CLASS 7 MATHS EXTRA QUESTIONS

Extra Questions for Class 7 Maths Chapter 14: Constructions and Tilings

Fresh practice questions for Class 7 Maths Chapter 14 "Constructions and Tilings", reinforcing ruler-and-compass constructions and tiling logic.

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Q1.

What is the minimum information needed to construct the perpendicular bisector of a line segment, and why must both arcs in a single pair use the same radius?

Answer: You only need the line segment itself. Both arcs in a pair must use the same radius because the perpendicular bisector is defined as the set of all points equidistant from both endpoints — if the two arcs had different radii, their intersection point would not be equidistant from the endpoints, and so would not lie on the true perpendicular bisector.

Q2. Assertion-Reason

Assertion (A): A 3-4-5 triangle always contains a right angle.
Reason (R): $3^2 + 4^2 = 5^2$, satisfying the converse of the Pythagoras theorem.

Answer: Both A and R are true, and R correctly explains A. Since 9 + 16 = 25, the converse of the Pythagoras theorem confirms the angle opposite the side of length 5 is a right angle.

Q3.

Starting from a constructed 60° angle (an equilateral triangle’s angle), list three new angles you could construct using only bisection and addition.

Answer: Bisecting 60° gives 30°; bisecting again gives 15°. Adding: 60° + 30° = 90°, 60° + 60° = 120°, 30° + 15° = 45°. (Any three of 30°, 15°, 90°, 120°, 45°, etc. are acceptable.)

Q4. Spot the Error

A student says: “To copy an angle without a protractor, I just need to measure its degree value with a ruler.” What’s wrong with this statement?

Answer: Incorrect. A ruler measures lengths, not angles, and cannot be used to directly determine or copy a degree value. The correct method uses a compass: draw equal-radius arcs cutting both arms of the original angle, measure the chord length between the two intersection points with the compass, and transfer that same chord length onto a new arc drawn from the new vertex — this recreates the identical angle using only length comparisons, no degree measurement needed.

Q5.

Why does joining six points marked around a circle — each exactly one radius-length apart — always produce a regular hexagon, no matter how big the circle is?

Answer: When the chord between two adjacent points equals the circle’s radius, the triangle formed by those two points and the centre has all three sides equal to the radius (two radii plus the equal chord), making it equilateral — so each central angle is exactly 60°. Since 360° ÷ 60° = 6 exactly, stepping off this chord length six times always returns exactly to the starting point, forming a regular hexagon, regardless of the circle's size.

Q6. HOTS

A rectangular region has 25 black squares and 25 white squares in a checkerboard colouring. Can it always be tiled using 2×1 dominoes? Explain.

Answer: Not necessarily — equal black and white counts are a **necessary** condition for domino tiling, but not always a **sufficient** one. Even with equal colour counts, the specific shape of the region matters: some regions with equal black/white squares still cannot be tiled if their shape blocks a valid domino arrangement (for example, a region split into two separate parts each with an odd number of squares). Equal counts rule out tiling being impossible for the colour-parity reason, but the actual arrangement must still be checked.

Q7.

Explain, using the perpendicular-bisector-locus idea, how you can construct a perpendicular to a line l through a point P that lies outside l.

Answer: Draw an arc centred at P that crosses line l at two points, A and B. Since both A and B are the same distance from P (equal radii of the same arc), P is equidistant from A and B, so P must lie on the perpendicular bisector of AB. Constructing that perpendicular bisector (using the standard equal-radius-arc method from A and B) therefore automatically produces a line that passes through P and is perpendicular to l.

Q8.

Why is a rhombus with a 45° angle a natural building block for a rosette pattern made of exactly 8 identical rhombi around a central point?

Answer: A full turn around a point is 360°. Dividing this equally among 8 rhombi means each rhombus must contribute 360° ÷ 8 = 45° at the centre. Since 8 × 45° = 360° exactly, eight such rhombi fit together around the point with no gaps and no overlaps.

Q9.

What is the Kanizsa triangle, and what psychological phenomenon does it demonstrate?

Answer: The Kanizsa triangle is a famous optical illusion (described by Gaetano Kanizsa in 1955) made of three "notched" circles and angled line segments arranged so that the human brain perceives a bright white triangle in the middle, even though no triangle is actually drawn. It demonstrates **illusory (subjective) contours** — the brain's tendency to automatically complete missing edges and shapes it expects to see, based on the surrounding visual cues.

Q10.

A standard tangram set has 7 pieces. List them, and explain the one rule that must always be followed when forming a new figure.

Answer: The 7 tangram pieces are: 2 large right triangles, 1 medium right triangle, 2 small right triangles, 1 square, and 1 parallelogram. The key rule: all 7 pieces must be used exactly once each, placed edge-to-edge with no gaps and no overlaps, to form the new figure.

See also: NCERT Solutions for Class 7 Maths Chapter 14

Quick revision: Revision Notes for Class 7 Maths Chapter 14