VELAMMAL BODHI CAMPUS - ATTUR

SUBJECT: Mathematics Class 7 **Congruence**
Name: Fortnight 3

1. You have two identical triangular tiles. For these two tiles to be considered congruent, what must be true? Which of the following methods, using only a ruler and protractor, would definitively prove their congruence?

   A Their areas must be equal. Proving their corresponding side lengths are equal is sufficient.
   B Their perimeters must be equal. Proving one pair of corresponding angles are equal is sufficient.
   C All corresponding side lengths must be equal, and all corresponding angles must be equal. Proving all three corresponding side lengths are equal (SSS congruence) is a valid method.
   D Their areas must be equal. Proving two pairs of corresponding angles are equal is sufficient.

2. You are building a rectangular garden and have a fixed amount of fencing to use for the perimeter. To maximize the area of your garden, what shape should the rectangular garden be?

   A long, narrow rectangle
   B square
   C circle
   D rectangle with one side twice as long as the other

3. Two triangles have the same perimeter. Does this guarantee that the triangles are congruent?

   A Yes, if two triangles have the same perimeter, they must be congruent.
   B No, two triangles with the same perimeter are not necessarily congruent. For example, a triangle with sides 3, 4, 5 has a perimeter of 12. A triangle with sides 2, 5, 5 also has a perimeter of 12, but they are not congruent.
   C Yes, if two triangles have the same perimeter, they must be congruent, but only if they are also right-angled triangles.
   D No, two triangles with the same perimeter are not necessarily congruent. However, if they have the same area, they must be congruent.

4. If two triangles are congruent, are their areas necessarily equal? Which statement best explains this?

   A Yes, because congruent triangles have the same side lengths and angles, meaning they occupy the same amount of space.
   B No, because congruent triangles can be scaled differently, leading to different areas.
   C Yes, but only if they are also equilateral triangles.
   D No, because the perimeter of congruent triangles can be different, affecting their area.

5. You have four identical triangular pieces of paper. If you can arrange these four pieces to form a larger triangle, under what condition will this larger triangle be congruent to each of the original four pieces?

   A The original triangle must be equilateral.
   B The original triangle must be a right-angled isosceles triangle.
   C This is not possible to form a larger triangle congruent to the original pieces.
   D The original triangle must be scalene.

6. A carpenter has two identical wooden planks. He cuts each plank into several pieces. The total length of the cuts made on the first plank is exactly the same as the total length of the cuts made on the second plank. Are the resulting sets of pieces necessarily congruent?

A Yes, because the total length of the cuts is the same.
B No, different shapes can be formed even with the same total cut length.
C Yes, if the planks are of the same size and shape, the pieces must be congruent.
D No, congruence depends on the number of pieces, not the length of cuts.

7. You are designing a kite and want to ensure that both halves of the kite are perfectly identical. Which geometric concept would you use to guarantee this symmetry, and how would you apply it?

   A Using the concept of similarity to scale down one half to match the other.
   B Applying the concept of congruence by ensuring corresponding sides and angles are equal between the two halves.
   C Calculating the area and perimeter of each half to confirm they are the same, which implies they are identical.
   D Using the Pythagorean theorem to measure the diagonals and ensure they are perpendicular for symmetry.

8. A farmer uses the same length of fence to create two different triangular plots of land. If the two triangular plots have the same perimeter, will they necessarily have the same area? Justify your answer.

   A Yes, because triangles with the same perimeter have the same area.
   B No, because triangles with the same perimeter can have different areas.
   C Yes, but only if the triangles are right-angled.
   D No, unless the triangles are identical (congruent).

9. You are designing a logo that consists of two congruent triangles. The perimeter of one of the triangles is 50 cm. If one of the triangles has sides of length 10 cm and 15 cm, what is the length of the third side of that triangle?

   A 15 cm
   B 20 cm
   C 25 cm
   D Cannot be determined

10. Consider two triangles, Triangle A and Triangle B. If Triangle A and Triangle B have the same area, are they necessarily congruent?

    A Yes, if two triangles have the same area, they must be congruent.
    B No, triangles with the same area are not necessarily congruent. For example, a triangle with base 6 units and height 4 units has the same area as a triangle with base 8 units and height 3 units, but they can have different shapes and side lengths.
    C Yes, but only if they also have the same perimeter.
    D No, congruence requires both equal area and equal corresponding angles.

11. A quilt is being made using 12 congruent triangular patches. If the area of a single triangular patch is A square units, what is the total area of the quilt?

    A \$12A\$
    B \$\(A \div 12\)\$
    C \$A + 12\$
    D \$A\^{}\{12\}\$

12. A triangle has a base of b and a height of h. What is its area? Consider another triangle with a base of $2b$ and a height of $h/2$. How does the area of the second triangle compare to the area of the first triangle?

    A The second triangle has half the area of the first.
    B The second triangle has the same area as the first.
    C The second triangle has double the area of the first.
    D The second triangle has one-fourth the area of the first.

13. Consider two triangles: Triangle ABC with sides $AB = 5$ cm, $BC = 6$ cm, $CA = 7$ cm, and Triangle PQR with sides $PQ = 5$ cm, $QR = 6$ cm, $RP = 7$ cm. Which statement is true regarding these two triangles?

    A They are congruent by SSS criterion.
    B They are not congruent.
    C They are congruent by SAS criterion.
    D They are congruent by ASA criterion.

14. A rectangular field has an area of 300 m^2. If its length is 20 m, what is its perimeter? Can a different rectangular field with the same area (300 m^2) have a different perimeter?

