                    Name________________________

Use a ruler, protractor, and compass to construct, when possible, a triangle with stated properties. If such a triangle cannot be drawn, explain why. Decide if there can be two or more noncongruent triangles with the stated properties.

1) An isosceles triangle with two sides of length 7 cm and an apex angle of measure 115°.
   A) Two or more such noncongruent triangles can be constructed.
   B) No such triangle can be constructed.
   C) Exactly one such triangle can be constructed.

2) An equilateral triangle with sides of length 9 cm.
   A) Exactly one such triangle can be constructed.
   B) No such triangle can be constructed.
   C) Two or more such noncongruent triangles can be constructed.

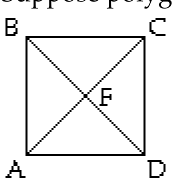
3) A triangle with sides of length 19 cm, 31 cm and 9 cm.
   A) Exactly one such triangle can be constructed.
   B) No such triangle can be constructed.
   C) Two or more such noncongruent triangles can be constructed.

4) A triangle with angles measuring 21° and 103° and a nonincluded side of length 13 cm.
   A) Two or more such noncongruent triangles can be constructed.
   B) No such triangle can be constructed.
   C) Exactly one such triangle can be constructed.

5) A triangle with angles of 29° and 113°.
   A) Exactly one such triangle can be constructed.
   B) Two or more such noncongruent triangles can be constructed.
   C) No such triangle can be constructed.

Answer the question.

6) Suppose polygon ABCD is any square with diagonals $\overline{AC}$ and $\overline{BD}$ intersecting at point F.



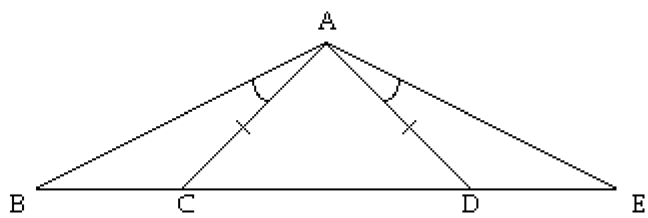
What can be said about any point on $\overline{AF}$ and points B and D?
What is the measure of ∠AFB?

7) If the diagonals of a quadrilateral bisect each other and are congruent to each other, what type of quadrilateral can it be?

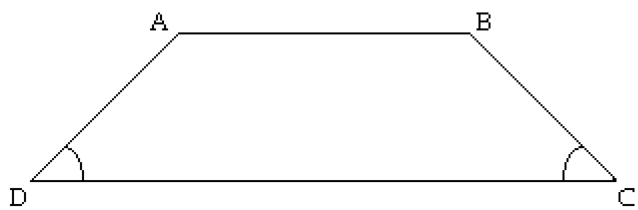
Prove the following property.

8) Let ABC be a triangle, and let M be the midpoint of side $\overline{BC}$. If $\overline{AM}$ is perpendicular to $\overline{BC}$, prove that ABC is an isosceles triangle.

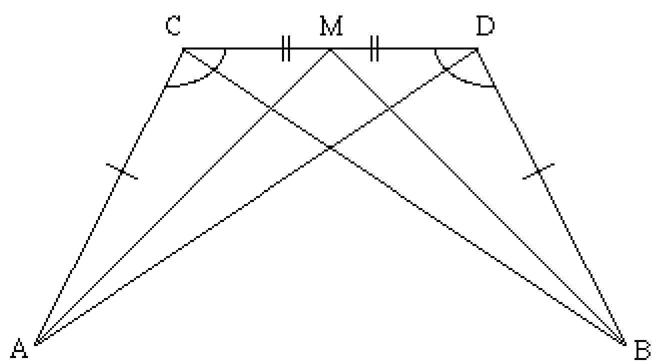
9) In the figure below, AC = AD and ∠BAC ≅ ∠DAE. Prove that the triangle ABE is isosceles.



10) In the trapezoid below, m(∠D) = m(∠C). Prove that AD = BC.



11) In the figure below, AC = BC, m(∠ACD) = m(∠BDC) and M is the midpoint of CD. Prove that m(∠MAD) = m(∠MBC).



Answer the question.

