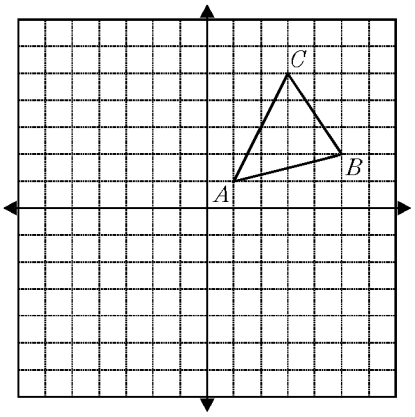
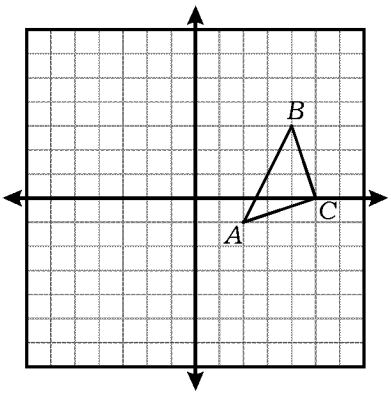
GABRIELINO HIGH SCHOOL

Geometry FALL Final Review Questions

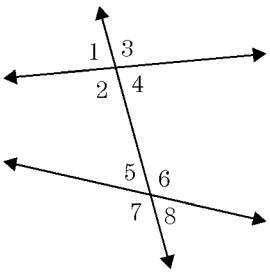
1. Find and sketch the image of $\triangle ABC$ under a rotation of $90^\circ$ about the origin. Give the coordinates of each point.



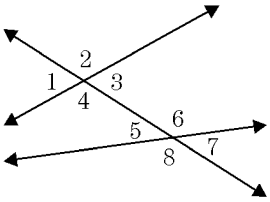

2. Find and sketch the image of $\triangle ABC$ under a rotation of $180^\circ$ about the origin. Give the coordinates of each point.




3. In the diagram, list all pairs of vertical angles.

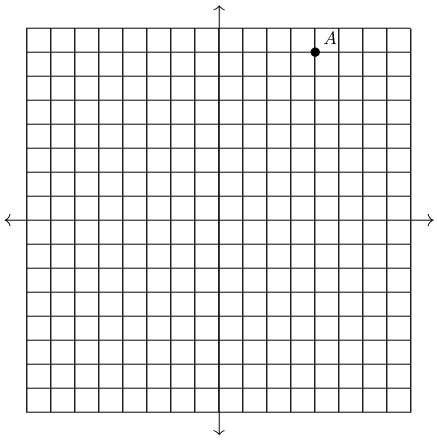



4. In the diagram, list all pairs of vertical angles.

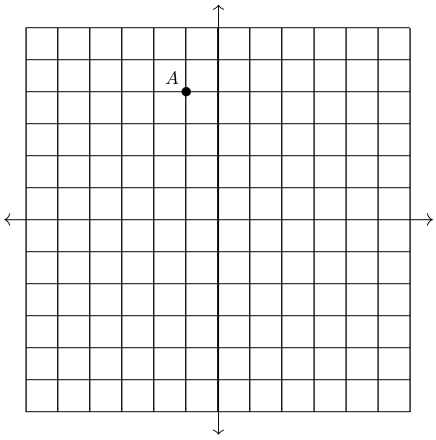



5. A triangle $ABC$ is defined by its vertices $A(1,3)$, $B(-2,5)$, and $C(0,-4)$. This triangle is then reflected in the $x$-axis. What are the coordinates of its image $A'B'C'$?

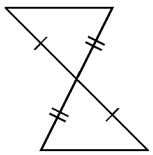
6. In the diagram, what is the image of point $A$ under the glide reflection that involves a translation $T$: $(x,y) \to (x-1, y-3)$ and a reflection in the line $y=3$? Plot $A'$ and *give its coordinates.*

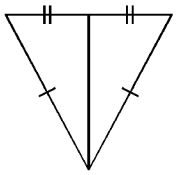


7. In the diagram, what is the image of point $A$ under the glide reflection that involves a translation $T$: $(x, y) \to (x-3, y+1)$ and a reflection in the line $x = 1$? Plot $A'$ and *give its coordinates.*

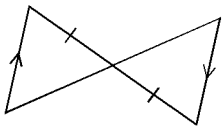



8. State whether the following pairs of triangles are necessarily congruent. If congruent, state the congruence postulate.

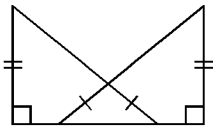


9. 

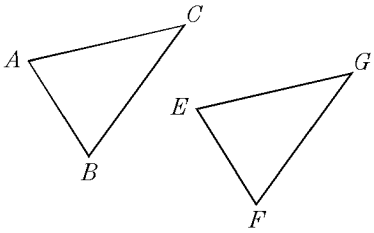
10. In the sketch using the indicated characteristics, can the two triangles be shown congruent? Why or why not?



11. In the sketch using the indicated characteristics, can two overlapping triangles be shown to be congruent? Why or why not?



