Part 1: Multiple Choice (40 items)

Standard MA3.2 Ability for visualization, spatial reasoning, and application of geometric models for problem – solving.

1. Which statement must always be true in Euclidean Geometry ?

   a. Three collinear points determine a plane.

   b. Through two distinct points, exactly one plane exists.

   c. Through three noncollinear points, exactly one plane exists.

   d. A plane contains exactly three points.

2. Which of the following best defines a ***line segment***?

   a. A straight path that has no beginning or end.

   b. A part of a line with two endpoints.

   c. A line that intersects another line at a right angle.

   d. A closed- figure with four sides of same length.

3. If two distinct lines **intersect**, which must be true?

   a. They form two angles.

   b. They form four unequal angles.

   c. They form two pairs of vertical angles.

   d. They are perpendicular.

4. The following are examples of ***parallelograms***, except which one?

   a. a kite

   b. a square

   c. a rectangle

   d. a rhombus

5. Which of the following is ***not*** an example of a ***polygon***?

   a. quadrilateral

   b. pentagon

   c. octagon

   d. circle

6. If two angles are ***vertical***, which must always be true?

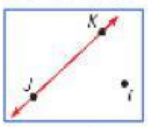
   a. They are supplementary.

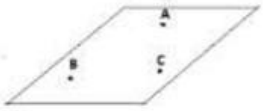
   b. They are adjacent.

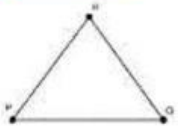
   c. They are congruent.

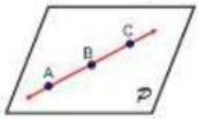
   d. They form a linear pair.

7. Which of the following points are **collinear points?**

   a. 

   b. 

   c. 

   d. 

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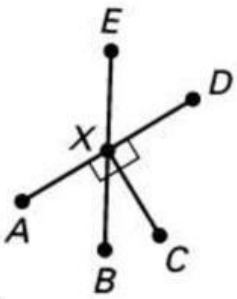
8. Which quadrilateral always has perpendicular diagonals?

a. Rectangle
b. Parallelogram
c. Rhombus
d. Trapezoid

For items 9 -11, consider the figure on the right.



9. Which of the following angle is ***supplementary*** to $\angle AXB$?

a. $\angle BXC$ b. $\angle AXD$ c. $\angle BXD$ d. $\angle AXC$

10. Given pt. X is a midpoint, which line segment is ***perpendicular bisector*** of $\overline{AD}$?

a. $\overline{XB}$ b. $\overline{XC}$ c. $\overline{XE}$ d. $\overline{BE}$

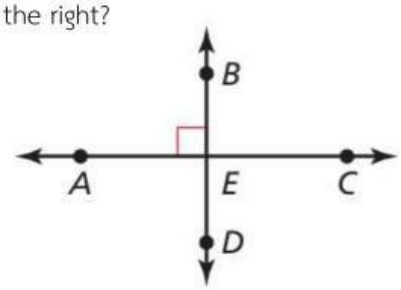
11. Which of the following pair of angles are ***two adjacent complementary angles***?

a. $\angle AXB$ and $\angle BXC$
b. $\angle AXB$ and $\angle CXD$
c. $\angle CXD$ and $\angle EXD$
d. $\angle AXB$ and $\angle EXD$

For items 12- 14, consider the diagram on the right.

12. Which of the following statement is **TRUE**, based on the diagram on the right?

a. $\overleftrightarrow{AC} \perp \overleftrightarrow{BD}$
b. $\angle AEB$ and $\angle CED$ are linear pair.
c. $\overrightarrow{EA}$ and $\overrightarrow{EB}$ are opposite rays.
d. $\angle AED$ and $\angle DEC$ are complementary angles.



