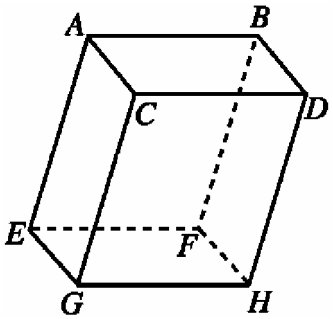
**Name:** _____ **Class:** _____ **Date:** _____ **ID: A**

## Geometry 21 - More Midterm Practice

1. What are the names of three planes that contain point *A*?




A. planes *ABDC*, *ABFE*, and *ACHF* B. planes *ABDC*, *ABFE*, and *CDHG* C. planes *CDHG*, *ABFE*, and *ACHF* D. planes *ABDC*, *EFGH*, and *ACHF*

2. Name the intersection of plane *ACG* and plane *BCG*.
A. $\overleftrightarrow{AC}$ B. $\overleftrightarrow{BG}$ C. $\overleftrightarrow{CG}$ D. The planes need not intersect.

3. Plane *ABC* and plane *BCE* ____ be the same plane.
A. must B. may C. cannot

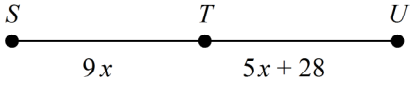
4. If $EF = 2x - 12$, $FG = 3x - 15$, and $EG = 23$, find the values of *x*, *EF*, and *FG*. The drawing is not to scale.


A. $x = 10$, $EF = 8$, $FG = 15$ B. $x = 3$, $EF = -6$, $FG = -6$ C. $x = 10$, $EF = 32$, $FG = 45$ D. $x = 3$, $EF = 8$, $FG = 15$

5. If $EG = 25$, and point F is 2/5 of the way between E and G, find the value *FG*.
The drawing is not to scale.


A. 12.5 B. 10 C. 15 D. 20

6. If *T* is the midpoint of $\overline{SU}$, what are *ST*, *TU*, and *SU*?

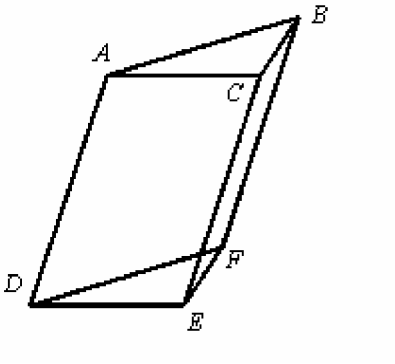



A. $ST = 7$, $TU = 63$, and $SU = 126$ B. $ST = 80$, $TU = 80$, and $SU = 160$ C. $ST = 18$, $TU = 18$, and $SU = 36$ D. $ST = 63$, $TU = 63$, and $SU = 126$

7. Find the measures of $\angle PMN$ and $\angle NMR$ if $\overrightarrow{MN}$ bisects $\angle PMR$. The measure of $\angle PMR$ is 136°. Draw a sketch that shows the given information. Explain your answer.

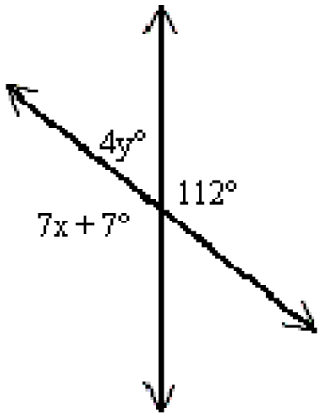
8. If $\overrightarrow{AB}$ is opposite $\overrightarrow{AC}$ and $\overrightarrow{AC}$ is opposite $\overrightarrow{AD}$, what can you conclude? Explain.

9. A piece of wood was cut into the wedge shape shown. Name the planes represented by the right-hand and left-hand sides of the wedge. Explain why the two planes are not the same plane.




10. $\overline{BD}$ bisects $\angle ABC$. $m\angle ABC = 7x$. $m\angle ABD = 3x + 36$. Find $m\angle DBC$.
A. 108 B. 72 C. 180 D. 42

11. Find the values of $x$ and $y$.

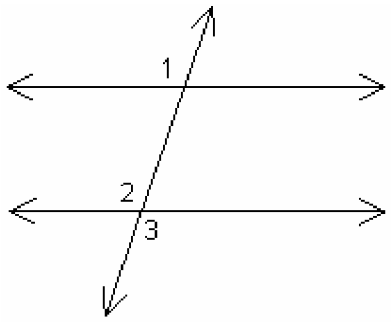



Drawing not to scale

A. $x = 15, y = 17$ B. $x = 112, y = 68$ C. $x = 68, y = 112$ D. $x = 17, y = 15$

12. What are the converse, inverse, and contrapositive of the following true conditional? What are the truth values of each? If a statement is false, give a counterexample.
If a figure is a rectangle, then it is a parallelogram.