12. Suppose $\triangle ABC$ is congruent to $\triangle EFG$. For each of the following, name the corresponding parts.

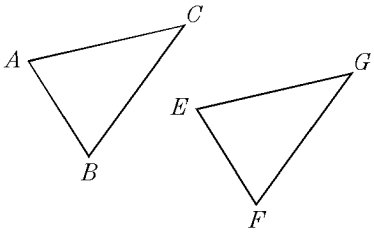



a) $\angle A$

b) $\angle BCA$

c) $\overline{AC}$

13. Suppose $\triangle ABC$ is congruent to $\triangle EFG$. For each of the following, name the corresponding parts.



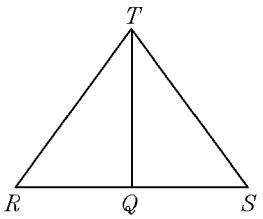

a) $\angle B$

b) $\angle CBA$

c) $\overline{AB}$

For the following problems, complete the triangle congruence statement, *and* name the postulate that justifies the statement.

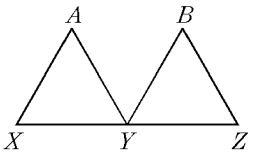
14.




$\triangle RTS$ is isosceles with legs $\overline{RT}$ and $\overline{TS}$. $Q$ is the midpoint of $\overline{RS}$.

$\triangle RTQ \cong$ _____ by _____.

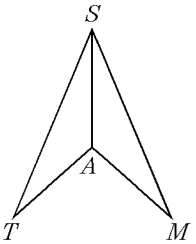
15.




$Y$ is the midpoint of $\overline{XZ}$, $\overline{AY} \cong \overline{BY}$, and $\angle AYX \cong \angle BYZ$.

$\triangle XYA \cong$ _____ by _____.

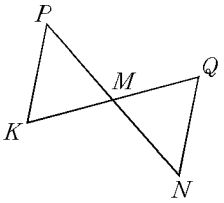
16.




$\overline{SA}$ is the angle bisector of $\angle TSM$ and $\overline{ST} \cong \overline{SM}$.

$\triangle SAT \cong$ _____ by _____.

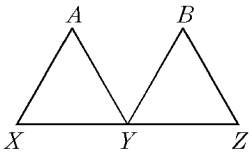
17.



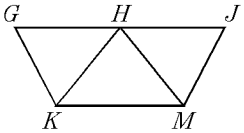

$\angle P \cong \angle N$, and $M$ is the midpoint of $PN$.

$\triangle PMK \cong$ _____ by _____.

18. In the diagram, $\overline{AY} \parallel \overline{BZ}$, $Y$ is the midpoint of $\overline{XZ}$ and $\overline{AY} \cong \overline{BZ}$. Can it be shown that $\angle A \cong \angle B$? Explain.



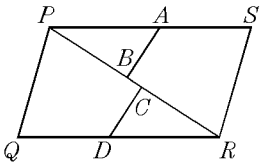

19. In the diagram, $\triangle HMK$ is an isosceles triangle with base $\overline{KM}$, $\overline{GJ} \parallel \overline{KM}$, and $H$ is the midpoint of $\overline{GJ}$. It follows that:




a) $\triangle KHG \cong$ _____ by _____

b) $\angle G \cong$ _____ by _____

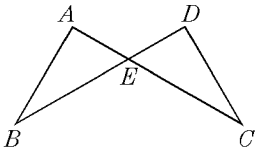
20.




$\overline{AB} \parallel \overline{CD}$, $\overline{PB} \cong \overline{CR}$, and $\overline{PS} \parallel \overline{QR}$.

$\triangle PAB \cong$ _____ by _____.

21.

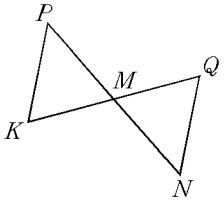



$\overline{BE} \cong \overline{CE}$ and $\overline{AE} \cong \overline{DE}$.

$\triangle ABE \cong$ _____ by _____.

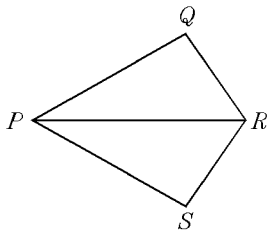
22. Given: $\overline{PK} \parallel \overline{QN}$, $\overline{PN}$ bisects $\overline{KQ}$

Prove: $\overline{KQ}$ bisects $\overline{PN}$



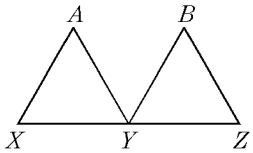
23. Given: $\overline{PR}$ bisects both $\angle SPQ$ and $\angle QRS$

Prove: $\triangle PQR \cong \triangle PSR$




24. Given: $\overline{AX} \parallel \overline{BY}$, $\overline{AY} \parallel \overline{BZ}$, $Y$ is the midpoint of $\overline{XZ}$

Prove: $\triangle AXY \cong \triangle BYZ$



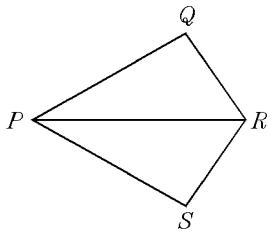

25. Given: $\angle X \cong \angle Z$, $\angle A \cong \angle B$, $Y$ is the midpoint of $\overline{XZ}$

Prove: $\triangle AXY \cong \triangle BZY$

Provide the missing information in the following two-column proofs.

