv/online survey, random
Influences: Bias, use of language, ethics, cost, time, timing, privacy, cultural sensitivity

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(MC – circle the right answer)

1. Which type of sampling method would be limited to individuals present at the location of the survey?
   a. convenience   b. online questionnaire   c. voluntary response   d. random

2. Which type of sampling method is considered free of bias?
   a. convenience   b. online questionnaire   c. voluntary response   **d. random**

3. The school president was asked to conduct a survey of the students to determine if the school should have another dance. Which of the following best represents a random sample?
   a. She asks 30 of her friends.   b. She surveys 30 grade 9 students.
   c. She places 30 questionnaires in the cafeteria.
   d. She asks the office for the names of 30 students, 6 from each grade.

(Short answers)

4. Name a problem related to this data collection.
   Bridget asked her classmates the following question: "Do you agree we spend too much time on homework?"

   ==The use of language is suggestive. Bridget thinks they are spending too much time on homework and the question is tying to get other people to agree==

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5. Name a problem related to this data collection.
   Brandon wanted to collect information on students' television viewing habits. He decided to mail a questionnaire, along with a self-addressed stamped envelope, to 300 students in his school.
   ==This method suffers from voluntary respond bias. Only the opinions from people who are willing to mail the questionnaires back to you are counted.==

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6. Anita surveyed her classmates to see if they were interested in a Christmas gift exchange. How might she have problems with cultural sensitivity? Explain

   ==Not everyone celebrates Christmas so it might be offensive to some cultures.==

Core Skills #2: Measure of Central Tendency in Statistics

7. A list of number is given:
   10, 14, 18, 12, 13, 15

   a) Find the **mean** the list

   $$\text{Mean} = \frac{10+14+18+12+13+15}{6} = \frac{82}{6} = 13.7$$

   b) Find the **median** of the list

   10, 12, 13, 14, 15, 18

   $$\text{Median} = \frac{13+14}{2} = 13.5$$

8. Find the **mode** of the following list

   a) 3, 5, 7, 5 , 9, 8, 9, 10, 7, 7, 9
   3, 5, 5, 7, 7, 7, 8, 9, 9, 9, 10
   mode 7 and 9

   b) 2, 3, 2, 5, 5, 3
   2, 2, 3, 3, 5, 5
   no mode

Core 1 Extending

9. Baby Cheung want ~~[crossed out]~~

Core 2 Extending

10. The mean of 30 numbers is 12. If the mean of the first 20 number is 15, what is the mean of the last 10 number?

   Mean of 30 = 12   Total = 30 × 12 = 360
   N N N .... ____ ____ N
   mean of 20 = 15   Mean of last 10 ?
   Total = 20 × 15 = 300   Total = 60

Mean of 20 = 15
Total = 20 × 15 = 300

Mean of last 10 ?
Total = 60

$$\text{mean} = \frac{60}{10 \text{ items}} = \boxed{6}$$
Ans)___ $\boxed{6}$

Core skill #3: Probability

11. State whether the following events are **mutually exclusive** and **explain** your reasoning. Drawing a heart or drawing a Jack from a standard deck of 52 playing cards.

Not mutually exclusive : There is a Jack of Heart.

12. State whether the following events are **Independent** and **explain** your reasoning. Rolling a 5 with one die and landing on a tail after tossing a coin

Independent : Rolling a die does not affect tossing a coin.

13. What is the probability that you will spin a number divisible by 3 on this spinner? 6 items

$$\frac{6}{8 \text{ total}} = \boxed{\frac{3}{4}}$$

(spinner: 18, 2, 15, 3, 12, 6, 10, 9)
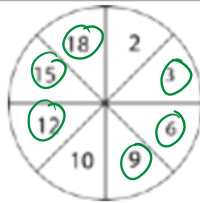
14. A game has three possible outcomes A, B and C. If P(A)=0.6 and P(B)=0.1, what is the probability of event C?

$$P(A) + P(B) + P(C) = 1$$
0.6   0.1
$$P(C) = 1 - 0.6 - 0.1 = \boxed{0.3}$$

15. A coin is tossed three times.

a) List the sample space for the three coins tosses. (ie, HHH, HHT......)

