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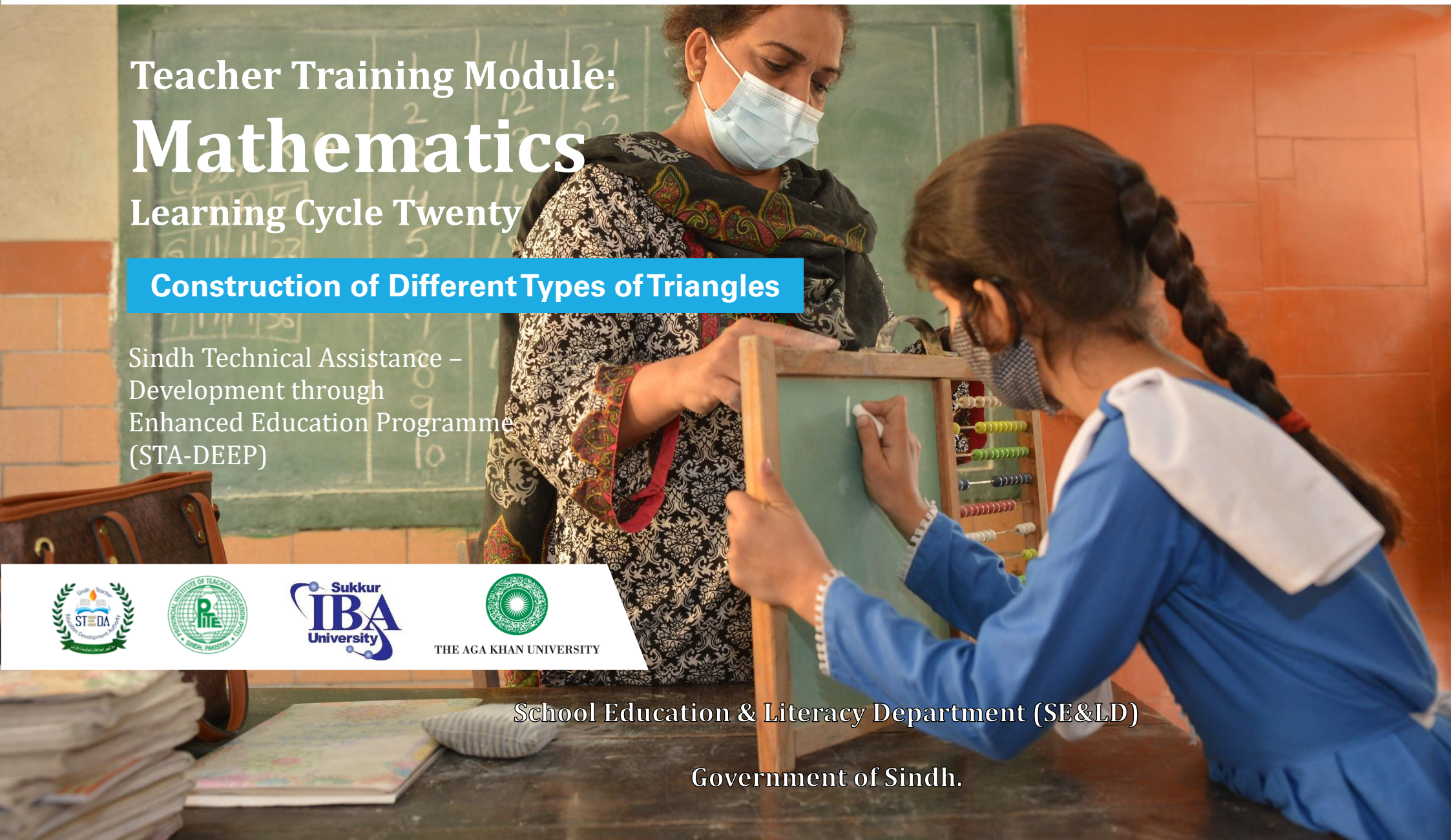
Teacher Training Module:

Mathematics

Learning Cycle Twenty

Construction of Different Types of Triangles

Sindh Technical Assistance – Development through Enhanced Education Programme (STA-DEEP)



School Education & Literacy Department (SE&LD)

Government of Sindh.

