

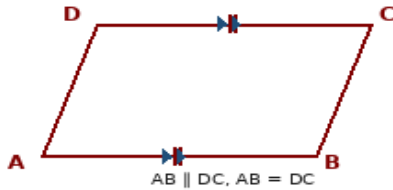
HASOOLEILM TUITION ACADEMY

Topic 13: Geometrical Properties of Regular Polygons

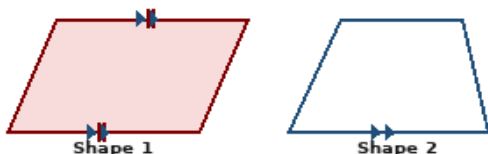
Instructions: Circle the letter of the BEST answer. Each correct answer = 1 mark. Time: 20 minutes.

1. In quadrilateral ABCD below, $AB \parallel DC$ and $AB = DC$. A student concludes ABCD is a parallelogram. Is this correct, and why?

Is ABCD a parallelogram?

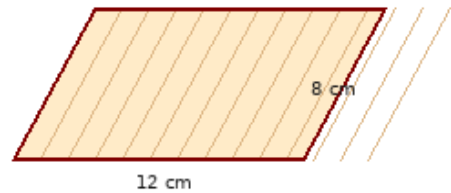


- A. No — you need ALL four sides to be equal
 B. No — you also need to verify the angles are 90°
 C. Yes — but only if the diagonals also bisect each other
 D. Yes — parallel is sufficient to prove it is a parallelogram
2. Quadrilateral ABCD has $AB \parallel DC$ but $AB \neq DC$ (shown). Can we conclude ABCD is a parallelogram?
 A. Yes — parallel opposite sides are enough
 B. No — the opposite sides must be BOTH parallel AND congruent
 C. Yes — a trapezium is a special parallelogram
 D. No — we need to check all four sides first
3. In quadrilateral PQRS, $PQ = SR = 9$ cm and $PQ \parallel SR$. A student says: 'PQRS might be a trapezium, not a parallelogram.' Is the student right?
 A. Yes — having one pair of sides equal and parallel only proves it is a trapezium
 B. No — if one pair of opposite sides is BOTH equal AND parallel, the shape MUST be a parallelogram, not just a trapezium
 C. Yes — we need two pairs of parallel sides to call it a parallelogram
 D. It depends on the interior angles
4. Which quadrilateral below is a parallelogram?

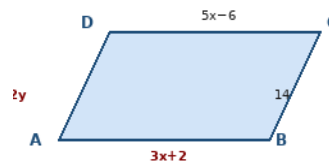


- A. Shape 1: $AB \parallel DC$ and $AB = DC$
 B. Shape 2: only $AB \parallel EF$ (trapezium)
 C. Both shapes are parallelograms
 D. Neither — more information is needed

5. In quadrilateral WXYZ, $WX = YZ = 7$ cm and $WX \parallel YZ$. What can we conclude?
 A. WXYZ is a rhombus
 B. WXYZ is a rectangle
 C. WXYZ is a parallelogram
 D. WXYZ is a trapezium only
6. A builder measures a floor tile: two opposite edges each measure 12 cm and he confirms they are parallel. He says the tile is a parallelogram. What else must be true for his conclusion to be correct?

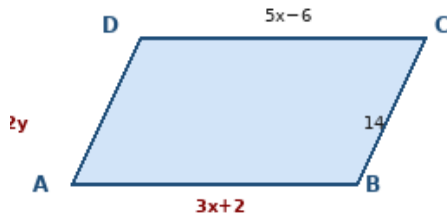


- A. The other two sides must also be 12 cm
 B. No additional condition needed
 C. The diagonals must be equal
 D. All four angles must be equal
7. Parallelogram ABCD has $AB = 3x + 2$ and $DC = 5x - 6$. Find the value of x and the length of AB.