13. $\angle AEB$ and $\angle DEC$ are pair of _____. Which of the following words **cannot accurately** represent the statement?

a. congruent angles
b. vertical angles
c. supplementary angles
d. adjacent angles

14. Given point **E** is a midpoint of $\overline{BD}$. Which of the following pair of segments are congruent?

a. $\overline{AC}$ and $\overline{AE}$
b. $\overline{AE}$ and $\overline{DE}$
c. $\overline{BE}$ and $\overline{ED}$
d. $\overline{BE}$ and $\overline{AC}$

15. The sum of the interior angles of a polygon is **1,980**^{0}.

How many sides does the polygon have?

a. 10 sides
b. 11 sides
c. 13 sides
d. 15 sides

16. A regular polygon has each interior angle measuring **156**^{0}.

How many sides does the polygon have?

a. 12
b. 14
c. 15
d. 18

LIVEWORKSHEETS

17. A regular polygon has each exterior angle measuring **60^0.**

What is the sum of its interior angles?

a. 540^0 b. 600^0 c. 720^0 d. 900^0

18. If the interior angles and exterior angles of a regular polygon are equal, then how many sides does it have?

a. 3 b. 4 c. 5 d. 6

19. What is the sum of the interior angles of a regular decagon?

a. 1440^0 b. 1980^0 c. 1800^0 d. 1620^0

20. In a regular polygon, each interior angle is **14 times** its exterior angle.

How many sides does the polygon have?

a. 12 b. 15 c. 16 d. 30

21. Which of the following **cannot be** a counterexample of the statement: "If a figure has two congruent opposite sides, then it is a square."

a. kite b. rhombus c. rectangle d. parallelogram

22. In what circumstances may a conditional statement become false?

a. Both parts are false.
b. Hypothesis false, conclusion true.
c. Hypothesis true, conclusion false.
d. Both parts are true.

23. Which of the following has a **false converse statement?**

a. If lines are non-coplanar and do not intersect, then they are skew lines.
b. If two lines do not intersect, then they are parallel.
c. If two lines form right angles, then the lines are perpendicular.
d. If a point lies on the y- axis, then its x-coordinate is zero.

24. Which of the following is the converse of the statement: "If a triangle has two congruent sides, then it is isosceles."?

a. If a triangle is isosceles, then its base angles are congruent.
b. If a triangle is isosceles, then it has two congruent angles.
c. If a triangle is isosceles, then it has two congruent sides.
d. If a shape has three sides, then it is an isosceles triangle.

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25. Which of these conditional statements is true?

a. If points are noncollinear, then they lie on the same line.

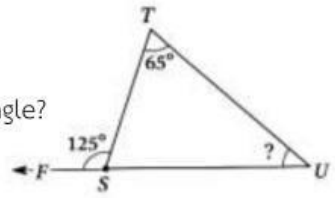
b. If two coplanar lines intersect, then the lines are parallel.

c. If a polygon has four sides, then the sum of its interior angles is 360^0.

d. If a quadrilateral is a parallelogram, then it is a rhombus.

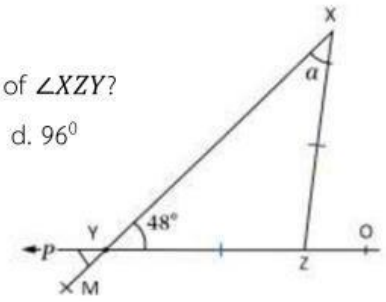
26. Consider the diagram on the right, what is the measure of the missing angle?

a. 35^0 b. 55^0 c. 40^0 d. 60^0



27. Given a figure on the right, what is the measure of $\angle XZY$?

a. 48^0 b. 84^0 c. 60^0 d. 96^0



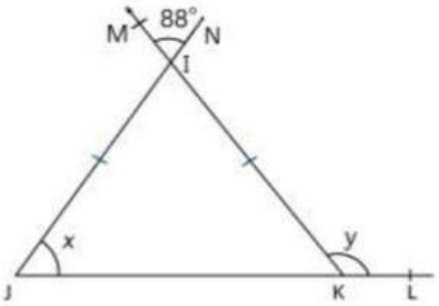
For items 28 – 29, consider the figure on the right.