Introduction and Rationale of the Training

Dear Teachers!

Welcome to the new phase of the Continuous Professional Development (CPD) Program. In the previous phase, we had focused on pedagogical skills that helped you to develop your skills to make classroom more interactive, participative, and joyful for our students. In the new phase, we will continue practicing those pedagogical skills and also learn about the introduced content knowledge and skills in Mathematics, Science, English, Urdu, and Sindhi. As a result, you will be better prepared to deal classroom situation using modern teaching strategies integrated with subject knowledge.

Our vision

Our common goal is to improve the quality of teaching in schools all over Sindh. We want students to become active and collaborative learners, problem solvers, and critical thinkers who approach tasks with creativity and confidence. They are conceptually clear about the subject content and have the skills to link this content with the world around them. To make this possible, we, as teachers, must be better prepared for the classroom demands in pedagogy and the subject content. Moreover, we aim to professionalize these trainings so that the CPD teacher training courses make an impact and substantially change student performance.

Our Teaching Philosophy

The CPD training sessions, including this training, follow a participatory teaching philosophy that engages teachers to apply and practice active and collaborative learning, as well as engage in self and peer reflection to become community of practice. The objective is not only to improve the teaching practices but to help you understand the theory of the subject content and the strategies that help students apply the content in daily life with confidence and mastery.

Supporting You

The training module is designed to support you in your classroom teaching. It will introduce you to the subject content and some approaches for use in the classroom. This will make your teaching more manageable and help you grow as a skillful teacher.

Acknowledgement

This module was developed by IBA Sukkur University and Aga Khan University - Institute for Educational Development under the direction of the Provincial Institute of Teacher Education (PITE). It was supported by UNICEF in the scope of the Sindh Technical Assistance Development through Enhanced Education Program (STA-DEEP), funded by the European Union.

We would like to express sincere gratitude to the following contributors:

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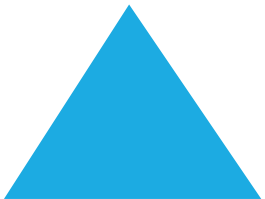
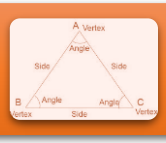
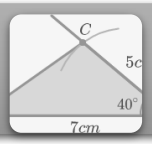


Constructions of Different Types of Triangles

Learning Objectives: By the end of the session, the teachers will be able to:



Classify triangles according to their sides and angles



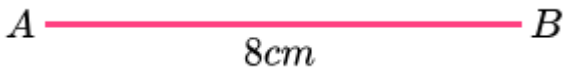
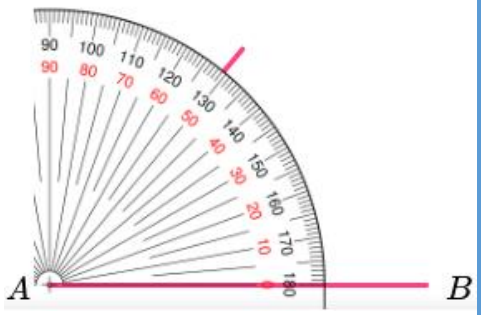
Construct different types of triangles using protractor and/or compass and steps of contruction

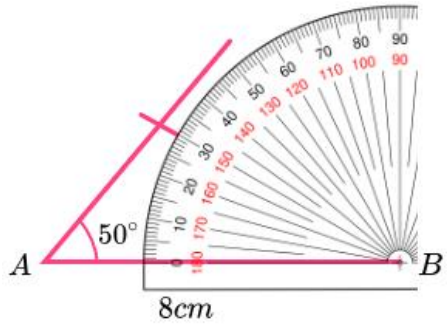
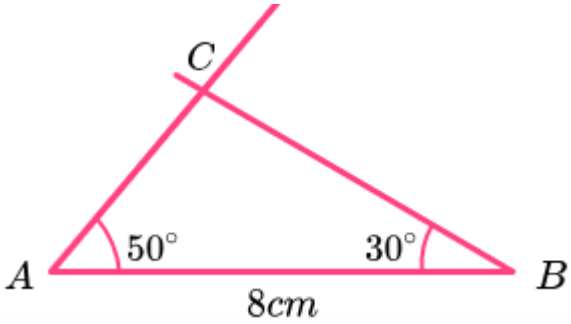
Explore that the triangle is constructed when the sum of two sides of a triangle is greater than the third side.