12) Can a parallelogram have exactly three right angles? Explain why or why not.

13) A quadrilateral is a ______ if and only if its diagonals are perpendicular bisectors of each other..

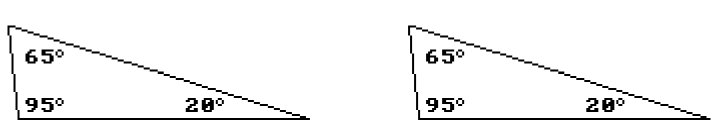
14) A square has the properties of which three quadrilaterals?

15) True or false : a trapezoid is a kite.

16) True or false: a rectangle is a trapezoid.

State whether the pair of triangles is congruent. If the information given is not sufficient, state "No conclusion possible".

17)



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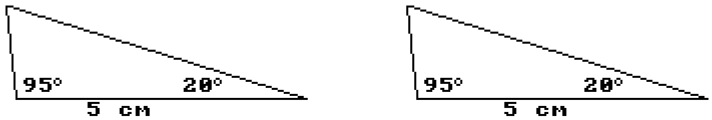

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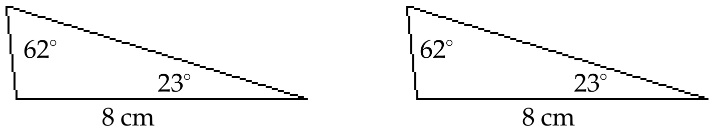


Solve.

20) Draw two parallelograms such that two angles and an included side are congruent respectively to two angles and an included side of the other parallelogram, and yet the two parallelograms are not congruent.

Answer the question.

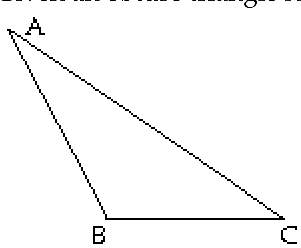
21) Explain how to construct a parallelogram given two adjacent sides. If it is not possible, explain why.

22) Explain how to construct a parallelogram with exactly three right angles. If it is not possible, explain why.

23) Construct a line through a point P parallel to a line l using the rhombus method.

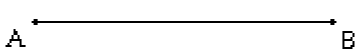
Answer question appropriately.

24) Given an obtuse triangle ABC, construct an altitude from vertex A.



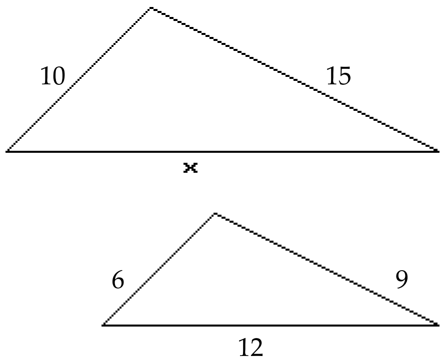
Complete each construction.

25) Given $\overline{AB}$ construct the perpendicular bisector of $\overline{AB}$ without putting any marks below $\overline{AB}$.



These triangles are similar. Find the missing length.

26)



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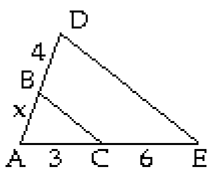


Answer the question.

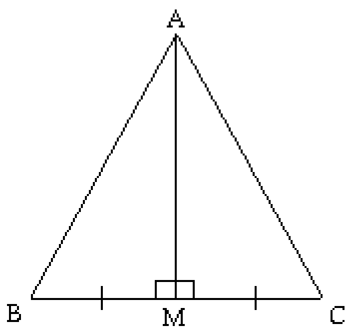
28) A tree casts a shadow 35 meters long. At the same time, the shadow cast by a vertical 7 meter stick is 5 meters long. Find the height of the tree.

29) Are two equilateral triangles always similar? Explain why or why not.

30) Are two parallelograms always similar? Explain why or why not.