26. Given: $\overline{PR}$ bisects $\angle SPQ$, $\angle Q$ and $\angle S$ are right angles

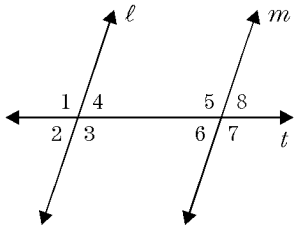
Prove: $\triangle PQR \cong \triangle PSR$




| statement | reason |
|---|---|
| 1. _____ | 1. Given |
| 2. $\angle QPR \cong \angle SPR$ | 2. _____ |
| 3. _____ | 3. right angles $\cong$ |
| 4. _____ | 4. reflexive property |
| 5. $\triangle PQR \cong \triangle PSR$ | 5. _____ |

27. Given: $\angle 2 \cong \angle 8$

Prove: $\ell \parallel m$

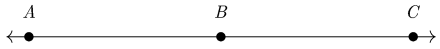



| statement | reason |
|---|---|
| 1. _____ | 1. Given |
| 2. $\angle 2 \cong \angle 4$, $\angle 8 \cong \angle 6$ | 2. _____ |
| 3. $\angle 4 \cong \angle 6$ | 3. _____ |
| 4. $\ell \parallel m$ | 4. _____ |

28. Explain the difference between $XY$ and $\overline{XY}$.

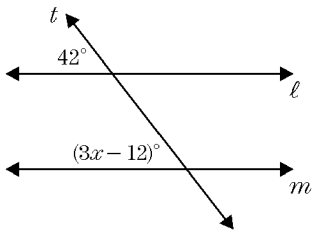
29. Explain the difference between $m\angle PQR$ and $\angle PQR$?

30. Give all of the possible names of segments shown in the diagram.

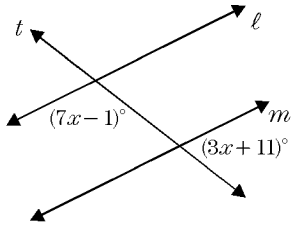



31. Give all of the possible names of segments shown in the diagram.


32. Find $x$ so that $\ell \parallel m$.

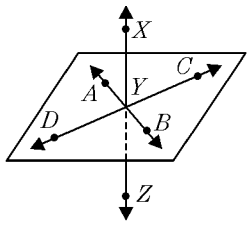


33. Find $x$ so that $\ell \parallel m$.



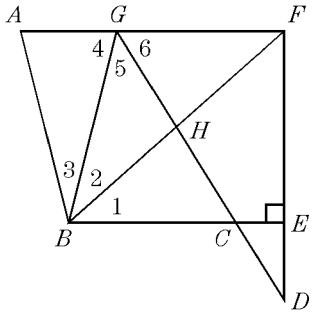

Determine whether each of the following statements is *true* or *false*.

34. In the drawing, $C$, $Z$, and $A$ are coplanar.

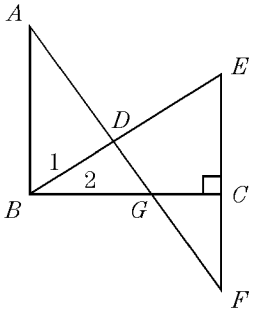



35. In the drawing, $B$, $C$, $D$, and $X$ are coplanar.

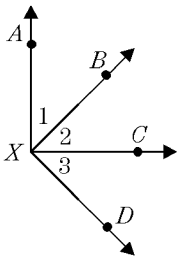
36. Name 2 straight angles shown in the diagram.



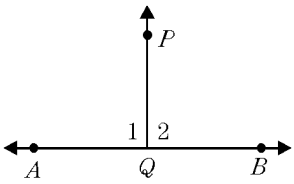

37. Name 2 straight angles shown in the diagram



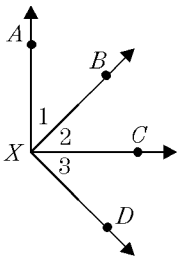

38. $\angle 1$ and $\angle 2$ are adjacent.



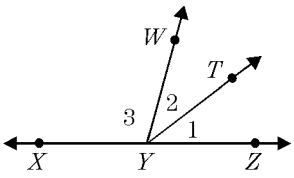

39. $\angle 1$ and $\angle 2$ are supplementary angles.




40. In the diagram, $\overrightarrow{XA} \perp \overrightarrow{XC}$. Name a pair of complementary angles.



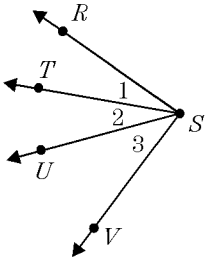
41. In the diagram, angle $WYX$ and angle _____ are supplementary.




42. In the diagram, $\angle 3$ and $\angle WYZ$ are a linear pair and form a straight line. $\overrightarrow{YT}$ bisects $\angle WYZ$. If $m\angle 3 = 122$, what is the value of $m\angle 1$?

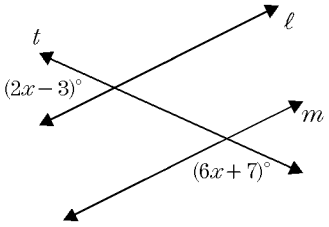
43. In the diagram, $\angle 3$ and $\angle WYZ$ are a linear pair and form a straight line. $\overrightarrow{YT}$ bisects $\angle WYZ$. If $m\angle 3 = 112$, what is the value of $m\angle 1$?

44. In the diagram, $\overrightarrow{SV} \perp \overrightarrow{SR}$, $m\angle VST = 60$, and $m\angle RSU = 50$. What is the measure of $\angle 2$?