28. What is the measure of angle x?

a. 92^0 b. 96^0 c. 44^0 d. 46^0

29. What is the measure of angle y?

a. 106^0 b. 136^0 c. 134^0 d. 88^0



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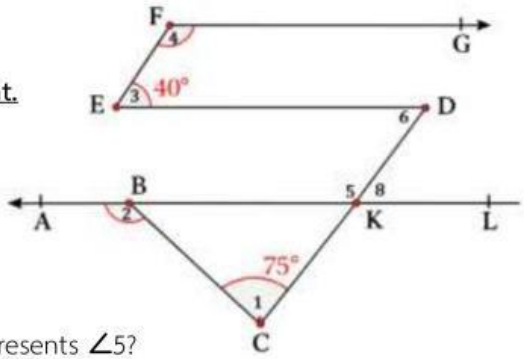
For items 30 - 32, consider the figure on the right.

Given: $\overline{AL} \parallel \overline{ED} \parallel \overline{FG}$, $\overline{EF} \parallel \overline{CD}$

and $\angle 1 = 75^0$, $\angle 3 = 40^0$



30. Which of the following expressions correctly represents $\angle 5$?

a. $\angle 5 = 180° - \angle 3$ b. $\angle 5 = \angle 1 + \angle 3$

c. $\angle 5 = 180° - (\angle 3 + \angle 1)$ d. $\angle 5 = 180° - \angle 1$

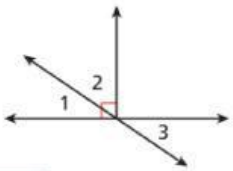
31. What is the measure of $\angle 4$?

a. 40° b. 140° c. 75° d. 105°

32. What is the measure of $\angle 2$?

a. 115^0 b. 105^0 c. 125^0 d. 120^0

For items 33 – 35. Complete the proof .



Given : $\angle 1$ and $\angle 2$ are complementary angles

Prove: $\angle 2$ and $\angle 3$ are complementary angles

Statements	Reasons
1. $\angle 1$ and $\angle 2$ are complementary.	1. Given
2. ___33.)___	2. Def. of comp.
3. $\angle 1 \cong \angle 3$	3. ___34.)___
4. $m\angle 1 = m\angle 3$	4. Def. of $\cong$
5. ___35.)___	5. Subst. *Steps 2, 4*
6. $\angle 2$ and $\angle 3$ are complementary.	6. Def. of comp.

33. Which of the following is appropriate for the 2nd statement?

a. $\angle 1 \cong \angle 2$ b. $\angle 1 = \angle 2$

c. $\angle 1 + \angle 2 = 180^0$ d. $\angle 1 + \angle 2 = 90^0$

34. Which of the following best describes the reason in the 3rd statement?

a. Corresponding angles are congruent b. Definition of complementary angles

c. Vertical angles are congruent d. Definition of supplementary angles

35. Which of the following is appropriate for the 5th statement?

a. $m\angle 3 + m\angle 2 = 90^0$ b. $m\angle 3 = m\angle 2$

c. $m\angle 3 + m\angle 2 = 180^0$ d. $m\angle 1 + m\angle 2 = 90^0$

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36. Look carefully at the sequence of adjacent squares with side lengths: **1 cm, 1 cm, 2 cm, 3 cm, 5 cm**

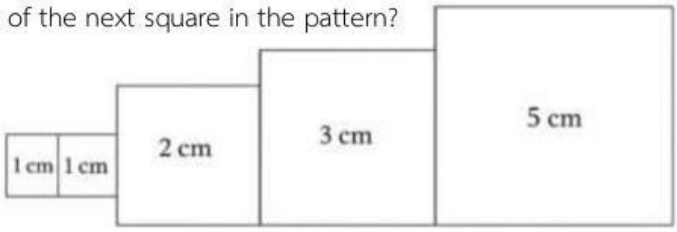
Using **inductive reasoning**, what is the side length of the next square in the pattern?

a. 6 cm

b. 7 cm

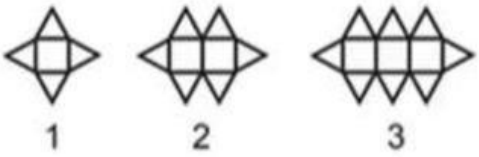
c. 8 cm

d. 10 cm



37. Consider the pattern of figures shown below.

How many triangles are in the **10th figure**?



a. 18 b. 22 c. 24 d. 26

38. **Premise 1:** If a triangle is equilateral, then it has three congruent sides.