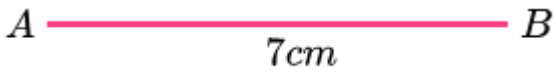
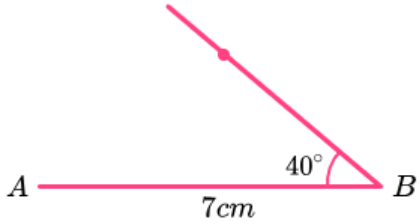
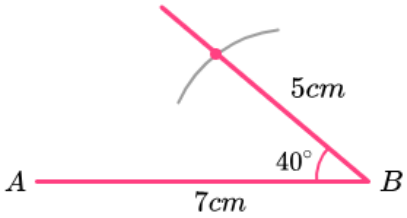
Session Plan

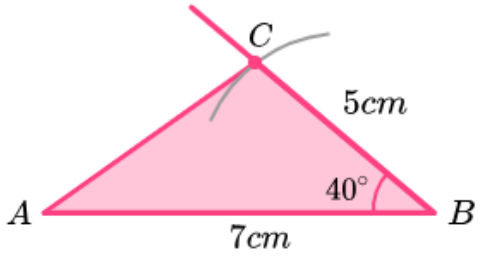
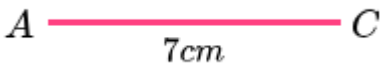
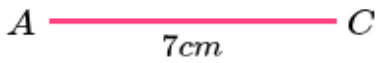
Instructional strategies/activities

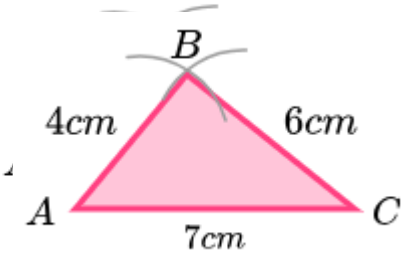
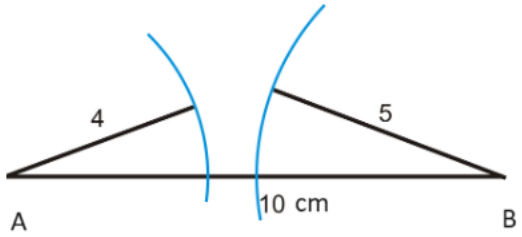
Time	Objective/purpose of the activity	Activities/learning experiences	Materials/resources
 30 min	**Activity 1:**  **Classify triangles with respect to angles and sides**	**Warm-up Activity:** **Instructions for the activity:** Handout-20.1A contains three Sets of triangles. The facilitator will divide teachers into three groups and give one set to each group. Teachers will work on following task: • Label the vertices of all the triangles • Measure the angles and sides of each triangle • Take one triangle at a time and classify it according to sides (isosceles, equilateral and scalene) and angles (right-angled, acute-angled and obtuse-angled triangle) in the handout-20.1B • Teachers will observe 'What is special about these triangles? In other words, what makes these triangles different to other triangles'? • Each group will share their work in class. **Facilitators' input** According to the lengths of their sides, triangles can be classified into three types which are: Scalene, Isosceles, and Equilateral.	Handout-20.1A Handout-20.1B Protractor Pencil Scale Eraser

		Triangles can be classified into three types with respect to their interior angles which are: Acute-angled triangle, Obtuse-angled triangle, Right-angled triangle.	
20 min	**Activity:**  **Construction of Triangle (ASA)**	Activity 2. The facilitator explains the construction of a triangle by using ruler and protractor i.e., a triangle having two angles and a side (ASA). AB =8cm, $\angle B = 30^{o}$, $\angle A = 50^{o}$ 1. Use a pencil and a ruler to draw the base of measurement 8 cm.  2. At point *A* use a protractor to measure the angle 50°, make a mark and then draw a straight line from point A through the mark. Make this line long. 	Protractor Pencil Foot Scale Eraser

		3. At point *B* use a protractor to measure the angle 30°, make a mark and then draw a straight line from point B though the mark which intersect at point C.   The triangle ABC is constructed Ask teachers to construct a triangle and share it with teacher sitting next to him/her Construct triangle PQR where PQ =7 cm, $\angle P = 45^0$, $\angle Q = 60^0$ and write the steps of construction.	

