Geometry · Shape & Space — Practice

CKSTEM Math Problem Solving · Grades 4–8

1 LENGTH, ANGLE, OR AREA?

A square classroom mat measures 3 m on every side. Name the measure each question asks for, then answer: (a) the distance around the mat, (b) the size of one of its corners, (c) the space the mat covers.

WORK IT OUT HERE

2 LENGTH, ANGLE, OR AREA?

A rectangular welcome banner is 8 m long and 5 m wide. Answer each question with the correct unit: (a) length of trim needed to go all the way around the banner, (b) measure of one corner of the banner, (c) area of the fabric.

WORK IT OUT HERE

3 LENGTH, ANGLE, OR AREA?

A rectangular playground is 12 m by 7 m. Match each quantity to LENGTH, ANGLE, or AREA, then compute it with the right unit: (a) metres of fencing around the playground, (b) the corner where two fences meet, (c) the playing surface inside.

WORK IT OUT HERE

4 PERIMETER IS THE BOUNDARY

Four identical square tiles, each 1 m on a side, are joined edge-to-edge in a single straight row. What is the perimeter of the whole row?

WORK IT OUT HERE

5 PERIMETER IS THE BOUNDARY

Eight identical square stepping stones, each 2 m on a side, are joined edge-to-edge in a single straight row. What is the perimeter of the whole row?

WORK IT OUT HERE

6 PERIMETER IS THE BOUNDARY

Twelve identical rectangular bricks are joined in a single straight row, long sides touching short sides — each brick is 3 m long and 1 m wide, and the long 3 m edges of neighbouring bricks butt together. What is the perimeter of the whole row?

WORK IT OUT HERE

7 FIXED PERIMETER → HALF

A rectangular lawn has a perimeter of 20 m. The length is 2 m more than the width. What is the area of the lawn?

WORK IT OUT HERE

8 FIXED PERIMETER → HALF

A rectangular reading rug has a perimeter of 28 m. Its length is 4 m more than its width. What is the area of the rug?

WORK IT OUT HERE

9 FIXED PERIMETER → HALF

A rectangular event tent has a perimeter of 48 m. Its length is twice its width. What is the area of the tent?

WORK IT OUT HERE

10 AREA = BASE × HEIGHT

A rectangular storage room is 7 m by 4 m, and a right-triangular shade has a base of 7 m and a height of 4 m. Find each area.

WORK IT OUT HERE

11 AREA = BASE × HEIGHT

A rectangular floor is 9 m long and 6 m wide. A right-triangular flag has a base of 9 m and a height of 6 m. Find each area.

WORK IT OUT HERE

12 AREA = BASE × HEIGHT

A rectangular stage is 12 m by 7 m, and a right-triangular banner has a base of 14 m and a height of 9 m. Find each area.

WORK IT OUT HERE

13 ANGLES COMBINE

Two rays share a vertex. The angle on one side of a splitter is 40° and on the other side is 25°. What is the full angle the splitter cuts in two?

WORK IT OUT HERE

14 ANGLES COMBINE

Two angles sit side by side along a straight line. One measures 47°. What is the other angle?

WORK IT OUT HERE

15 ANGLES COMBINE

Three rays from a single vertex split a full turn into three angles. Two of them measure 95° and 138°. What is the third angle?

WORK IT OUT HERE

16 EXTERIOR ANGLES MAKE 360

Each exterior angle of a regular polygon measures 45°. How many sides does the polygon have?

WORK IT OUT HERE

17 EXTERIOR ANGLES MAKE 360

A regular polygon has each interior angle equal to 5 times its exterior angle at the same vertex. How many sides does the polygon have?

WORK IT OUT HERE

18 EXTERIOR ANGLES MAKE 360

A regular polygon has each interior angle equal to 8 times its exterior angle at the same vertex. How many sides does the polygon have?

WORK IT OUT HERE

19 SIMILAR TRIANGLES

In triangle ABC, point D is on AB and point E is on AC, with DE parallel to BC. AD = 3, DB = 3, and BC = 10. Find DE.

WORK IT OUT HERE

20 SIMILAR TRIANGLES

In triangle ABC, point D is on AB and point E is on AC, with DE parallel to BC. AD = 5, DB = 10, and BC = 24. Find DE.

WORK IT OUT HERE

21 SIMILAR TRIANGLES

In triangle ABC, point D is on AB and point E is on AC, with DE parallel to BC. AD = 6, DB = 9, and BC = 20. Find DE.