Premise 2: $\triangle ABC$ is equilateral.

Which of the following **must be the conclusion**?

a. $\triangle ABC$ has three right angles

b. $\triangle ABC$ has two congruent sides

c. $AB \cong BC \cong CA$

d. $\triangle ABC$ is not isosceles

39. **Premise 1:** If a number is divisible by 4, then it is even.

Premise 2: If a number is even, then it is divisible by 2.

Premise 3: 16 is divisible by 4.

Which of the following **must be the conclusion**?

a. 16 is divisible by 8.

b. 16 is a multiple of 3.

c. 16 is divisible by 2.

d. If a number is divisible by 2, then it is divisible by 4.

40. **Premise 1:** If two angles are supplementary, then their sum is 180°.

Premise 2: If two angles have a sum of 180°, then they form a straight angle.

What conclusion can you make?

a. If two angles form a straight angle, then they are supplementary.

b. If two angles are supplementary, then they are vertical angles.

c. If two angles are supplementary, then they form a straight angle.

d. If two angles are equal, then they are supplementary.

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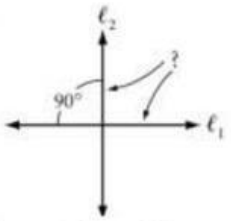
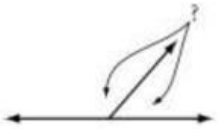
B. For items 3 – 14, match each term with one of the following items below. (1 pt. each)

a.



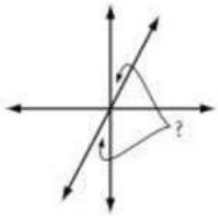
b.



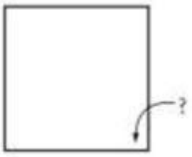
c.

d. $m\angle P = 68°$
$m\angle XYZ = 114°$
$m\angle Y = 112°$
$m\angle STP = 58°$

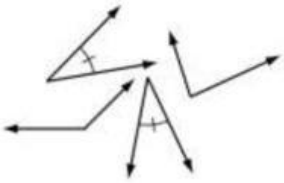
e.



f.



g.



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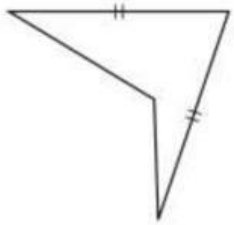
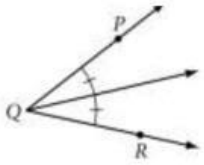
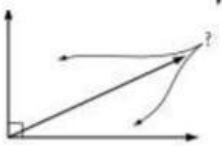


i. $m\angle A = 87°$
$m\angle X = 96°$
$m\angle Y = 90°$

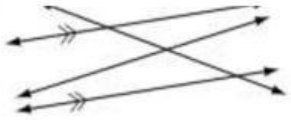
j.



k.



l.



_____ 3. Acute angle

_____ 4. Pair of supplementary angles

_____ 5. Parallel lines

_____ 6. Right angle

_____ 7. Congruent segments

_____ 8. Pair of vertical angles

_____ 9. Perpendicular lines

_____ 10. Bisected angle

_____ 11. Obtuse angle

_____ 12. Linear pair of angles

_____ 13. Pair of complementary angles

_____ 14. Pair of congruent angles

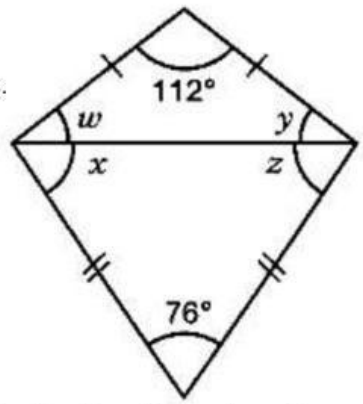
15. Find the measure of the unknown angles. (1 pt. each)

$\angle w =$

$\angle x =$

$\angle y =$

$\angle z =$



What is the name of the quadrilateral in the given figure above ? _____

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