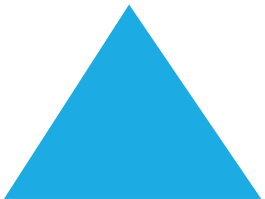
20 min	**Activity:**  **Construction of triangle SAS**	**Activity 3.** The facilitator explains the construction of a triangle by using ruler and protractor i.e., a triangle having two sides and an angle (SAS). **Construct △ ABC** Where, AB = 7 cm ∠ B = 40° and BC = 5cm 1. Use a pencil and a ruler to draw the base  2. At point B use a protractor to measure the angle 40°, make a mark and then draw a straight line from point B through the mark. Make this line long.  3. Taking B as centre, 5 cm as radius draw an arc which intersect at point C 	

		4. Join A and C.  The triangle is constructed Ask teachers to construct a triangle and share it with teacher sitting next to him/her **1.** Triangle DEF where DE =7 cm, ∠ E = 45⁰, EF = 8cm and write the steps of construction.	
 20 min	**Activity:**  **Construction of triangle SSS**	Activity 4: Construct SSS △ ABC Where, AC = 7 cm AB = 4 cm and BC= 6 cm **1.** Draw AC 7 cm long.   2. Take A as center 4cm as radius draw an arc  	

		3. Take C as center, 6 cm as radius draw an arc which intersects at point B. Join AB and CB.  The triangle is constructed Ask teachers to construct a triangle and share it with teacher sitting next to him/her **1.** Triangle KLM where KL =5 cm, LM = 6.5 cm KM = 7 cm and write the steps of construction.	
 15 min	**Activity:**  **Pattern Seeking Challenge!**	The facilitator will ask the teachers to construct a triangle when sides are 4cm, 5cm, 10cm Expected response: This triangle will not be constructed. 	Refer Mathematics STBB Class VI Exercise 10.3