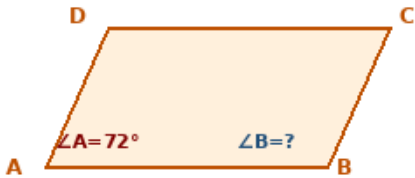


- A. $x = 3$, $AB = 11$ cm
 B. $x = 4$, $AB = 14$ cm
 C. $x = 2$, $AB = 8$ cm
 D. $x = 5$, $AB = 17$ cm
8. In parallelogram ABCD, $\angle A = 110^\circ$. What are $\angle B$, $\angle C$, $\angle D$?
 A. $\angle B = 110^\circ$, $\angle C = 70^\circ$, $\angle D = 70^\circ$
 B. $\angle B = 70^\circ$, $\angle C = 110^\circ$, $\angle D = 70^\circ$
 C. $\angle B = 70^\circ$, $\angle C = 70^\circ$, $\angle D = 110^\circ$
 D. All angles are 90°

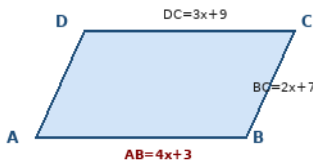
9. In parallelogram ABCD, $BC = 2y$ and $AD = 14$. Using the opposite sides property, find y .



- A. $y = 7$
 B. $y = 14$
 C. $y = 28$
 D. $y = 3.5$
10. In parallelogram ABCD, $\angle A = (3x + 10)^\circ$ and $\angle C = (5x - 30)^\circ$. Find x and $\angle A$.
- A. $x = 15, \angle A = 55^\circ$
 B. $x = 20, \angle A = 70^\circ$
 C. $x = 10, \angle A = 40^\circ$
 D. $x = 25, \angle A = 85^\circ$
11. In parallelogram ABCD, $\angle A = 72^\circ$. Find $\angle B$

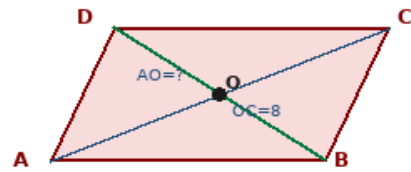


- A. 72°
 B. 108°
 C. 144°
 D. 36°
12. Parallelogram ABCD has $AB = 4x + 3$, $BC = 2x + 7$ and $DC = 3x + 9$. Find the perimeter.



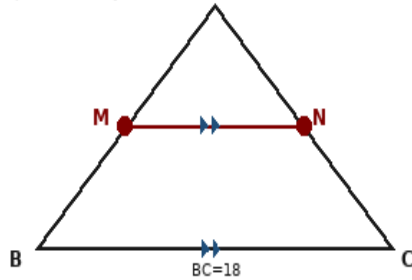
- A. 52 cm
 B. 60 cm
 C. 48 cm
 D. 56 cm
13. In parallelogram ABCD, $\angle A + \angle B + \angle C + \angle D = 360^\circ$. If $\angle A = 65^\circ$, which set of angles is correct?
- A. $\angle B = 115^\circ, \angle C = 65^\circ, \angle D = 115^\circ$
 B. $\angle B = 65^\circ, \angle C = 115^\circ, \angle D = 65^\circ$
 C. $\angle B = 90^\circ, \angle C = 90^\circ, \angle D = 115^\circ$
 D. $\angle B = 115^\circ, \angle C = 115^\circ, \angle D = 65^\circ$

14. Diagonals of parallelogram ABCD intersect at O. If $OC = 8$ cm, what is OA ?



- A. 4 cm
 B. 16 cm
 C. 8 cm
 D. Cannot be determined
15. In parallelogram ABCD, diagonals meet at P. $AP = 3m + 1$ and $PC = 5m - 7$. Find m and the full length of diagonal AC.
- A. $m = 4, AC = 26$ cm
 B. $m = 3, AC = 20$ cm
 C. $m = 4, AC = 13$ cm
 D. $m = 5, AC = 32$ cm
16. In parallelogram ABCD, diagonal $BD = 2n$ and $BP = 10$. Diagonals meet at P. Find n .
- A. $n = 5$
 B. $n = 10$
 C. $n = 20$
 D. $n = 15$
17. Diagonals of parallelogram ABCD meet at M. $AM = 2x + 3$ and $MC = 4x - 7$. Find BM if $BM = 3y$ and $MD = 12$.
- A. $BM = 12$
 B. $BM = 6$
 C. $BM = 4$
 D. $BM = 24$
18. In parallelogram ABCD, diagonals AC and BD bisect each other at O. $AO = 5$ cm, $BO = 7$ cm. What is $AC + BD$?
- A. 24 cm
 B. 12 cm
 C. 10 cm
 D. 14 cm
19. In parallelogram ABCD, diagonals meet at O. Which of the following statements is FALSE?
- A. $AO = OC$
 B. $BO = OD$
 C. $AC = BD$
 D. The diagonals bisect each other
20. M and N are midpoints of AB and AC respectively in triangle ABC with $BC = 18$ cm. What is MN ?