    A 60 m; Yes
    B 50 m; No
    C 60 m; No
    D 50 m; Yes

15. A piece of string is 24 cm long. You want to form a triangle using this string, where the side lengths are whole numbers. Which of the following sets of side lengths is NOT possible for a triangle with a perimeter of 24 cm?

    A 10 cm, 8 cm, 6 cm
    B 12 cm, 7 cm, 5 cm
    C 11 cm, 7 cm, 6 cm
    D 9 cm, 9 cm, 6 cm

16. If two triangles have the same angle measures, are they necessarily congruent? Explain why or why not.

    A Yes, because having the same angles means all sides must also be equal in length.
    B No, because triangles with the same angle measures are similar, not necessarily congruent. They can be different sizes.
    C Yes, because congruent triangles are defined by having equal angles.
    D No, because congruent triangles must have both equal angles and equal side lengths, and having equal angles does not guarantee equal side lengths.

17. Consider two triangles, $\triangle ABC$ with sides $AB = 5$ cm, $BC = 6$ cm, and $CA = 7$ cm, and $\triangle PQR$ with sides $PQ = 5$ cm, $QR = 6$ cm, and $RP = 7$ cm. Which statement correctly describes their relationship and the congruence criterion used?

    A The triangles are congruent by SSS criterion because all three corresponding sides are equal.
    B The triangles are not congruent because the order of sides does not match.
    C The triangles are congruent by SAS criterion because two sides and an included angle are equal.
    D The triangles are congruent by AAS criterion because two angles and a non-included side are equal.

18. A rectangular field has an area of 300 square meters. If its length is 20 meters, what is its perimeter? Can a different rectangular field with the same area have a different perimeter?

    A Perimeter is 70 meters. Yes, a different field can have a different perimeter.
    B Perimeter is 50 meters. No, all fields with the same area have the same perimeter.
    C Perimeter is 70 meters. No, all fields with the same area have the same perimeter.
    D Perimeter is 50 meters. Yes, a different field can have a different perimeter.

19. A piece of string is 24 cm long. You want to form a triangle using the entire string as the perimeter, with side lengths being whole numbers. Which of the following options lists sets of side lengths that form valid triangles and their correct areas?

A Triangle 1: 4 cm, 10 cm, 10 cm; Area = 38.73 cm^2 (approx.). Triangle 2: 5 cm, 9 cm, 10 cm; Area = 22.45 cm^2 (approx.)
B Triangle 1: 7 cm, 8 cm, 9 cm; Area = 125 cm^2. Triangle 2: 6 cm, 8 cm, 10 cm; Area = 24 cm^2
C Triangle 1: 5 cm, 10 cm, 9 cm; Area = 21.21 cm^2 (approx.). Triangle 2: 7 cm, 8 cm, 9 cm; Area = 125 cm^2
D Triangle 1: 11 cm, 11 cm, 2 cm; Area = 10.91 cm^2 (approx.). Triangle 2: 10 cm, 7 cm, 7 cm; Area = 24.49 cm^2 (approx.)

20. Two triangles are said to have the same angle measures. Are these triangles necessarily congruent?

    A Yes, if all three angles are equal, the triangles must be congruent.
    B No, triangles with equal angle measures are similar, not necessarily congruent.
    C Yes, if two angles are equal, the third angle must also be equal, making them congruent.
    D No, unless the side lengths are also equal, the triangles cannot be guaranteed to be congruent.

21. You are building a frame for a picture using two congruent triangular pieces of wood. The perimeter of the entire frame (which is made up of these two triangles joined along one side) is 40 cm. If one side of each triangular piece of wood is 12 cm, what could be the lengths of the other two sides of each triangle?

    A 14 cm and 14 cm B 16 cm and 12 cm C 10 cm and 18 cm D 15 cm and 13 cm

22. A large triangle is divided into four smaller, congruent triangles. What is the area of each small triangle compared to the area of the large triangle?

    A Equal to the area of the large triangle
    B Half the area of the large triangle
    C One-fourth the area of the large triangle
    D Twice the area of the large triangle

23. Consider a triangle with side lengths 8 cm, 8 cm, and 5 cm. Can another triangle be formed with the same perimeter but different side lengths? If so, will this new triangle be congruent to the original triangle?

    A Yes, a new triangle can be formed, and it will be congruent to the original triangle.
    B No, a new triangle cannot be formed with the same perimeter and different side lengths.
    C Yes, a new triangle can be formed, but it will not be congruent to the original triangle.
    D No, a new triangle cannot be formed, but if it could, it would be congruent.

24. A rectangular garden is 15 meters long and 10 meters wide. What is its area? If you wanted to create a new rectangular garden with the same area as the original but with a different perimeter, which of the following could be the dimensions (length and width) of the new garden?

    A Length: 20 m, Width: 7.5 m
    B Length: 25 m, Width: 6 m
    C Length: 30 m, Width: 5 m
    D Length: 12.5 m, Width: 12 m

25. Two triangles are congruent. If the area of one triangle is 50 square centimeters, what is the area of the other triangle?

    A 25 square centimeters
    B 100 square centimeters
    C 50 square centimeters
    D 75 square centimeters

Q2: B
Q3: B
Q4: A
Q5: B
Q6: B
Q7: B

Q8: B
Q9: B
Q10: B
Q11: A
Q12: B
Q13: A
Q14: D
Q15: B
Q16: D
Q17: A
Q18: A
Q19: B
Q20: B
Q21: A
Q22: C
Q23: C
Q24: A
Q25: C