HHH   TTT   HTT   HHT   THT   HTH   TTH   THH

b) what is the probability of getting all 3 Heads

$$\boxed{\frac{1}{8}}$$

c) what is the probability of getting 2 heads and 1 tail?

$$\boxed{\frac{3}{8}}$$

16. Two 6-sided dice are rolled. Determine the probability of the following.

a. The sum of the two dice is 5
(1,4) (4,1)
(2,3) (3,2) $\boxed{\frac{4}{36}}$

b. The sum of the two dice is less than or equal to 6

Sum 2	Sum 3	Sum 4	Sum 5	Sum 6
(1,1)	(1,2)	(1,3)		(3,3)
	(2,1)	(3,1)		(2,4)(4,2)
		(2,2)		(1,5)(5,1)

$$P = \frac{15}{36}$$ $\frac{5}{12}$ $\boxed{P = \frac{5}{12}}$

c. The sum is greater than 8 or a multiple of 5

greater than 8				multiple of 5	
Sum 12	Sum 11	Sun 10	Sum 9	Sum 5	Sum 10
(6,6)	(5,6)	(5,5)	(3,6) (6,3)	(1,4)(4,1)	(5,5)
	(6,5)	(4,6)	(4,5) (5,4)	(2,3)(3,2)	(4,6)(6,4)
		(6,4)			

$$P(>8) = \frac{16}{36}$$
$$P(\times5) = \frac{7}{36}$$
$$P(>8 \text{ or } \times5) = \frac{16+7-3}{36}$$
$$= \frac{20}{36} = \boxed{\frac{5}{9}}$$

17. A jar contains 3 red, 2 yellow and 4 blue marbles. A marble is chosen at random from the jar. Without replacing it, a second marble is chosen. What is the probability of choosing a yellow and then a blue marble?

1st: 3R 2Y 4B   2nd: 3R 1Y 4B
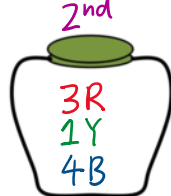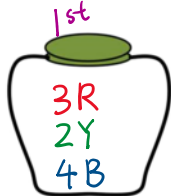
$$P(1^{st} Y) = \frac{2}{9}$$ $$P(2^{nd} B) = \frac{4}{8}$$

$$P(1^{st} Y \text{ and } 2^{nd} B) = \frac{2}{9} \times \frac{4}{8} = \boxed{\frac{8}{81}} = \boxed{9.9\%}$$

18. A deck of 52 cards from Ace to King has four suits: Heart and Diamond which are red and Spades and Clubs which are black. Determine the following probability

a) selecting a Red 9
$$\boxed{\frac{2}{52}}$$

b) drawing an even red card
2, 4, 6, 8, 10
5 items × 2
$$P = \frac{10}{52} = \boxed{\frac{5}{26}}$$

a) selecting a Red 9

$$\frac{2}{52}$$

b) drawing an even red card

5 items $\times 2$ ◆♥

$$P = \frac{10}{52} = \frac{5}{26}$$

c) not drawing a heart

13 Hearts

$52 - 13 = 39$ not heart

$$\frac{39}{52} = \frac{3}{4}$$

d) drawing a face card **or** a 9

$$P(Face) = \frac{12}{52}$$
$$P(9) = \frac{4}{52}$$

$$P(Face \text{ or } 9) = \frac{12}{52} + \frac{4}{52} = \frac{16}{52} = \frac{4}{13}$$

e) drawing a Spade or a 7

$$P(Spade) = \frac{13}{52}$$
$$P(7) = \frac{4}{52}$$

overlap

$$P(Spade \text{ or } 7) = \frac{13}{52} + \frac{4}{52} - \frac{1}{52}$$

$$P = \frac{16}{52} = \frac{4}{13}$$

f) drawing a 3, then drawing another 3 without replacing the first card

$$P(1^{st} 3) = \frac{4}{52}$$
$$P(2^{nd} 3) = \frac{3}{51}$$

$$P(1^{st} 3 \text{ and } 2^{nd} 3) = \frac{4}{52} \times \frac{3}{51} = \frac{1}{221}$$

19. 90 people in a community participated in a technology survey. It was found that 70 people have a smartphone, 40 people have a tablet. Fill in the Venn Diagram, then what is the probability that a person selected a random has....

   a.   A smartphone only
   b.   both a smartphone and a tablet
   c.   a smartphone or a tablet
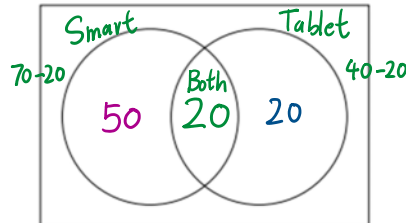
$$\overset{S}{70} + \overset{T}{40} = 110 \text{ but only } 90 \text{ ppl}$$

$$\therefore 110 - 90 = 20 \text{ ppl over counted (both)}$$

Smart   Tablet

$70 - 20$ $40 - 20$

50   Both 20   20

a) $\dfrac{50}{90} = \dfrac{5}{9}$

b) $\dfrac{20}{90} = \dfrac{2}{9}$

c) $\dfrac{90}{90} = 1$