13. Complete the two-column proof.
**Given:** $\angle 1 \cong \angle 2$, $m\angle 1 = 130$
**Prove:** $m\angle 3 = 130$




Drawing not to scale

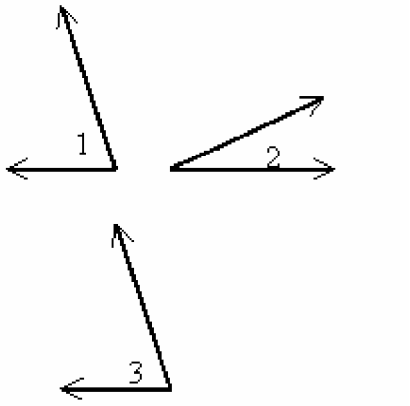
| | |
|---|---|
| $\angle 1 \cong \angle 2$, $m\angle 1 = 130$ | a. _____ |
| $m\angle 2 = 130$ | b. _____ |
| $m\angle 2 = m\angle 3$ | c. _____ |
| $m\angle 3 = 130$ | d. _____ |

14. **a.** Write the following conditional in if-then form.
**b.** Write its converse in if-then form.
**c.** Determine the truth value of the original conditional and its converse. Explain why each of them is true or false, and provide a counterexample(s) for any false statement(s).

On a number line, the points with coordinates –2 and 5 are seven units apart.

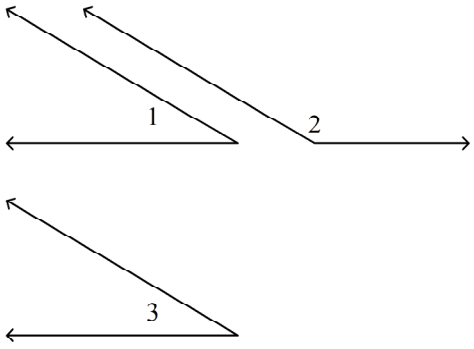
15. **Given:** $\angle 1$ and $\angle 2$ are complementary, and $\angle 2$ and $\angle 3$ are complementary.

**Prove:** $\angle 1 \cong \angle 3$




16. **Given:** $\angle 1$ and $\angle 2$ are supplementary, and $\angle 1 \cong \angle 3$.

**Prove:** $\angle 3$ and $\angle 2$ are supplementary.

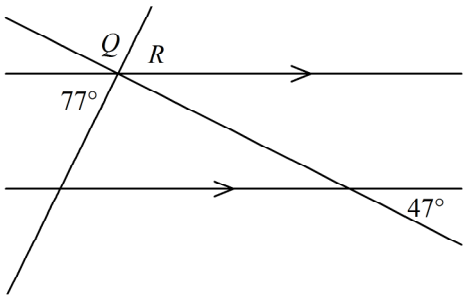



17. Write a two-column proof.

**Given:** $7y = 8x - 14$; $y = 6$

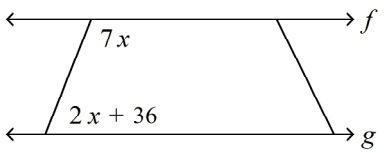
**Prove:** $x = 7$

18. Find $m\angle Q$. The diagram is not to scale.



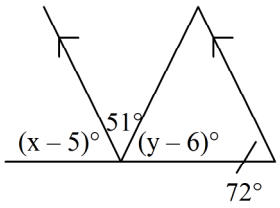

A. 66 B. 56 C. 124 D. 103

19. The expressions in the figure below represent the measures of two angles. Find the value of $x$. $f \parallel g$. The diagram is not to scale.




A. 15 B. 17 C. –16 D. 16

20. Find the values of $x$ and $y$. The diagram is not to scale.

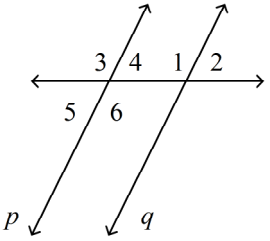



A. $x = 51, y = 63$ B. $x = 77, y = 63$ C. $x = 63, y = 77$ D. $x = 77, y = 65$

21. Justify the statement algebraically.

In a triangle, if the sum of the measures of two angles is equal to the measure of the third angle, then the triangle is a right triangle.

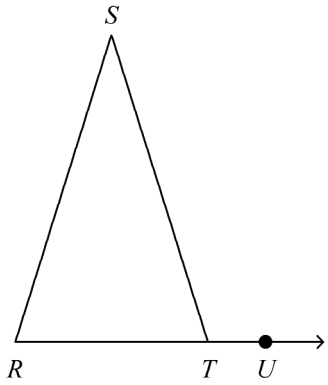
22. Find the value of $x$ for which $p$ is parallel to $q$, if $m\angle 1 = (9x)$ and $m\angle 3 = 117$.The diagram is not to scale.




A. 108 B. 13 C. 117 D. 126

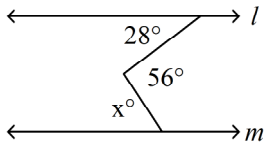
23. Find the value of $x$. The diagram is not to scale.

**Given:** $\angle SRT \cong \angle STR$, $m\angle SRT = 28$, $m\angle STU = 2x$




A. 28 B. 30 C. 14 D. 76

24. Find the value of $x$ for which $l$ is parallel to $m$. The diagram is not to scale.

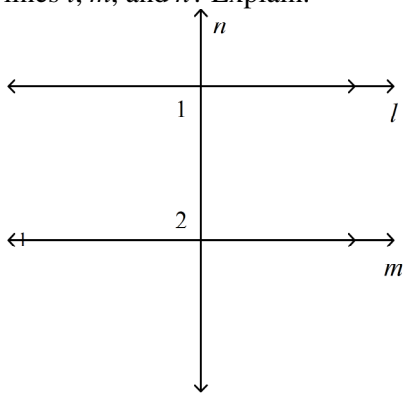



A. 28 B. 56 C. 84 D. 152

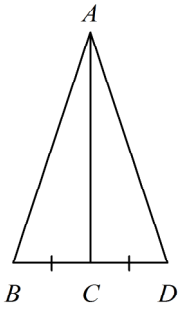
25. Given $\Delta QRS \cong \Delta TUV$, $QS = 3v + 2$, and $TV = 7v - 6$, find the length of $QS$ and $TV$.
A. 2 B. 9 C. 8 D. 20