Answer Key
Testname: CHAPTER10REVIEW.TST

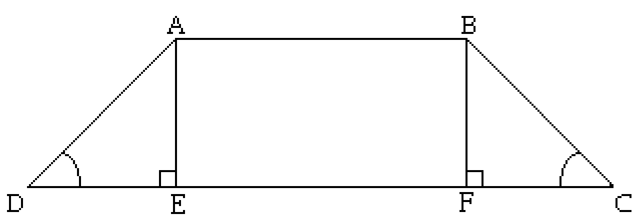
1) C
2) A
3) B
4) C
5) B
6) Any point on $\overline{AF}$ will be equidistant from points B and D.
7) A rectangle.
8) Answers will vary. A sample correct response would be as follows.



MB = MC, m(∠AMB) = m(∠AMC) = 90°, and clearly AM = AM. By SAS, △AMB ≅ △AMC, and so AB = AC, i.e. ABC is an isosceles triangle.
9) Answers will vary. A sample correct response would be as follows.

As △ACD is isosceles, m(∠ACD) = m(∠ADC). It follows that m(∠ACB) = 180° – m(∠ADC) = m(∠ADE). By ASA, △ABC ≅ △AED, and hence ∠B ≅ ∠E, i.e. triangle ABE is isosceles.
10) Answers will vary. A sample correct response would be as follows.

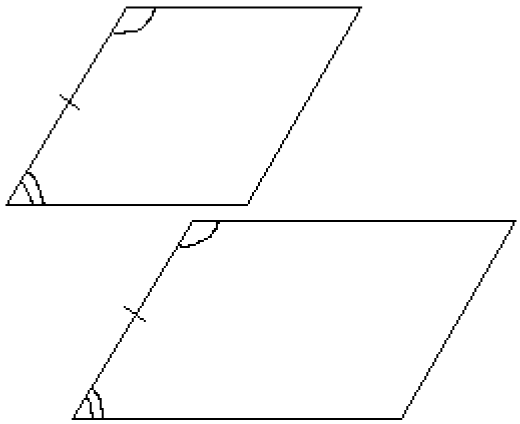
Mark points E and F on DC such that AE and BF are perpendicular to DC.



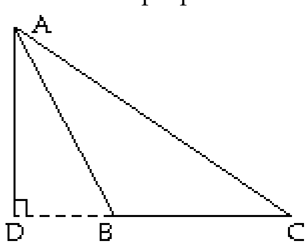
As ABFE is a parallelogram (in fact, a rectangle), AE = BF. By AAS, △ADE ≅ △BCF, and hence AD = BC.
11) Answers will vary. A sample correct response would be as follows.

By SAS, △ACM ≅ △BDM, and so m(∠MAC) = m(∠MBD). Again, by SAS, △ACD ≅ △BCD, and so m(∠DAC) = m(∠CBD). Thus m(∠MAD) = m(∠DAC) – m(∠MAC) = m(∠CBD) – m(∠MBD) = m(∠MBC).
12) No, because opposite angles of a parallelogram are congruent. Hence, the fourth angle would also be a right angle.
13) Rhombus
14) Parallelogram, rectangle, and rhombus
15) False
16) True
17) No conclusion possible
18) Congruent
19) Congruent

20)



21) Construct the lines parallel to each of the given sides.
22) Not possible. Opposite angles of a parallelogram are congruent, so the parallelogram would need to have a fourth right angle.
23) Draw any line through P that intersects l at point A. A and P are vertices of the rhombus. Draw an arc with the pointer of the compass at A and with radius $\overline{AP}$ that intersects l at X. X is the third vertex of the rhombus. Using the same opening of the compass, draw intersecting arcs, one with the pointer at P, the other with the pointer at X. The intersection of the two arcs, Y, is the fourth vertex of the rhombus. $\overline{PY}$ is parallel to l.
24) Construct a perpendicular from vertex A to the line containing $\overline{BC}$ at point D. $\overline{AD}$ is the altitude from vertex A.



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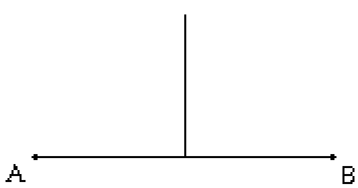

26) x = 20
27) 2
28) 49
29) Yes. No matter what size the triangles are, they will have the same shape since the interior angles are always 60°.
30) No. The ratio of the adjacent sides of a parallelogram is not always the same and the angles are not always the same.