Grade 7 Mathematics

Term 3 Exam Readiness & Comprehensive Study Guide

CAPS Curriculum Aligned

Learner Name: _____

Class / Grade: Grade 7 _____

Teacher: _____

Date: _____

Examination Overview

Duration: 60 Minutes

Total Marks: 50 Marks

Difficulty: Easy to Medium

Coverage: Term 3 Geometry & Data/Probability

1. Test Scope & Assessment Blueprint

This test preparation guide directly mirrors the structure and weighting of the Grade 7 Term 3 Mathematics Examination. Review the blueprint below to focus your study time effectively.

Section	Focus Area	Marks	Topics Covered
Section A	Multiple Choice	10 Marks	Definitions, visual angle identification, basic circle properties, simple probability concepts, cross-sections.
Section B	Short Calculations	15 Marks	Radius/Diameter conversions, Circumference, Area of circles, Volume of rectangular prisms/cubes, theoretical probability calculations.
Section C	Geometry & Constructions	15 Marks	Solving missing angles (complementary, supplementary, vertical), Triangle Inequality Theorem applications, triangle classifications.
Section D	Data & Probability	10 Marks	Compound event sample spaces, tree diagrams, predicting outcomes, interpreting dot plots, experimental vs. theoretical probability.

2. "Must-Know" Formula Sheet

Memorize these essential geometric and statistical formulas. Ensure correct units are included in all calculated answers (e.g., cm, cm², cm³).

Geometry & Circle Formulas

Radius / Diameter:

$d = 2r$ | $r = \frac{d}{2}$

Circle Circumference (Perimeter):

$C = 2\pi r$ or $C = \pi d$

Area of a Circle:

$A = \pi r^2$ *(Note: Use $\pi \approx 3{,}14$ or $\frac{22}{7}$)*

Volume of Rectangular Prism / Cube:

$V = l \times b \times h$ | $V_{cube} = s^3$

Probability Formulas

Theoretical Probability: $P(Event) = \frac{\text{Number of Favourable Outcomes}}{\text{Total Number of Possible Outcomes}}$

Experimental Probability (Relative Frequency): $P(Experimental) = \frac{\text{Number of Times Event Occurred}}{\text{Total Number of Trials}}$

3. Core Notes & Worked Examples

Part 1: Geometry

A. Circle Relationships

A circle is a 2D shape where all points on the boundary are at an equal distance from the center.

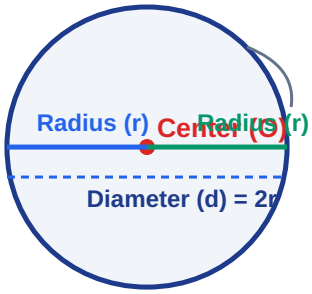

Figure 1: Anatomy of a circle showing Center, Radius, Diameter, and Circumference.

Radius (r): Distance from the center to any point on the outer edge.

Diameter (d): Distance across the circle passing through the center. ($d = 2r$)

Circumference (C): The perimeter around the outside of the circle.

Worked Example: Circle Area & Circumference

Question: Calculate the circumference and area of a circular swimming pool with a radius of $r = 7\ cm$. (Use $\pi = \frac{22}{7}$).

Solution:

1. $C = 2\pi r = 2 \times \frac{22}{7} \times 7 = 2 \times 22 = 44\ cm$
2. $A = \pi r^2 = \frac{22}{7} \times (7)^2 = \frac{22}{7} \times 49 = 22 \times 7 = 154\ cm^2$

B. Angle Relationships

Understanding angle rules allows you to find unknown angles without measuring.

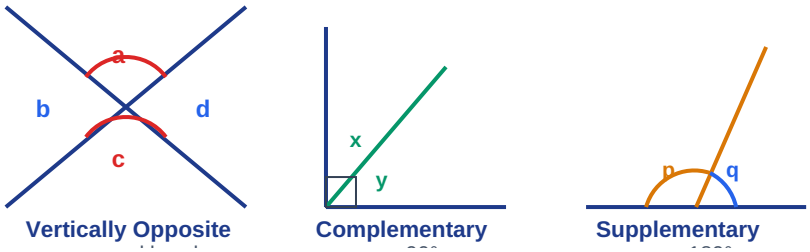

Figure 2: Key angle relationships used in geometric calculations.

- **Complementary Angles:** Two or more angles that add up to $90°$.
- **Supplementary Angles:** Angles on a straight line that add up to $180°$.
- **Vertically Opposite Angles:** Equal angles formed opposite each other when two straight lines intersect.