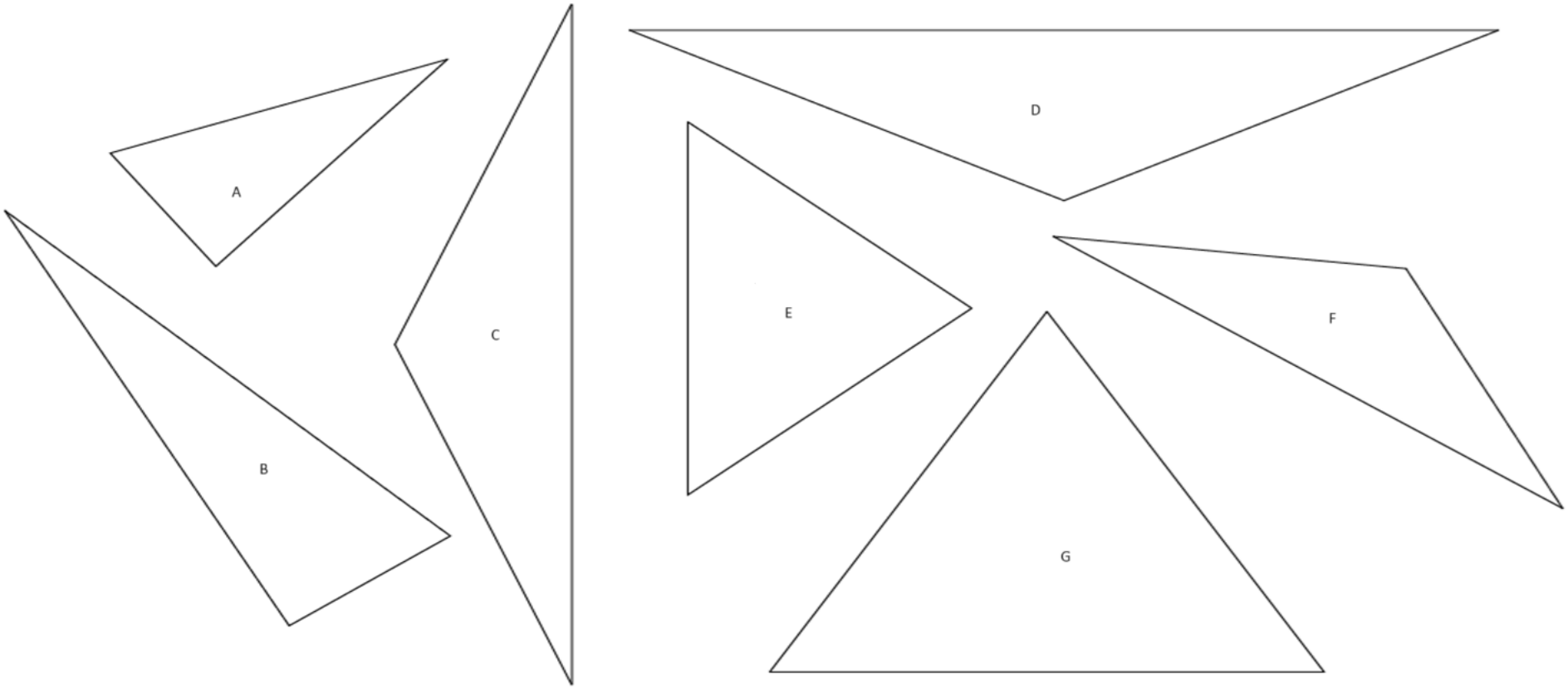
		After the teachers mention that they are not able to construct a triangle, facilitator will ask them to explore the reason by observing all the triangle constructed. Give them hint to see the relationship between two sides with the third side. Facilitator's Notes: Because the triangle is constructed when the sum of two sides of a triangle is greater than the third side. In this case sum of two sides i.e., 4+5 is not greater than 10.	
 15 mins	**Activity:**  **Assessment**	Teachers will be asked to complete the assessment 1. When three sides of the triangle are equal then this triangle can be classified as: i. Isosceles triangle ii. Equilateral triangle iii. Obtuse-angled triangle 2. Find the measure of the third angle of a triangle when ∠A = 70°, ∠B = 80° i. ∠C= 30° ii. ∠C= 40° iii. ∠C= 50°	

		3. Construct a triangle PQR in which PQ = 4 cm, QR is 6 cm and ∠Q =40° 4. Construct a triangle ABC in which BC = 6 cm, CA = 5 cm and AB = 4 cm. 5. Construct a right-angled triangle ABC in which ∠C = 90° and ∠B = 45°, CB = 5 cm.	