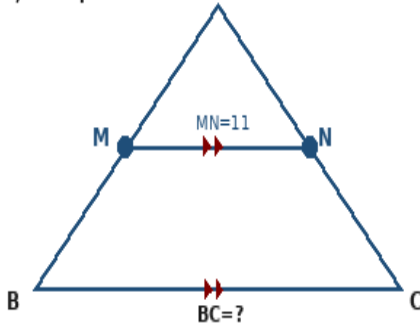
M, N are midpoints — find MN



- A. 18 cm
- B. 6 cm
- C. 9 cm
- D. 36 cm

21. In triangle ABC, M and N are midpoints of AB and AC. MN = 11 cm. Find BC.

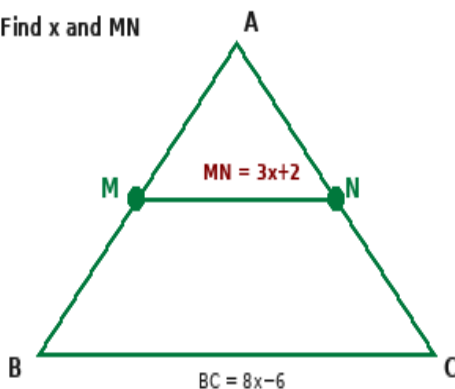
M, N midpoints of AB and AC — find BC



- A. 5.5 cm
- B. 11 cm
- C. 22 cm
- D. 33 cm

22. MN joins midpoints of sides AB and AC of triangle ABC. MN = $3x + 2$ and BC = $8x - 6$. Find x and MN.

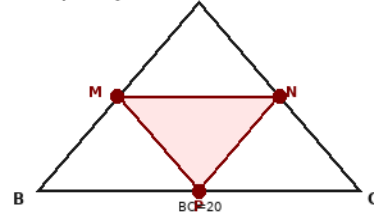
Find x and MN



- A. $x = 2$, MN = 8 cm
- B. $x = 5$, MN = 17 cm
- C. $x = 1$, MN = 5 cm
- D. $x = 3$, MN = 11 cm

23. In triangle ABC, P, Q, R are midpoints of BC, CA, AB respectively. BC = 20 cm. Find the perimeter of triangle PQR.

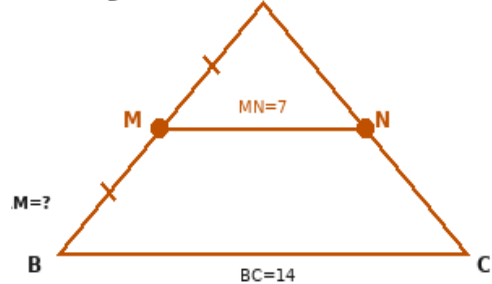
All midpoints joined — find MN + NP + MP



- A. 20 cm
- B. 60 cm
- C. 10 cm
- D. Not measurable

24. M is midpoint of AB in triangle ABC, and N is midpoint of AC. MN = 7 cm and BC = 14 cm. A student says AM must equal 7 cm. Is the student correct?

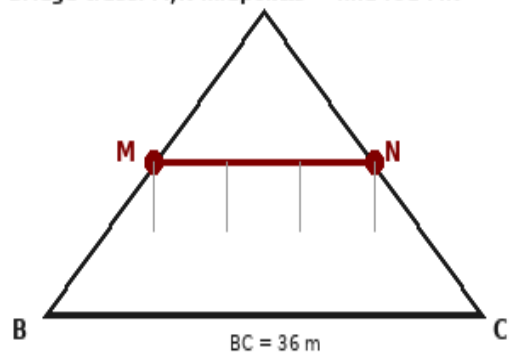
Find AM given MN and BC



- A. Yes — AM = MN always
- B. No — $MN = \frac{1}{2} BC$
- C. Yes — $AM = \frac{1}{2} MN$
- D. Yes — $MN \parallel BC$ and $BC = 14$

25. A bridge truss is modelled as triangle ABC with BC = 36 m. M and N are midpoints of AB and AC. A horizontal rod MN is placed. How long is the rod MN?

Bridge truss: M, N midpoints — find rod MN



- A. 36 m
- B. 72 m
- C. 18 m
- D. 12 m

Best of luck!