26. Given $\Delta ABC \cong \Delta PQR$, $m\angle B = 3v + 4$, and $m\angle Q = 8v - 6$, find $m\angle B$ and $m\angle Q$.
A. 22 B. 11 C. 10 D. 25

27. Given $m\angle 1 = m\angle 2$, what can you conclude about the lines $l$, $m$, and $n$? Explain.




28. What other information do you need in order to prove the triangles congruent using the SAS Congruence Postulate?

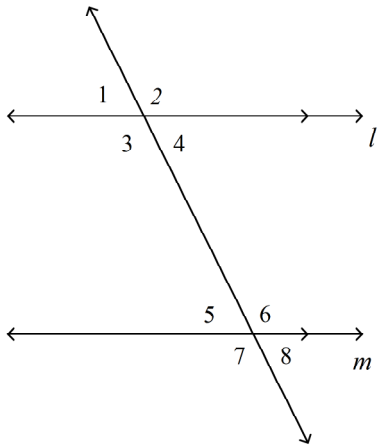



A. $\angle BAC \cong \angle DAC$ B. $\overline{AC} \perp \overline{BD}$
C. $\angle CBA \cong \angle CDA$ D. $\overline{AC} \cong \overline{BD}$

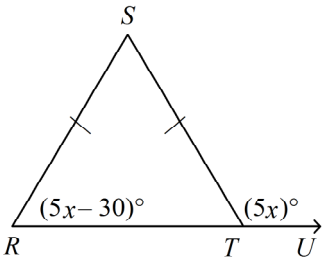
29. Two sides of an equilateral triangle have lengths $x + 2$ and $-2x + 20$. Which could be the length of the third side: $14 - x$ or $2x + 4$?
A. $2x + 4$ only B. both $14 - x$ and $2x + 4$ C. $14 - x$ only D. neither $14 - x$ nor $2x + 4$

30. Write a two-column proof.

**Given:** $\angle 2$ and $\angle 5$ are supplementary.
**Prove**: $l \parallel m$



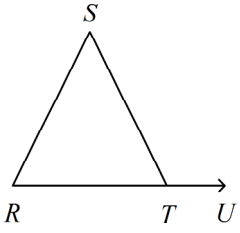

31. Find the value of $x$. The diagram is not to scale.




A. $x = 60$ B. $x = 21$ C. $x = 15$ D. none of these

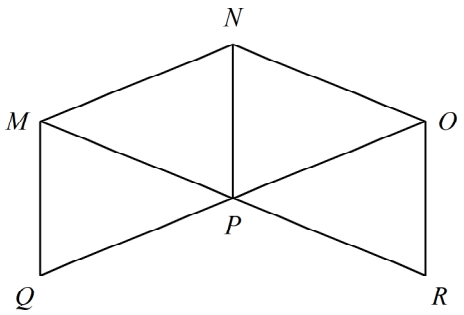
32. Find the value of $x$. The diagram is not to scale.

**Given:** $\overline{RS} \cong \overline{ST}$, $m\angle RST = 7x - 54$, $m\angle STU = 8x$



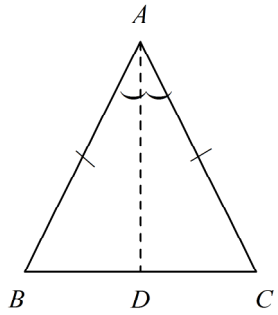

A. 14 B. 152 C. 16 D. 19

33. Which two triangles are congruent by ASA?
$\overline{MR}$ bisects $\overline{QO}$, and $\angle MQP \cong \angle ROP$.




A. $\Delta MQP$ and $\Delta MPN$ B. $\Delta MPQ$ and $\Delta RPO$ C. $\Delta MNP$ and $\Delta ONP$ D. none

34. Supply the reasons missing from the proof shown below.
**Given:** $\overline{AB} \cong \overline{AC}$, $\angle BAD \cong \angle CAD$
**Prove:** $\overline{AD}$ bisects $\overline{BC}$

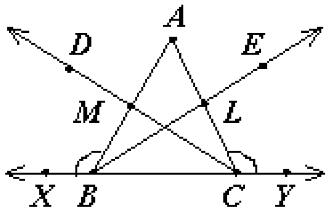



| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{AC}$ | 1. Given |
| 2. $\angle BAD \cong \angle CAD$ | 2. Given |
| 3. $\overline{AD} \cong \overline{AD}$ | 3. Reflexive Property |
| 4. $\Delta BAD \cong \Delta CAD$ | 4. ___?___ |
| 5. $\overline{BD} \cong \overline{CD}$ | 5. ___?___ |
| 6. $\overline{AD}$ bisects $\overline{BC}$ | 6. Definition of segment bisector |

A. ASA; Corresp. parts of $\cong \Delta$ are $\cong$. B. SAS; Reflexive Property C. SSS; Reflexive Property D. SAS; Corresp. parts of $\cong \Delta$ are $\cong$.