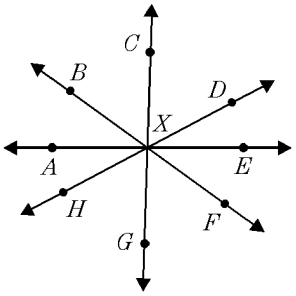



45. In the diagram, $\overrightarrow{SV} \perp \overrightarrow{SR}$, $m\angle VST = 65$, and $m\angle RSU = 55$. What is the measure of $\angle 2$?

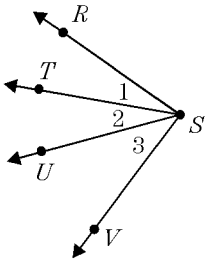
46. Find $x$ so that $\ell \parallel m$.




47. Name a supplemental angle to $\angle AXB$.

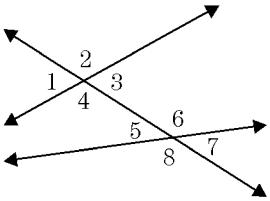



48. In the diagram, $\overrightarrow{SU}$ is the angle bisector of $\angle TSV$. $m\angle 1 = 4x - 3$ and $m\angle 2 = 2x + 1$. What is the value of $x$ if the measure of $\angle RSV$ is 96?

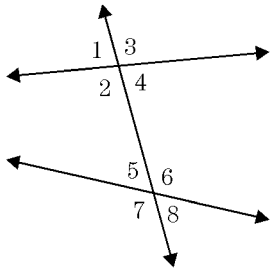



49. In the diagram, $\overrightarrow{SU}$ is the angle bisector of $\angle TSV$. $m\angle 1 = 3x + 7$ and $m\angle 3 = x + 3$. What is the value of $x$ if the measure of $\angle RSV$ is 82?

50. Name all the pairs of alternate interior angles shown in the diagram.



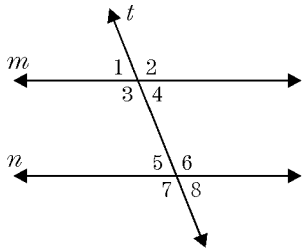
51. Name all the pairs of alternate interior angles shown in the diagram.




52. If two parallel lines are cut by a transversal, then alternate interior angles must be congruent.

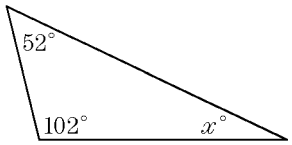
53. If two lines are cut by a transversal, then alternate interior angles must be congruent.

54. In the diagram, if $m\angle 4 = 36$, what does the measure of $\angle 6$ need to be in order for line $m$ to be parallel to line $n$?

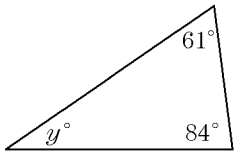



55. In the diagram, if $m\angle 3 = 127$, what does the measure of $\angle 5$ need to be in order for line $m$ to be parallel to line $n$?

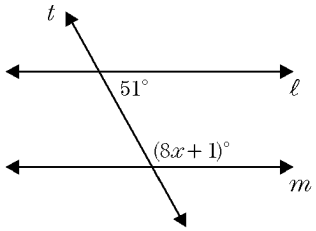
56. Find the value of $x$ in the diagram.




57. Find the value of $y$ in the diagram.

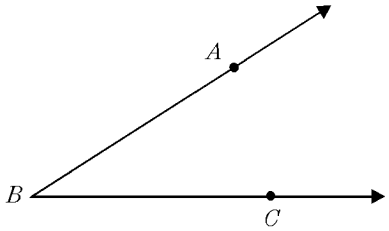



58. Find $x$ so that $\ell \parallel m$.

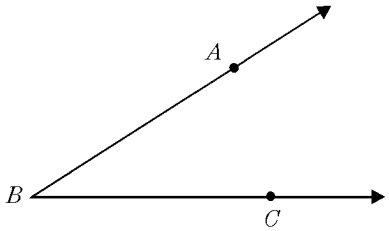



Using only a compass and straightedge, perform the following constructions.

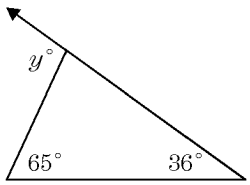
59. Construct an angle congruent to $\angle ABC$.



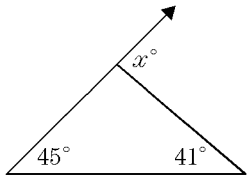

60. Construct the angle bisector of $\angle ABC$.



61. Find the value of $y$ in the diagram.



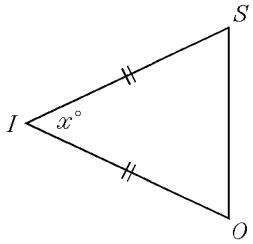

62. Find the value of $x$ in the diagram.




63. Given $P(-3,-4)$, $Q(-8,-3)$ and $R(-1,4)$. Write the equation of the line which passes through $Q$ and is perpendicular to $\overleftrightarrow{PR}$.

64. Given $A(-6,0)$, $B(-2,2)$ and $C(5,9)$. Write the equation of the line which passes through $A$ and is perpendicular to $\overleftrightarrow{BC}$.