C. Triangle Inequality Theorem & Properties

The Triangle Inequality Rule

The sum of the lengths of any two sides of a triangle must always be **strictly greater** than the length of the third side:

$$a + b > c \quad | \quad a + c > b \quad | \quad b + c > a$$

Warning: Common Mistake in Triangle Construction

Can a triangle have sides of length $3\ cm$, $4\ cm$, and $8\ cm$?
Check: $3 + 4 = 7\ cm$. Since $7\ cm < 8\ cm$, these sides **cannot** form a triangle! The two shorter sides would never meet.

D. Volume of 3D Prisms & Cross-Sections

A **cross-section** is the 2D shape revealed when you make a straight cut through a 3D object.

- A rectangular prism cut parallel to its base gives a rectangle identical to the base.
- **Volume Formula:** $V = ext\{Base\ Area\} \times ext\{Height\} = l \times b \times h$

Part 2: Probability & Data Handling

A. Theoretical vs. Experimental Probability

Theoretical Probability	Experimental Probability
Based on mathematical reasoning/fair conditions.	Based on actual experiment or test results.
What *should* happen in theory.	What *actually* happened during trials.
Example: Rolling a standard die, $P(4) = \frac{1}{6}$.	Example: Rolling a die 60 times and getting '4' 12 times: $P(4) = \frac{12}{60} = \frac{1}{5}$.

Note: As the number of trials increases, experimental probability gets closer to theoretical probability.

B. Tree Diagrams & Compound Events

A **compound event** involves two or more simple events (e.g., flipping a coin twice). A **tree diagram** maps out all possible outcomes in the sample space.

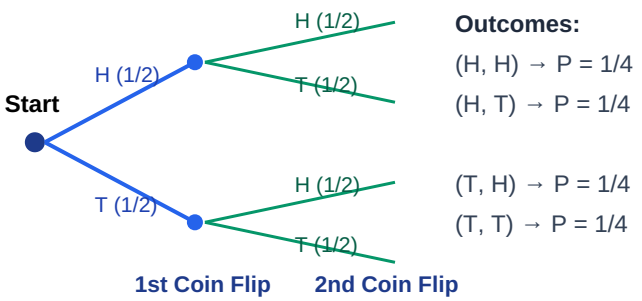

Figure 3: Tree Diagram for flipping a fair coin twice, showing sample space and probabilities.

4. Quick Practice Questions ("Test Your Knowledge")

Complete these exam-style questions to assess your readiness. Answers are provided at the end of this guide.

Question 1 (Section A - 2 Marks):
Two angles are supplementary. If Angle A measures $65°$, what is the measure of Angle B?
a) $25°$ b) $115°$ c) $35°$ d) $125°$

Question 2 (Section B - 3 Marks):
A circular garden rug has a diameter of $14\ cm$. Calculate:
a) The radius of the rug.
b) The area of the rug using $\pi = \frac{22}{7}$.

Question 3 (Section C - 3 Marks):
You are given three wooden sticks of lengths $5\ cm$, $9\ cm$, and $15\ cm$. State whether these sticks can be connected to form a triangle. Show your working using the Triangle Inequality Theorem.

Question 4 (Section B - 3 Marks):
Calculate the volume of a rectangular prism storage box with length $l = 10\ cm$, width $b = 4\ cm$, and height $h = 5\ cm$.

Question 5 (Section D - 4 Marks):
A bag contains 3 red marbles and 2 blue marbles. A marble is drawn, its color is recorded, and then it is replaced in the bag. A second marble is then drawn.
a) Draw a simple tree diagram or list the sample space of possible outcome color pairs.
b) What is the theoretical probability of drawing two red marbles in a row?

Answer Key & Detailed Solutions

Question 1 Solution:
Supplementary angles add up to $180°$.
$ext{Angle B} = 180° - 65° = 115°$.
Correct Option: b) 115°

Question 2 Solution:
a) $r =$

$\frac{d}{2} = \frac{14}{2} = 7$ cm.

b) $A = \pi r^2 = \frac{22}{7} \times (7)^2 = \frac{22}{7} \times 49 = 154\ cm^2$.

Question 3 Solution:

Check the two shorter sides against the longest side:

$5 + 9 = 14\ cm$.

Since $14\ cm < 15\ cm$, the sum of the two shorter sides is NOT greater than the third side.

Conclusion: No, these sticks cannot form a triangle.

Question 4 Solution:

$V = l \times b \times h = 10\ cm \times 4\ cm \times 5\ cm = 200\ cm^3$.

Question 5 Solution:

Total marbles = $3 + 2 = 5$.

Probability of Red on 1st draw: $P(R) = \frac{3}{5}$.

Probability of Red on 2nd draw: $P(R) = \frac{3}{5}$.

a) Sample Space: $\{(R,R), (R,B), (B,R), (B,B)\}$.

b) $P(R, R) = \frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$ (or 0,36 / 36%).