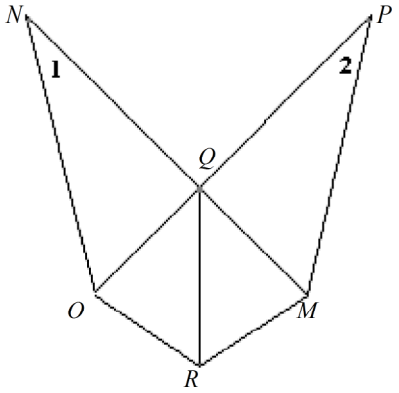
35. Two sides of a triangle have lengths 6 and 8. What lengths are possible for the third side? Explain.

36. $\overrightarrow{BE}$ is the bisector of $\angle ABC$ and $\overrightarrow{CD}$ is the bisector of $\angle ACB$. Also, $\angle XBA \cong \angle YCA$. Which of AAS, SSS, SAS, or ASA would you use to help you prove $\overline{BL} \cong \overline{CM}$?



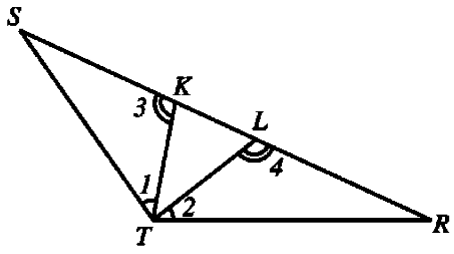

A. AAS B. SSS C. SAS D. ASA

37. Write a two-column proof to show that $\Delta OQR \cong \Delta MQR$.
**Given:** $\overline{NO} \cong \overline{PM}$, $\angle 1 \cong \angle 2$, and $\overline{OR} \cong \overline{MR}$

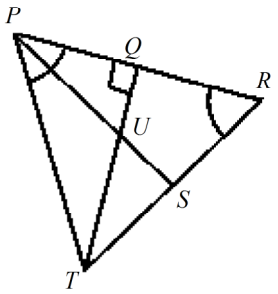



38. $P$, $Q$, and $R$ are three different points. $PQ = 3x + 2$, $QR = x$, $RP = x + 2$, and $x > 0$. List the angles of $\Delta PQR$ in order from largest to smallest and justify your response.

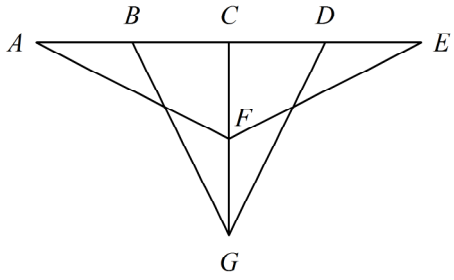
39. In the figure, $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, and $\overline{TK} \cong \overline{TL}$. Prove that $\Delta RTK \cong \Delta STL$.



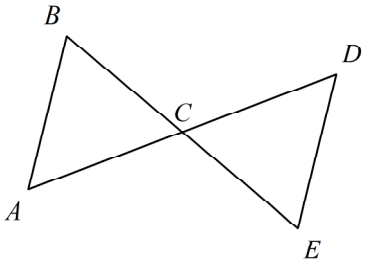

40. Determine which triangles in the figure are congruent by AAS.




41. Separate and redraw $\Delta BDG$ and $\Delta AEF$. Identify any common angles or sides.

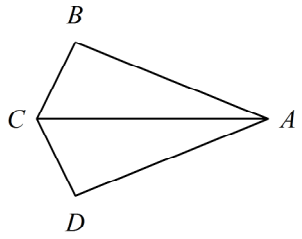



42. Write a two-column proof.
**Given:** $\overline{BC} \cong \overline{EC}$ and $\overline{AC} \cong \overline{DC}$
**Prove:** $\overline{BA} \cong \overline{ED}$



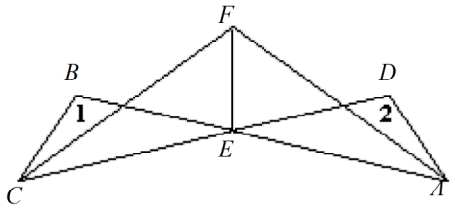

43. $m\angle A = 9x - 7$, $m\angle B = 7x - 9$, and $m\angle C = 28 - 2x$. List the sides of $\Delta ABC$ in order from shortest to longest.
A. $\overline{AB}$; $\overline{AC}$; $\overline{BC}$ B. $\overline{BC}$; $\overline{AB}$; $\overline{AC}$ C. $\overline{AC}$; $\overline{AB}$; $\overline{BC}$ D. $\overline{AB}$; $\overline{BC}$; $\overline{AC}$

44. Write a two-column proof:
**Given:** $\angle BAC \cong \angle DAC$, $\angle DCA \cong \angle BCA$
**Prove:** $\overline{BC} \cong \overline{CD}$

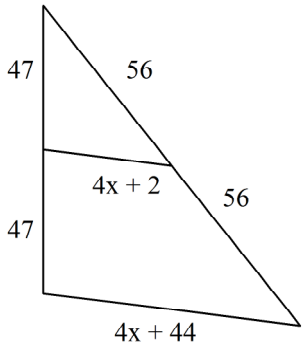



45. Write a proof.

**Given:** $\overline{BC} \cong \overline{DA}$, $\angle 1 \cong \angle 2$, and $\overline{CF} \cong \overline{AF}$
**Prove:** $\Delta CFE \cong \Delta AFE$