65. In the diagram, $\triangle ISO$ is isosceles. If $x = 52$ and $IO = 6$, find the values for the following:

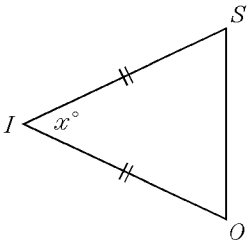



a) $m\angle S =$ _____

b) $IS =$ _____

c) $m\angle SOI =$ _____

66. In the diagram, $\triangle ISO$ is isosceles. If $x = 46$ and $IS = 8$, find the values for the following:




a) $m\angle S =$ _____

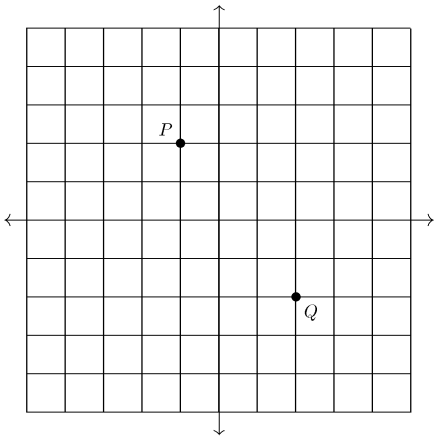
b) $IO =$ _____

c) $m\angle IOS =$ _____

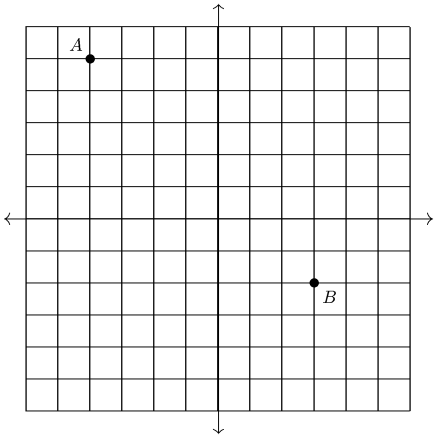
67. Write the equation of the line that contains $(-1,7)$ and is parallel to the line $y = -2x - 5$.

68. Write the equation of the line that contains $(8,0)$ and is parallel to the line $y = \frac{3}{4}x + 1$.

69. In the diagram, what is the exact distance between points $P$ and $Q$?

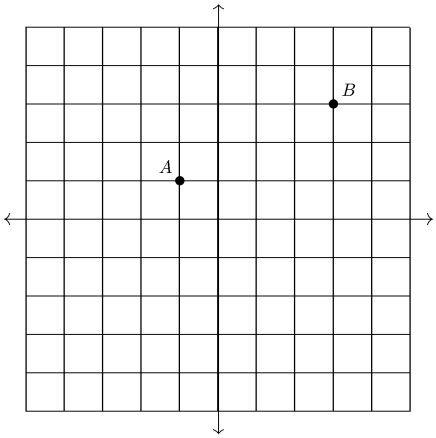


70. In the diagram, what is the exact distance between points $A$ and $B$?




71. The coordinates of point $D$ are $(3, -6)$ and the coordinates of point $E$ are $(-1, -2)$. What are the coordinates of the point that is halfway between these two points?

72. What is the midpoint of the segment connecting points $A(-1, 1)$ and $B(3, 3)$?



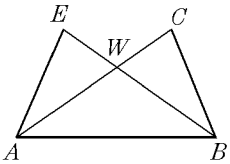

73. The midpoint of $\overline{OP}$ is the point $M(1, -3)$. If the coordinates of $P$ are $(6, 1)$, what are the coordinates of $O$?

74. The midpoint of $\overline{KL}$ is the point $M(3, 5)$. If the coordinates of $K$ are $(-3, -4)$, what are the coordinates of $L$?

Provide the missing information in the following two-column proofs.

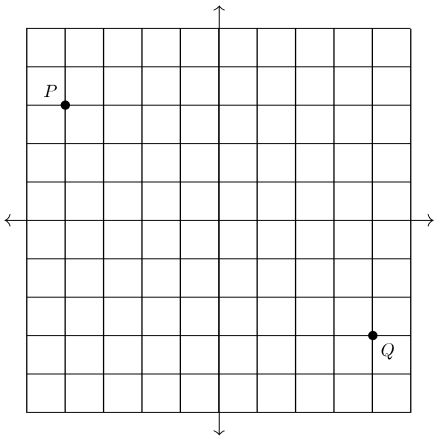
75. Given: $\overline{EA} \cong \overline{CB}$,
$\angle EAB \cong \angle CBA$

Prove: $\triangle BAE \cong \triangle ABC$

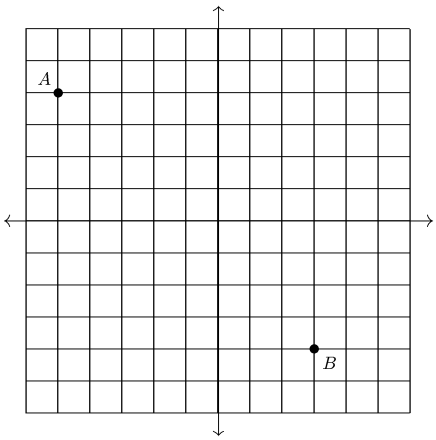



| statement | reason |
|---|---|
| 1. $\overline{EA} \cong \overline{CB}$ | 1. _____ |
| 2. $\angle EAB \cong \angle CBA$ | 2. _____ |
| 3. _____ | 3. Reflexive Property |
| 4. $\triangle BAE \cong \triangle ABC$ | 4. _____ |