WORK IT OUT HERE

22 CHAIN THE ANGLE FACTS

Points A, B, C lie on a circle with centre O, so OA = OB = OC. The central angle ∠AOB measures 100°. Find the base angle ∠OAB of triangle OAB.

WORK IT OUT HERE

23 CHAIN THE ANGLE FACTS

On a circle with centre O, points A, B, C lie on the rim with OA = OB = OC. The central angles are ∠AOB = 60° and ∠BOC = 100°. Find ∠ABC.

WORK IT OUT HERE

24 CHAIN THE ANGLE FACTS

On a circle with centre O, points A, B, C lie on the rim with OA = OB = OC. The central angles are ∠AOB = 110° and ∠BOC = 50°. Find ∠ABC.

WORK IT OUT HERE

Answer Key

Each answer comes with a hint that names the move. The tag says which video to rewatch if you are stuck.

1. **(a) 12 m, (b) 90°, (c) 9 m²** — *Length, Angle, or Area?*
Name the measure first — length around, angle at a corner, area inside — then pick the matching rule for each.

2. **(a) 26 m, (b) 90°, (c) 40 m²** — *Length, Angle, or Area?*
Decide which measure each part wants; the trim is a length, the corner is an angle, the fabric is an area.

3. **(a) 38 m, (b) 90°, (c) 84 m²** — *Length, Angle, or Area?*
Tag each part as length, angle, or area first; the fencing is around the boundary, the corner is the turn, the surface is inside.

4. **10 m** — *Perimeter Is the Boundary*
Walk the outside edge: the long top and long bottom, plus the two short ends — every shared wall is inside, not on the boundary.

5. **36 m** — *Perimeter Is the Boundary*
Count outside edges only: the long top and bottom each span all eight stones, and the two ends are one stone wide.

6. **26 m** — *Perimeter Is the Boundary*
Trace only the outside boundary: a long top, a long bottom across all twelve bricks, and the two narrow ends.

7. **24 m²** — *Fixed Perimeter → Half*
Cut the perimeter in half to get length + width, then use the extra clue to split that sum into the two sides.

8. **45 m²** — *Fixed Perimeter → Half*
Half the perimeter is length + width; together with the 4 m gap, that pins down each side.

9. **128 m²** — *Fixed Perimeter → Half*
Halve the perimeter to get one width plus one length, then use the doubling clue to split that sum into the two sides.

10. **Room 28 m²; shade 14 m²** — *Area = Base × Height*
Rectangle area is base times height; the right triangle on the same base and height is half of that rectangle.

11. **Floor 54 m²; flag 27 m²** — *Area = Base × Height*
Use base times height for the rectangle, then halve the same product for the right triangle.

12. **Stage 84 m²; banner 63 m²** — *Area = Base × Height*
Multiply base by height for the rectangle; for the triangle, multiply its own base by its own height and halve.

13. **65°** — *Angles Combine*
Angles that share a vertex add up — combine the two pieces to get the whole.

14. **133°** — *Angles Combine*
Angles on one side of a straight line total 180°; subtract the known piece from the straight angle.

15. **127°** — *Angles Combine*
Angles around one point add to 360°; subtract the two known pieces from a full turn.

16. **8 sides** — *Exterior Angles Make 360*
Exterior angles of any polygon sum to 360°; divide that total by one exterior angle to get the side count.

17. **12 sides** — *Exterior Angles Make 360*
Interior plus exterior at a vertex equals 180°; use the ratio to find one exterior angle, then divide 360° by it.

18. 18 sides — *Exterior Angles Make 360*

Interior and exterior at a vertex sum to 180°; use the multiple to find one exterior angle, then divide 360° by it.

19. 5 — *Similar Triangles*

A parallel cut makes a smaller triangle similar to the big one — find AD ÷ AB and scale BC by that ratio.

20. 8 — *Similar Triangles*

Compute AD ÷ AB to get the shrink ratio of the small triangle, then multiply BC by it.

21. 8 — *Similar Triangles*

The parallel cut gives similar triangles; find AD ÷ AB, then scale BC by that ratio.

22. 40° — *Chain the Angle Facts*

Two equal radii make triangle OAB isosceles, so the two base angles are equal and the three angles total 180°.

23. 100° — *Chain the Angle Facts*

Each central angle gives an isosceles triangle; find the base angle at B in each, then add the two pieces.

24. 100° — *Chain the Angle Facts*

Each pair of equal radii forms an isosceles triangle; compute the base angle at B in each and combine them.