46. Find the length of the midsegment. The diagram is not to scale.



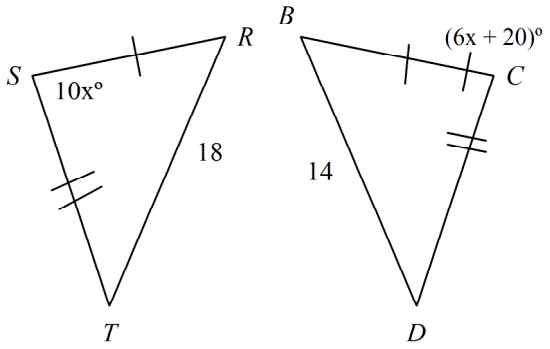

A. 24 B. 0 C. 42 D. 84

47. Use indirect reasoning to explain why a quadrilateral can have no more than three obtuse angles.

48. Where can the perpendicular bisectors of the sides of a right triangle intersect?
I. inside the triangle
II. on the triangle
III. outside the triangle
A. I only B. II only C. I or II only D. I, II, or II

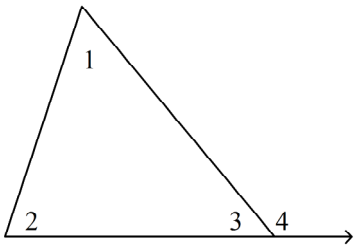
49. In $\Delta ABC$, centroid $D$ is on median $\overline{AM}$. $AD = x + 4$ and $DM = 2x - 4$. Find $AM$.
A. 13 B. 4 C. 12 D. 6

50. What is the range of possible values for $x$?



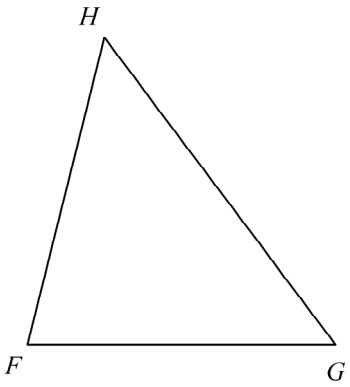

A. $0 < x < 18$ B. $0 < x < 5$ C. $7 < x < 18$
D. $5 < x < 18$

51. Name the second largest of the four angles named in the figure (not drawn to scale) if the side included by $\angle 1$ and $\angle 2$ is 11 cm, the side included by $\angle 2$ and $\angle 3$ is 16 cm, and the side included by $\angle 3$ and $\angle 1$ is 14 cm.

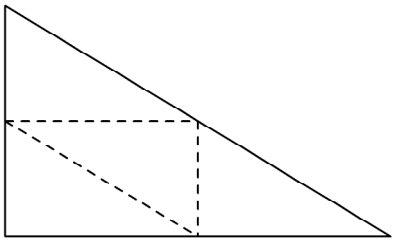



A. $\angle 3$ B. $\angle 4$ C. $\angle 2$ D. $\angle 1$

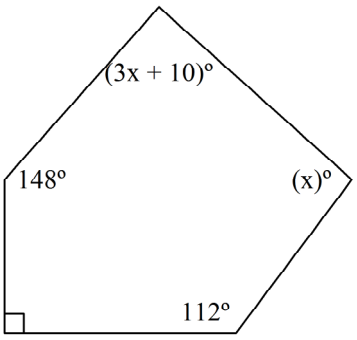
52. In $\Delta FGH$, draw median $\overline{FJ}$ from $F$ to the side opposite $F$.




53. Mei has a large triangular stone that she wants to divide into four smaller triangular stepping stones in a pathway. Explain why cutting along each midsegment creates four congruent stepping stones.

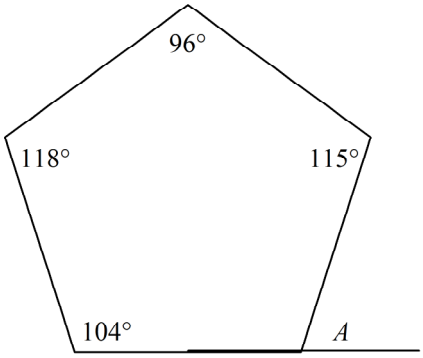


54. Find the value of $x$. The diagram is not to scale.



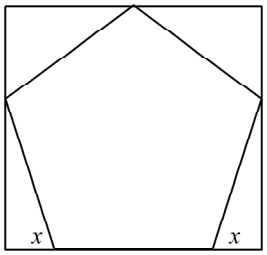

A. 90 B. 45 C. 35 D. 145

55. Find $m\angle A$. The diagram is not to scale.




A. 107 B. 117 C. 63 D. 73

56. This jewelry box has the shape of a regular pentagon. It is packaged in a rectangular box as shown here. The box uses two pairs of congruent right triangles made of foam to fill its four corners. Find the measure of the foam angle marked.