76. In the diagram, what is the exact distance between points $P$ and $Q$?

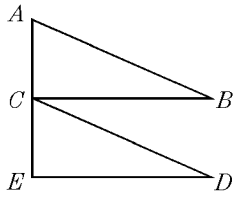


77. In the diagram, what is the exact distance between points $A$ and $B$?

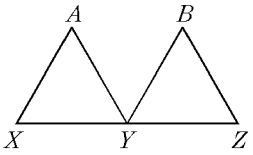



78. If one angle of a triangle has a measure greater than $90^\circ$, then the triangle is called a(n) _____ triangle.

79. Name the transformation that maps $\triangle ABC \rightarrow \triangle CDE$.




80. Name the transformation that maps $\triangle XAY \rightarrow \triangle YBZ$.




81. The translation $T$: $(x, y) \rightarrow (x - 2, y + 3)$ maps the point $(3, -1)$ to _____.

82. The translation $T$: $(x, y) \rightarrow (x + 3, y - 1)$ maps the point $(-2, -5)$ to _____.

83. Given $\overrightarrow{BD}$ bisects $\angle ABC$, $m\angle ABD = 2x - 15$, and $m\angle CBD = x + 35$, what is the measure of $\angle ABC$?

84. You are given that $\overrightarrow{AX}$ bisects $\angle BAC$ and that $m\angle BAX = x + 25$ and $m\angle CAX = 4x - 11$. What is the measure of $\angle BAX$?

85. Given $\overrightarrow{BD}$ bisects $\angle ABC$, $m\angle ABD = 2x - 10$, and $m\angle CBD = x + 30$, what is the value of $x$?

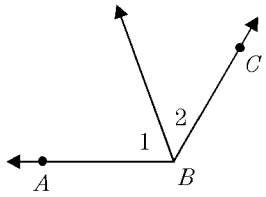
86. Given $\overrightarrow{XZ}$ bisects $\angle WXY$, $m\angle WXZ = 3x - 12$, and $m\angle ZXY = x + 18$, what is the value of $x$?

87. You are given that $\overrightarrow{AX}$ bisects $\angle BAC$ and that $m\angle BAX = 3x + 12$ and $m\angle CAX = 5x - 4$. What is the value of $x$?

88. $\overrightarrow{XY}$ bisects $\angle TXP$, $m\angle TXY = 4x - 2$, and $m\angle PXY = x + 20$. What is the value of $x$?

89. Find the value of $x$ given:

$$m\angle 1 = 6x - 5$$
$$m\angle 2 = 4x$$
$$m\angle ABC = 120$$




90. The points $A(-3, 4)$, $B(1, 3)$, and $C(-2, -3)$ form a triangle when plotted on a coordinate plane. Using the distance formula, calculate the following measures to the nearest tenth of a unit.

a) $AC$

b) $AB$

c) $BC$

What kind of triangle is $\triangle ABC$?

91. Rewrite the following declarative statement as a conditional statement.

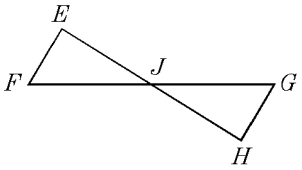
"Isosceles triangles have congruent base angles."

92. Rewrite the following declarative statement as a conditional statement.

"All equilateral triangles are equiangular."

93. Given: $\overline{EF} \cong \overline{HG}$, $J$ is midpoint of $\overline{EH}$ and $\overline{FG}$

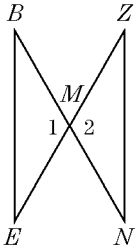
Prove: $\triangle FEJ \cong \triangle GHJ$




| statement | reason |
|---|---|
| 1. _____ | 1. Given |
| 2. $\overline{EJ} \cong \overline{HJ}$ | 2. _____ |
| 3. $\overline{FJ} \cong \overline{GJ}$ | 3. _____ |
| 4. $\triangle FEJ \cong \triangle GHJ$ | 4. _____ |

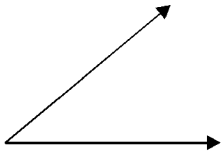
94. Given: $M$ is midpoint of $\overline{EZ}$, $\angle E \cong \angle Z$

Prove: $\triangle BME \cong \triangle NMZ$

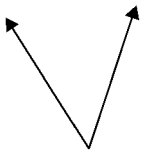



| statement | reason |
|---|---|
| 1. _____ | 1. Given |
| 2. $\overline{ME} \cong \overline{MZ}$ | 2. _____ |
| 3. $\angle E \cong \angle Z$ | 3. _____ |
| 4. _____ | 4. vertical angles are congruent |
| 5. $\triangle BME \cong \triangle NMZ$ | 5. _____ |

95. Estimate the degree measure of this angle.



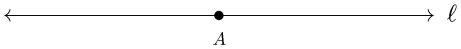
96. Estimate the degree measure of this angle.



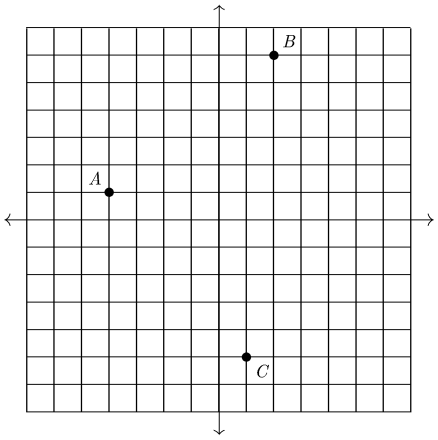
Using only a compass and straightedge, perform the following constructions.

