GRADE 8 MATH — 4TH QUARTER

4.1 INTRODUCTION TO SYSTEM OF LINEAR EQUATIONS

-A system of linear equations is a set of two or more linear equations with the same variables

Example:
x + y = 5
x - y = 1

Solutions of a system
•**One solution —** lines intersect
•**No solution —** parallel lines
•**Infinite solutions —** same line

4.2 SOLVING A SYSTEM OF LINEAR EQUATIONS ALGEBRAICALLY

Methods:

1. Substitution — solve one equation for a variable, then substitute into the other.
2. Elimination — add or subtract equations to eliminate a variable.
3. Comparison — solve both equations for the same variable and compare.

Example (Elimination)
x + y = 5
x - y = 1 (add 2x = 6, x = 3, then y = 2)

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4.3 SOLVING PROBLEMS INVOLVING LINEAR INEQUALITIES

-Linear Inequalities uses symbols : <.>. <.>

Example:
x + 3 > 5
x > 2

When multiplying/dividing by a negative, flip the inequality sign
Example:
-2x > 6 ~ x < -3

PROBABILITY AND COUNTING TECHNIQUES

-Used in count possible outcomes efficiently

Counting Principles

1. Fundamental Counting Principle to Multiply choices.
   .Example: 3 shirts × 2 pants = 6 outfits

2. Permutation (Arrangement maatters)
   $P(n,r) = \frac{n!}{(n-r)!}$
3. Combination (Arrangement doesn't matter)
   $C(n, r) = \frac{n!}{r!(n-r)!}$

4.4 MEASURES OF VARIABILITY OF UNGROUPED DATA

-This shows how spread out data is.

1. Range : Range = Highest - Lowest or R=H-L
2. Mean Deviation : Average of the absolute differences between each data point and a central point (mean or median)
3. Variance : Average of squared distance from mean
4. Standard Deviation: Square root of variance—small value: data close together, large values: data spread out

4.5 PRIMARY AND SECONDARY DATA

- Primary Data: Collected first-hand by researcher

Example: Surveys, Interviews, etc.

- Secondary Data : Already collected by others

Example: Books, Internet, Government reports, etc.

4.6 SAMPLE SPACE AND COUNTING SAMPLE POINTS

-Sample space — set of all possible outcomes

Example: Rolling die — S = 1, 2, 3, 4, 5, 6

4. 7 EXPERIMENTAL AND THEORETICAL PROBABILITY

Experimental Probability — Based on actual experiment

$$P(E) = \frac{\text{times event occurs}}{\text{total outcomes}}$$

Example: coin tossed 20 times, 12 heads

$$\frac{12}{20}$$

•Heads = 12
•Tails = 8

Solution: We are asked for the probability of getting heads.

$$P(H) = \frac{12}{20}$$

P (H) = 0.6 or 60%

-Because experimental probability uses real results from an experiment.
-The coin was tossed 20 times and it actually landed heads 12 times, so we use that number.

Experimental probability can change if the experiment is repeated.

Theoretical Probability — based on formulas

$$P(E) = \frac{\text{favorable outcomes}}{\text{total outcomes}}$$

Example: probability of 3 on a die

$$\frac{1}{6}$$

Solution: A die has 6 possible outcomes:

S = {1, 2, 3, 4, 5, 6}

-Favorable outcome = 2 only — 1 outcome
-Total outcomes = 6

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

P (2) = 0.167 or 16.7%

-The question chooses event “getting a 2.”
-Theoretical probability does not depend on experiments.
-It uses all possible outcomes of a fair die.