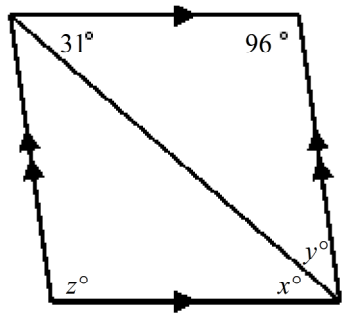



A. 54° B. 36° C. 18° D. 72°

57. Use *less than*, *equal to*, or *greater than* to complete this statement: The measure of each exterior angle of a regular 10-gon is ____ the measure of each exterior angle of a regular 6-gon.
A. cannot tell B. less than C. greater than
D. equal to

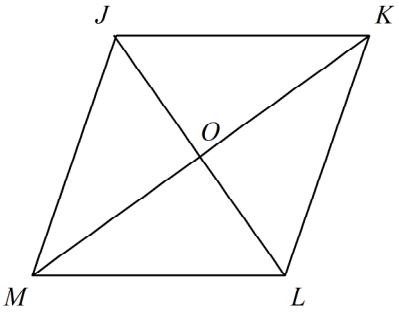
58. A nonregular hexagon has five exterior angle measures of 55, 58, 69, 57, and 55. What is the measure of the interior angle adjacent to the sixth exterior angle?
A. 104 B. 66 C. 114 D. 124

59. Find the values of the variables in the parallelogram. The diagram is not to scale.



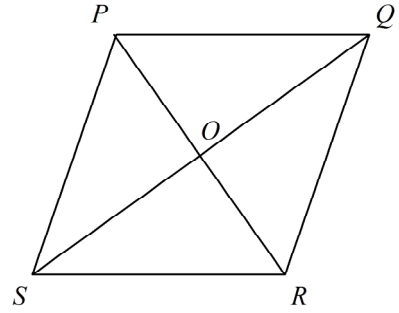

A. $x = 53$, $y = 31$, $z = 96$ B. $x = 53$, $y = 53$, $z = 127$ C. $x = 31$, $y = 53$, $z = 96$ D. $x = 31$, $y = 53$, $z = 127$

60. In the parallelogram, $m\angle KLO = 78$ and $m\angle MLO = 42$. Find $m\angle KJM$. The diagram is not to scale.



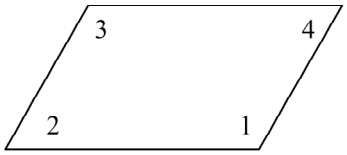

A. 110 B. 120 C. 78 D. 60

61. In the parallelogram, $m\angle QRP = 32$ and $m\angle PRS = 84$. Find $m\angle PQR$. The diagram is not to scale.



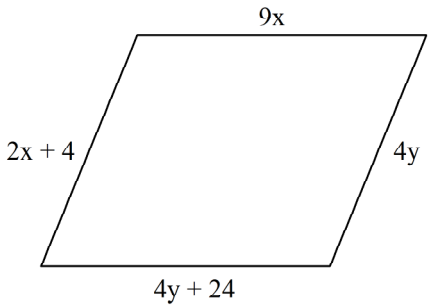

A. 84 B. 116 C. 32 D. 64

62. For the parallelogram, if $m\angle 2 = 4x - 20$ and $m\angle 4 = 3x - 11$, find $m\angle 1$. The diagram is not to scale.



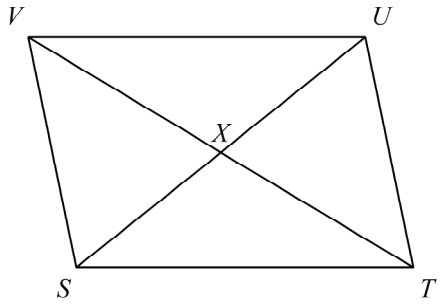

A. 9 B. 16 C. 164 D. 174

63. For what values of $x$ and $y$ must this quadrilateral be a parallelogram? Find the lengths of the sides. The diagram is not to scale.



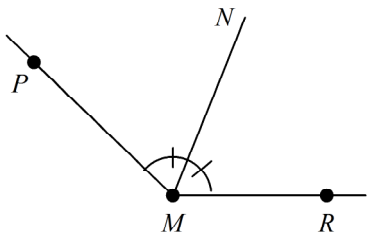

64. For a regular $n$-gon:
**a.** What is the sum of the measures of its angles?
**b.** What is the measure of each angle?
**c.** What is the sum of the measures of its exterior angles, one at each vertex?
**d.** What is the measure of each exterior angle?
**e.** Find the sum of your answers to parts **b** and **d**. Explain why this sum makes sense.

65. **Given:** $\overline{SV} \parallel \overline{TU}$ and $\Delta SVX \cong \Delta UTX$
**Prove:** $VUTS$ is a parallelogram



# Geometry 21 - More Midterm Practice
## Answer Section

1. A
2. C
3. B
4. A
5. C
6. D
7. [4]




$m\angle PMN = m\angle NMR = 68$. Because $\overleftrightarrow{MN}$ bisects $\angle PMR$, $m\angle PMN = m\angle NMR$. By the Angle Addition Postulate, $m\angle PMN + m\angle NMR = m\angle PMR$. By Substitution, $m\angle PMN + m\angle PMN = m\angle PMR$, or $2m\angle PMN = m\angle PMR$. Thus, $m\angle PMN = \frac{1}{2}m\angle PMR = \frac{1}{2}(136) = 68$, and $m\angle NMR = 68$ as well.

[3] finds correct angle measures and gives explanation, but no diagram
[2] finds correct angle measures and draws correct diagram, but incomplete or incorrect explanation
[1] finds correct angle measures only

8. $\overrightarrow{AB} = \overrightarrow{AD}$. Sample explanation: Both rays have endpoint $A$ and extend in the direction away from point $C$.
9. $BFEC$ and $BFDA$. Explanations may vary. Sample: If the two planes were the same plane, then points $A$, $B$, $C$, $D$, $E$, and $F$ would all be in the same plane and the piece of wood would be flat rather than wedge-shaped.
10. D
11. A
12. Converse:
If a figure is a parallelogram, then it is a rectangle.
The converse is false. A parallelogram that does not have four 90º angles is not a rectangle.

