

Year 9 · 9.1 Architecture: Pythagoras and Trigonometry — Learning objectives

What students should be able to do by the end of this unit.

Area Review

1. I can calculate the areas of various shapes.
2. I can plot and identify coordinates on a Cartesian plane (xy graph).

Surds

3. I can differentiate between rational and irrational numbers.
4. I can understand the concept of surds and their approximate values.
5. I can perform simple manipulations and apply basic identities involving surds.

Pythagoras' Theorem

6. I can solve equations of the form $x = k$.
7. I can apply Pythagoras' theorem to find missing sides in right-angled triangles.
8. I can use Pythagoras' theorem for practical applications, including finding distances between two points and lengths on 3D solids (such as prisms, pyramids, cones, and spheres).
9. I can understand the informal concept of the converse of Pythagoras' theorem.
10. I can understand and use vocabulary related to 3D shapes, such as vertex, edge, and face.
11. I can classify different 3D shapes and identify their properties.
12. I can understand and create nets of 3D shapes.
13. I can calculate the surface area of prisms and cylinders.
14. I can calculate the volume of solids, including prisms, pyramids, and cylinders.
15. I can convert between units of capacity.

Formulae and Solving Equations

16. I can substitute values into given formulae.
17. I can rearrange formulae to solve for a specific variable.
18. I can solve rational equations involving rearrangement and substitution.
19. I can solve equations for a single variable.

Transformations

- 20. I can perform translations, rotations, and reflections of shapes.
- 21. I can transform individual coordinates and rigid figures on the Cartesian plane.
- 22. I can describe transformations in detail.
- 23. I can perform and describe compound transformations.

Congruence and Similarity

- 24. I can understand definitions and notation for congruence ($\equiv$) and similarity ($\sim$).
- 25. I can identify congruent figures (without specific triangle congruency rules).
- 26. I can identify similar figures using matching angle criteria.
- 27. I can find missing sides or angles in similar figures. 2.
- 28. I can understand that area scales by the square of the scale factor (sf) and convert between area units. 3.
- 29. I can understand that volume scales by the cube of the scale factor (sf) and convert between volume units.

Trigonometric Ratios

- 30. I can identify and name the sides of a right-angled triangle.
- 31. I can define sine, cosine, and tangent ratios.
- 32. I can use trigonometric ratios to find missing sides or angles in right-angled triangles.