97. Construct the perpendicular bisector of segment $AB$.

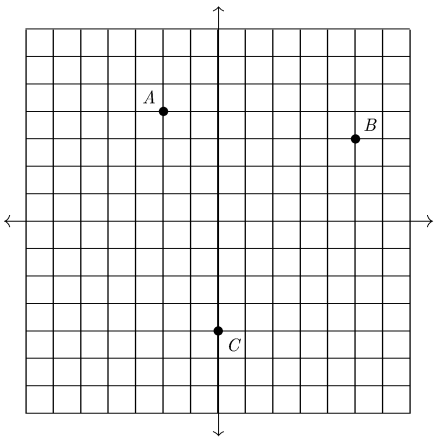

98. Construct a line through point $A$ perpendicular to line $\ell$.




99. In the diagram, connect the letters to form $\triangle ABC$. Using the distance formula, calculate the lengths of the sides to the nearest tenth of a unit *and* classify triangle $ABC$.



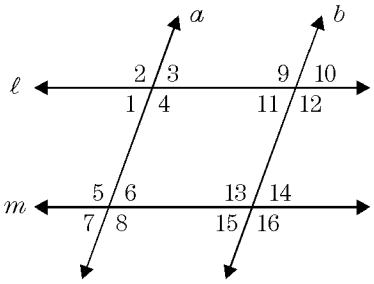
100. In the diagram, connect the letters to form $\triangle ABC$. Using the distance formula, calculate the lengths of the sides to the nearest tenth of a unit *and* classify triangle $ABC$.




101. What is the area of $\triangle ABC$ if $A(-1,0)$, $B(4,5)$, and $C(7,0)$ are the coordinates of its vertices?

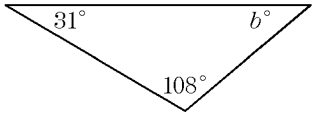
102. What is the area of $\triangle ABC$ if $A(-2,0)$, $B(5,9)$, and $C(8,0)$ are the coordinates of its vertices?

103. In the diagram, $\angle 6$ and $\angle 13$ are supplementary. Which two lines (if any) *must* be parallel?

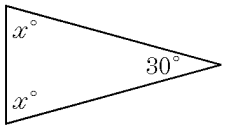



104. In the diagram, $\angle 12$ and $\angle 14$ are supplementary. Which two lines (if any) *must* be parallel?

105. Find the value of $b$ in the diagram.




106. Find the value of $x$ in the diagram.




107. In the example, what properties of algebra are being used?

$$2x - 6y = 8$$
$$\frac{(2x-6y)}{2} = \frac{(8)}{2}$$
$$\frac{2x}{2} - \frac{6y}{2} = \frac{8}{2}$$

108. In the example, what properties of algebra are being used?

$$2y + 3x = 4x$$
$$2y + 3x - 3x = 4x - 3x$$
$$2y + (3x - 3x) = (4x - 3x)$$

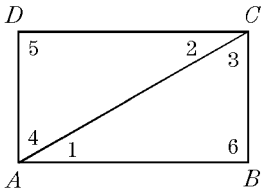
109. Write the equation of the line that contains $(-5,1)$ and is perpendicular to the line $y = \frac{5}{2}x + 2$.

110. Write the equation of the line that contains $(4,-3)$ and is perpendicular to the line $y = -4x$.

Solve.

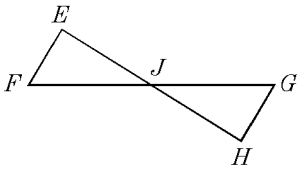
111. Given: $\overline{AD} \perp \overline{DC}$, $\overline{CB} \perp \overline{AB}$, $\overline{AD} \parallel \overline{BC}$

Prove: $\triangle ABC \cong \triangle CDA$



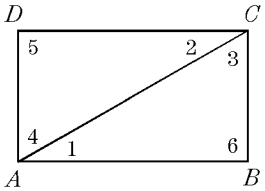
112. Given: $\overline{FE} \perp \overline{EH}$, $\overline{HG} \perp \overline{EH}$, $J$ is the midpoint of $\overline{EH}$