Inverse:
If a figure is not a rectangle, then it is not a parallelogram.
The inverse is false. A parallelogram with angles that are not all 90º angles is not a rectangle, but it is a parallelogram.

Contrapositive:
If a figure is not a parallelogram, then it is not a rectangle.
The contrapositive is true.

13.

[4] **a.** Given
**b.** Substitution Property
**c.** Vertical Angles Theorem
**d.** Substitution Property
[3] three parts correct
[2] two parts correct
[1] one part correct

14. **a.** On a number line, if points have coordinates –2 and 5, then they are seven units apart.
**b.** On a number line, if points are seven units apart, then they have coordinates –2 and 5.
**c.** The original conditional is true by the Ruler Postulate. The converse is false. The points 0 and 7 are seven units apart, but their coordinates are not –2 and 5.

15.

[4] By the definition of complementary angles, $m\angle 1 + m\angle 2 = 90$ and $m\angle 2 + m\angle 3 = 90$. By the Transitive Property of Equality (or Substitution Property), $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$. By the Subtraction Property of Equality, $m\angle 1 = m\angle 3$, and $\angle 1 \cong \angle 3$ by the definition of congruent angles.
OR
equivalent explanation
[3] one step missing OR one incorrect justification
[2] two steps missing OR two incorrect justifications
[1] correct steps with no explanations

16.

[4] $\angle 1$ and $\angle 2$ are supplementary, because it is given. So, $m\angle 1 + m\angle 2 = 180°$ by the definition of supplementary angles. $\angle 1 \cong \angle 3$ because it is given. So, $m\angle 1 = m\angle 2$ by the definition of congruent angles. By the Substitution Property, $m\angle 3 + m\angle 2 = 180°$, so by the definition of supplementary angles, $\angle 3$ and $\angle 2$ are supplementary.
OR
equivalent explanation
[3] one step missing OR one incorrect justification
[2] two steps missing OR two incorrect justifications
[1] correct steps with no explanations

17.

[4]

| | |
|---|---|
| $7y = 8x - 14; y = 6$ | Given |
| $42 = 8x - 14$ | Substitution Property |
| $56 = 8x$ | Addition Property of Equality |
| $7 = x$ | Division Property of Equality |
| $x = 7$ | Symmetric Property of Equality |

OR
equivalent proof.
[3] one step missing OR one incorrect justification
[2] two steps missing OR two incorrect justifications
[1] correct steps with no explanations

18. B
19. D
20. B

21. $m\angle 1 + m\angle 2 + m\angle 3 = 180$. Given $m\angle 1 + m\angle 2 = m\angle 3$, by substitution, $m\angle 3 + m\angle 3 = 180$. $2m\angle 3 = 180$, and $m\angle 3 = 90$. Thus, $\angle 3$ is a right angle, and the triangle is a right triangle.
22. B
23. D
24. A
25. C
26. C
27. $l$ and $m$ are both perpendicular to $n$. Explanation: Because $l$ and $m$ are parallel, $\angle 1$ and $\angle 2$ are supplementary by the Same-Side Interior Angles Postulate. It is given that $m\angle 1 = m\angle 2$, so $180 = m\angle 1 + m\angle 2 = m\angle 1 + m\angle 1 = 2m\angle 1$, and $m\angle 1 = 90 = m\angle 2$. Because $\angle 1$ and $\angle 2$ are right angles, $l$ is perpendicular to $n$ and $m$ is perpendicular to $n$.
28. B
29. C
30.

[4]

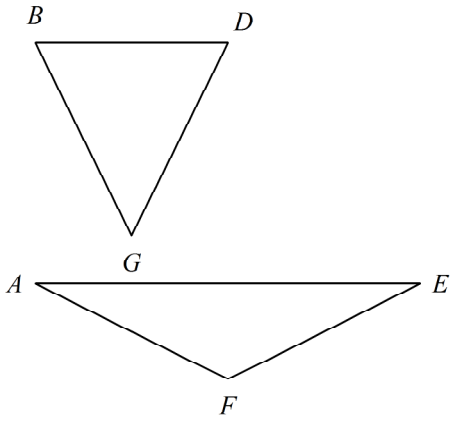
| Statements | Reasons |
|---|---|
| 1. $\angle 2$ and $\angle 5$ are supplementary | 1. Given |
| 2. $\angle 3 \cong \angle 2$ | 2. Vertical angles |
| 3. $\angle 3$ and $\angle 5$ are supplementary | 3. Substitution |
| 4. $l \parallel m$ | 4. Converse of Same-Side Interior Angles Postulate |

[3] correct idea, some details inaccurate
[2] correct idea, some statements missing
[1] correct idea, several steps omitted

31. B
32. A
33. B
34. D
35. Let $x$ be the length of the third side. By the Triangle Inequality Theorem, $6 + x > 8$, $6 + 8 > x$, and $8 + x > 6$. Solving each inequality, $x > 2$, $x < 14$, and $x > -2$, respectively; or $2 < x < 14$.
36. D
37.

| Statement | Reason |
|---|---|
| 1. $\overline{NO} \cong \overline{PM}$ | 1. Given |
| 2. $\angle 1 \cong \angle 2$ | 2. Given |
| 3. $\angle OQN \cong \angle MQP$ | 3. Vertical angles are congruent. |
| 4. $\Delta OQN \cong \Delta MQP$ | 4. AAS |
| 5. $\overline{OQ} \cong \overline{MQ}$ | 5. Corresp. parts of $\cong \Delta \cong$ |
| 6. $\overline{OR} \cong \overline{MR}$ | 6. Given |
| 7. $\overline{QR} \cong \overline{QR}$ | 7. Reflexive Property |
| 8. $\Delta OQR \cong \Delta MQR$ | 8. SSS |

