Triangles: Classification and Theorems

Answer Key

1. Answer: B

Explanation: By definition, an isosceles triangle has two congruent sides.

2. Answer: A

Explanation: The SAS Postulate states that if two corresponding sides of a triangle are congruent and the included angle (the angle between these sides) is also congruent, then the triangles are congruent. In the given figure, we can see that side PQ is congruent to MN, and side QR is congruent to NO. For us to be able to apply the SAS Postulate, we have to identify the included angles of the pair of congruent sides.

For sides MN and NO of triangle MNO, it is clear that the included angle is MNO since it is located between the aforementioned sides. On the other hand, angle PQR is the included angle of PQ and QR since it is the one located between these sides.

Therefore, the angle that must be congruent to angle MNO is angle PQR.

3. Answer: D

Explanation: The Isosceles Triangle Theorem states that the base angles of an isosceles triangle are congruent. Since y and z are the measurements of the base angles of the isosceles triangle of the problem, then we can state that y and z are congruent. Therefore, $y = z$.

The answer is option D.

4. Answer: D

Explanation: Given two sides of a triangle, we can identify the set of real numbers that can be possible values of the third side using this formula:

Triangles: Classification and Theorems

Answer Key

First Side - Second Side ≤ Third Side ≤ First Side + Second Side

According to the given problem, two sides of the triangle are 7 cm and 10 cm long. Therefore, we have:

$$10 - 7 \leq \text{Third Side} \leq 10 + 7$$
$$3 \leq \text{Third Side} \leq 17$$

Thus, the possible lengths of the third side of the triangle can be any real number between 3 and 17. Among the given values in the options, the one in option D (which is 20.5 cm) is not included in this range.

Thus, the answer is option D.

5. Answer: A

Explanation: Using the same formula we used in item 4:

First Side - Second Side ≤ Third Side ≤ First Side + Second Side

The given measurements of two of the sides of the triangle are 12 cm and 21 cm. By substitution:

$$21 - 12 \leq \text{Third Side} \leq 21 + 12$$
$$9 \leq \text{Third Side} \leq 39$$

Thus, the possible lengths of the third side of the triangle can be any real number between 9 and 39. The least value within the range we have derived is 9. Thus, the least possible value of the measurement of the third side is 9 cm.