Prove: $\triangle FEJ \cong \triangle GHJ$



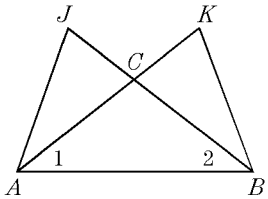

113. Given: $\overline{AB} \parallel \overline{DC}$, $\overline{AD} \parallel \overline{BC}$

Prove: $\triangle ABC \cong \triangle CDA$




114. Given: $\angle 1 \cong \angle 2$, $\angle AJB \cong \angle BKA$

Prove: $\triangle ABK \cong \triangle BAJ$



GABRIELINO HIGH SCHOOL Geometry FALL Final Review Questions 11/30/2016

1.
Answer: $A'(-1,1)$, $B'(-2,5)$, $C'(-5,3)$

2.
Answer: $A'(-2,1)$, $B'(-4,-3)$, $C'(-5,0)$

3.
Answer: $(\angle 1, \angle 4)$, $(\angle 2, \angle 3)$, $(\angle 5, \angle 8)$, $(\angle 6, \angle 7)$

4.
Answer: $(\angle 1, \angle 3)$, $(\angle 2, \angle 4)$, $(\angle 5, \angle 7)$, $(\angle 6, \angle 8)$

5.
Answer: $A'(1,-3)$, $B'(-2,-5)$, $C'(0,4)$

6.
Answer: $(3,2)$

7.
Answer: $(6,5)$

8.
Answer: yes; SAS

9.
Answer: yes; SSS

10.
Answer: yes; ASA or AAS

11.
Answer: yes; AAS

12.
Answer: $\angle E$; $\angle FGE$; $\overline{EG}$

13.
Answer: $\angle F$; $\angle GFE$; $\overline{EF}$

14.
Answer: $\triangle STQ$, SSS or SAS

15.
Answer: $\triangle ZYB$, SAS

16.
Answer: $\triangle SAM$, SAS

17.
Answer: $\triangle NMQ$, ASA or AAS

18.
Answer: yes; show $\triangle XAY \cong \triangle YBZ$ by SAS and use CPCTC

19.
Answer: $\triangle MHJ$ by SAS; $\angle J$ by CPCTC

20.
Answer: $\triangle RDC$, ASA or AAS

21.
Answer: $\triangle DCE$, SAS

22.
Answer: [proof]

23.
Answer: [proof]

24.
Answer: [proof]

25.
Answer: [proof]

26.
Answer: [proof]

27.
Answer: [proof]

28.
Answer: $XY$—length of segment;
$\overline{XY}$—segment itself

29.
Answer: $m\angle PQR$—measure of angle;
$\angle PQR$—angle itself

30.
Answer: $\overline{AB}$, $\overline{BA}$, $\overline{BC}$, $\overline{CB}$, $\overline{AC}$, $\overline{CA}$

31.
Answer: $\overline{PQ}$, $\overline{QP}$, $\overline{QR}$, $\overline{RQ}$, $\overline{PR}$, $\overline{RP}$

32.
Answer: 18

33.
Answer: 17

34.
Answer: True

35.
Answer: False

36.
Answer: any 2: $\angle AGF$, $\angle GHD$, $\angle GCD$, $\angle BHF$, $\angle BCE$, $\angle FED$, $\angle HCD$ (or equivalent names)

37.
Answer: any 2: $\angle ADF$, $\angle BDE$, $\angle DGF$, $\angle AGF$, $\angle ECF$, $\angle BGC$ (or equivalent names)

38.
Answer: True

39.
Answer: True

40.
Answer: $\angle 1$, $\angle 2$

41.
Answer: $\angle WYZ$

42.
Answer: 29

43.
Answer: 34

44.
Answer: $20^\circ$

45.
Answer: $30^\circ$

46.
Answer: 22

47.
Answer: $\angle BXE$ or $\angle AXF$

48.
Answer: 12.125 or $\frac{97}{8}$

49.
Answer: 13.8 or $\frac{69}{5}$

50.
Answer: $\angle 4$, $\angle 6$; $\angle 3$, $\angle 5$

51.
Answer: $\angle 2$, $\angle 6$; $\angle 4$, $\angle 5$

52.
Answer: True

53.
Answer: False

54.
Answer: $144^\circ$

55.
Answer: $53^\circ$

56.
Answer: 26

57.
Answer: 35

58.
Answer: 16

59.
Answer: [construction]

60.
Answer: [construction]

61.
Answer: 101

62.
Answer: 86

63.
Answer: $y = -\frac{1}{4}x - 5$

64.
Answer: $y = -x + 6$

65.
Answer: 64; 6 units; 64

66.
Answer: 67; 8 units; 67

67.
Answer: $y = -2x + 5$

68.
Answer: $y = \frac{3}{4}x - 6$

69.
Answer: 5 units

70.
Answer: $7\sqrt{2}$ units

71.
Answer: $(1, -3)$

72.
Answer: $(1, 2)$

73.
Answer: $(-4, -7)$

74.
Answer: $(6, 14)$

75.
Answer: [proof]

76.
Answer: 10 units

77.
Answer: $8\sqrt{2}$ units

78.
Answer: obtuse

79.
Answer: translation

80.
Answer: translation

81.
Answer: $(1, 2)$

82.
Answer: $(1, -6)$

83.
Answer: $170^\circ$

84.
Answer: $37^\circ$

85.
Answer: 40

86.
Answer: 15

87.
Answer: 8

88.
Answer: $7\frac{1}{3}$

89.
Answer: 12.5

90.
Answer: 7.1; 4.1; 6.7; scalene

91.
Answer: If a triangle is isosceles, then it has congruent base angles.

92.
Answer: If a triangle is equilateral, then it is equiangular.

93.
Answer: [proof]

94.
Answer: [proof]

95.
Answer: $\approx 40$

96.
Answer: $\approx 50$

97.
Answer: [construction]

98.
Answer: [construction]

99.
Answer: $AB = 7.8,\ AC = 7.8,\ BC = 11.0$; isosceles

100.
Answer: $AB = 7.1,\ AC = 8.2,\ BC = 8.6$; scalene

101.
Answer: 20 units$^2$

102.
Answer: 45 units$^2$

103.
Answer: $a \parallel b$

104.
Answer: $\ell \parallel m$

105.
Answer: 41

106.
Answer: 75

107.
Answer: division; distributive

108.
Answer: subtraction; associative

109.
Answer: $y = -\frac{2}{5}x - 1$

110.
Answer: $y = \frac{1}{4}x - 4$

111.
Answer: [proof]

112.
Answer: [proof]

113.
Answer: [proof]

114.
Answer: [proof]