38. $\angle R$, $\angle Q$, $\angle P$. Sample: Because $x = QR > 0$, $x < x + 2 < 3x + 2$, thus $QR < RP < PQ$. The largest angle ($\angle R$) is opposite $\overline{PQ}$; the next largest angle ($\angle Q$) is opposite $\overline{RP}$.
39. Answers may vary. Sample: $\Delta RTL \cong \Delta STK$ by ASA, so $\angle R \cong \angle S$. Supplements of congruent angles are congruent, so $\angle RKT \cong \angle SLT$. $\Delta RTK \cong \Delta STL$ by AAS.
40. $\Delta PQT \cong \Delta RQT$
41. No angle or side is common to both $\Delta BDG$ and $\Delta AEF$.




42. [4]

| Statement | Reason |
|---|---|
| 1. $\overline{BC} \cong \overline{EC}$ and $\overline{AC} \cong \overline{DC}$ | 1. Given |
| 2. $\angle BCA \cong \angle ECD$ | 2. Vertical angles are congruent. |
| 3. $\Delta BCA \cong \Delta ECD$ | 3. SAS |
| 4. $\overline{BA} \cong \overline{ED}$ | 4. Corresp. parts of $\cong \Delta$ are $\cong$. |

[3] correct idea, some details inaccurate
[2] correct idea, not well organized
[1] correct idea, one or more significant steps omitted

43. A
44. [4]

| Statement | Reason |
|---|---|
| 1. $\angle BAC \cong \angle DAC$ and $\angle DCA \cong \angle BCA$ | 1. Given |
| 2. $\overline{CA} \cong \overline{CA}$ | 2. Reflexive Property |
| 3. $\Delta CBA \cong \Delta CDA$ | 3. ASA |
| 4. $\overline{BC} \cong \overline{CD}$ | 4. Corresp. parts of $\cong \Delta$ are $\cong$. |

[3] correct idea, some details inaccurate
[2] correct idea, not well organized
[1] correct idea, one or more significant steps omitted

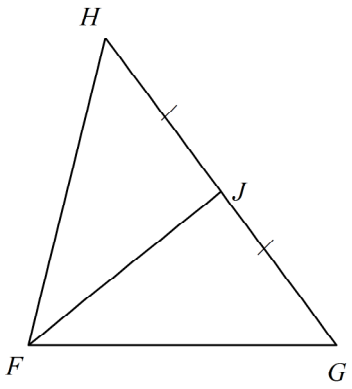
45.

[4]

| Statement | Reason |
|---|---|
| 1. $\overline{BC} \cong \overline{DA}$ | 1. Given |
| 2. $\angle 1 \cong \angle 2$ | 2. Given |
| 3. $\angle BEC \cong \angle DEA$ | 3. Vertical angles are congruent. |
| 4. $\Delta BEC \cong \Delta DEA$ | 4. AAS |
| 5. $\overline{CE} \cong \overline{AE}$ | 5. Corresp. parts of $\cong \Delta \cong$ |
| 6. $\overline{CF} \cong \overline{AF}$ | 6. Given |
| 7. $\overline{EF} \cong \overline{EF}$ | 7. Reflexive Property |
| 8. $\Delta CFE \cong \Delta AFE$ | 8. SSS |

[3] correct idea, some details inaccurate
[2] correct idea, not well organized
[1] correct idea, one or more significant steps omitted

46. C
47. Assume a quadrilateral has more than three obtuse angles. Then it has four angles, each with a measure greater than 90. Their sum is greater than 360, which contradicts the fact that the sum of the measures of the angles of a quadrilateral is 360. Thus a quadrilateral can have no more than three obtuse angles.
48. B
49. C
50. D
51. D
52.




53. Cutting along each midsegment produces four triangles with sides that are half the length of the original sides. All three sides of each of the four triangle have the same measure, therefore by SSS, the triangles are congruent.
54. B
55. D
56. D
57. B
58. C
59. C
60. B

61. D
62. C
63. $x = 4$, $y = 3$; 12, 36
64.

[4] **a.** $180(n - 2)$

**b.** $\frac{180(n - 2)}{n}$

**c.** 360

**d.** $\frac{360}{n}$

**e.** $\frac{180(n - 2)}{n} + \frac{360}{n}$

$= \frac{180(n - 2) + 360}{n}$

$= \frac{180n - 360 + 360}{n}$

$= \frac{180n}{n}$

$= 180$

This sum makes sense because an interior angle and its adjacent exterior angle are supplementary.

[3] parts **a**–**d** correct; small error in part **e**

[2] parts **a**–**d** correct

[1] three correct answers

65.

[4] Because $\Delta SVX \cong \Delta UTX$, $\overline{SV} \cong \overline{TU}$ because corresponding parts of congruent triangles are congruent. It is given that $\overline{SV} \parallel \overline{TU}$. Therefore quadrilateral $VUTS$ is a parallelogram because if one pair of opposite sides of a quadrilateral is both congruent and parallel, then the quadrilateral is a parallelogram.

[3] correct idea, some details inaccurate

[2] correct idea, not well organized

[1] correct idea, one or more significant steps omitted