Geometry

Name _____ Date _____

SESSION 1

A diagonal that proves something

In quadrilateral ABCD, AB is parallel to CD and AB = CD. Draw diagonal AC. Prove triangles BAC and DCA congruent and then show BC is parallel to AD. State why each step follows.

Start here if you were away. Draw the diagonal. Find one side shared by both triangles.

SESSION 2

From coordinates to a proof

Plot A(0,0), B(4,0), C(6,3), D(2,3). Prove ABCD is a parallelogram and decide whether it is a rectangle. Give a reason for both results.

Start here if you were away. Compare the directions of opposite sides first.

Geometry

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SESSION 3

Why the shadows tell us height

At the same time on level ground a 1.5 m post casts a 2 m shadow and a tree casts an 8 m shadow. Both stand vertically. Draw and justify a proportion, find the height, and identify one condition that could invalidate the model.

Start here if you were away. Draw a right angle at each base. Mark the sunlight direction.

SESSION 4

Turn an arc into a length

A circular track has radius 12 m. A runner travels counterclockwise through a central angle of 150 degrees. Find the arc length exactly, and explain why it is shorter than half a lap. Compare it with the straight path between endpoints.

Start here if you were away. Write the fraction of a complete turn first.

Geometry

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SESSION 5

Which measures scale?

A solid cylinder of radius 2 cm and height 5 cm is enlarged by a scale factor of 3 in every length. Compute the original and enlarged volumes. Explain why tripling only the original volume gives a different result.

Start here if you were away. Write $V = \pi r^2 h$. List the new radius and height.

SESSION 6

Prove or disprove a classification

For A(0,0), B(3,1), C(2,4), D(−1,3), decide whether ABCD is a square. Support both angle and side claims. Decide whether equal diagonals alone would have proved it.

Start here if you were away. Compute the direction and squared length of each side.