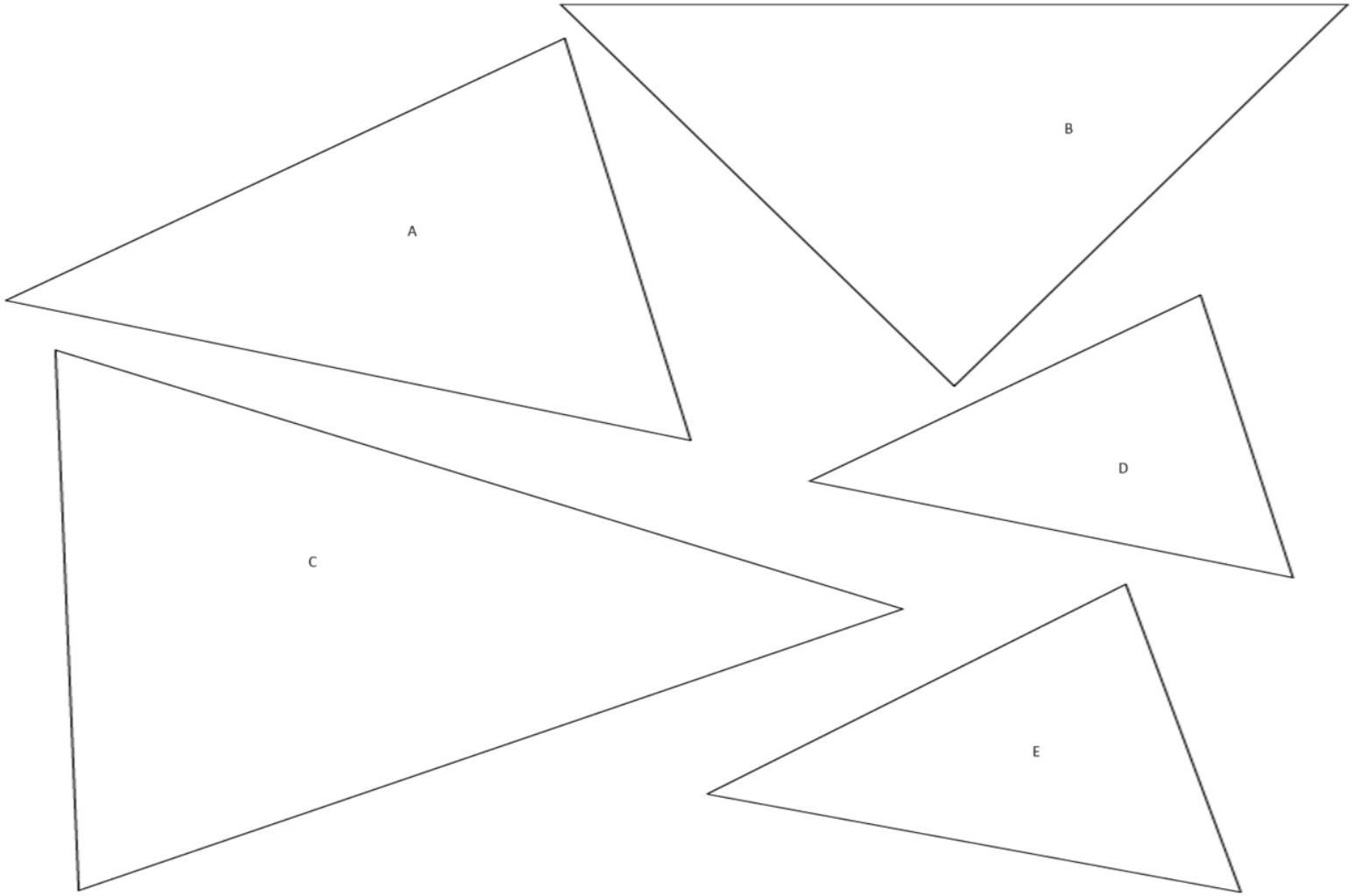


Handout 20.1A

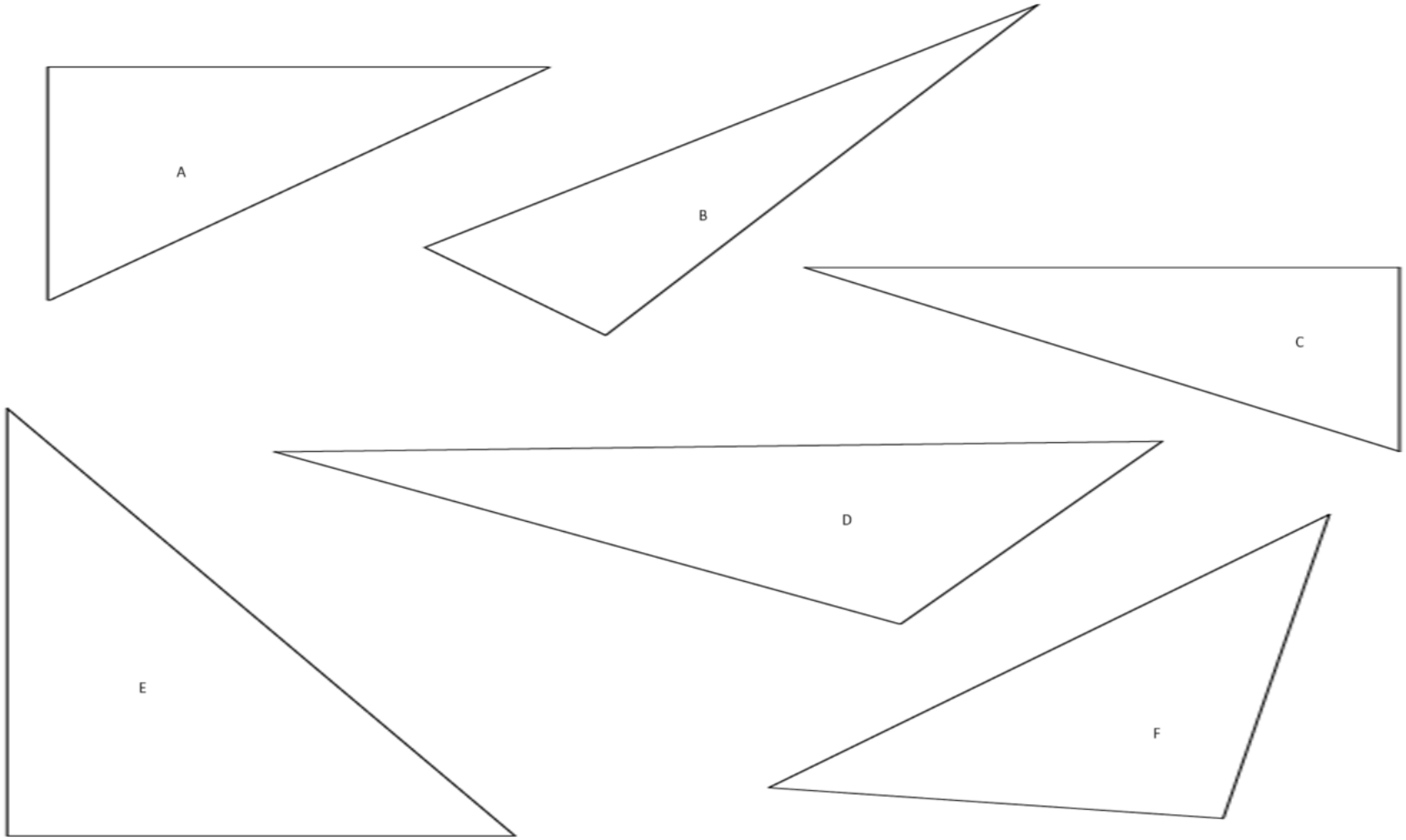
Set 1.



Set 2



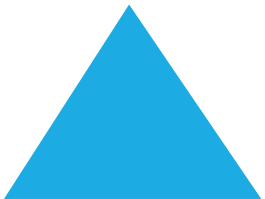
Set 3



Handout 20.1B

Set Number _____

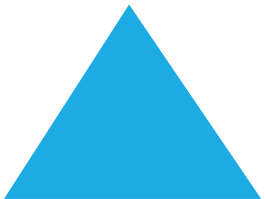
Triangle	**Measure of side 1, side 2, side 3 (in cm)**	**Measure of angle 1, angle 2, angle 3 (in degrees)**	**Name of the triangle as per Sides** (isosceles/ equilateral/ scalene)	**Name of the triangle as per angles** (right- angled / acute-angled / obtuse-angled)
A				
B				
C				
D				
E				
F				
G				



For reference:

List of 1-20 LCs topics

Learning Cycles (LCs)	Topics
LC-1	Developing Number Sense
LC-2	Fractions
LC-3	Decimal and Percentage
LC-4	Ratio and Proportion
LC-5	Introduction to Algebra
LC-6	Algebraic Identities
LC-7	Angle and its Constructions
LC-8	Area and Perimeter
LC-9	Three Dimensional Shapes
LC-10	Information Handling
LC-11	Place Value
LC-12	Highest Common Factor (HCF) and Least Common Multiple (LCM)
LC-13	Fraction Addition and Subtraction
LC-14	Fraction Multiplication
LC-15	Laws of Exponents
LC-16	Square Roots
LC-17	Simultaneous Linear Equations
LC-18	Unit Conversion
LC-19	Pythagoras Theorem
LC-20	**Construction of Different Types of Triangles**



For reference:

List of Resource Items for LCs (11-20)

Items	No. of items	LC-11	LC-12	LC-13	LC-14	LC-15	LC-16	LC-17	LC-18	LC-19	LC-20
Dice	8	✓							✓		
Pair of scissors	8	✓	✓								
Paper Plate	18		✓								
Red beans	½ kg	✓	✓								
Counters (Red/Black)	10								✓		
Counters (Blue/White)	10								✓		
Color pencil box	4			✓	✓						
Measuring tape	8								✓		
Geometry Box	8									✓	✓

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