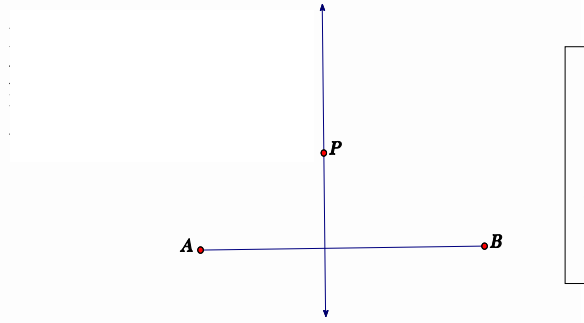
Seattle Public Schools KEY to Review Questions for the Washington State Geometry End of Course Exam

1) Which term best defines the type of reasoning used below?
Abdul broke out in hives the last four times that he ate chocolate candy. Abdul concludes that he will break out in hives if he eats chocolate.

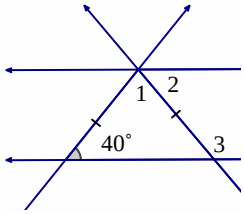
a) Inductive **Standard: G.1.A (Chapter 2)**
b) Deductive
c) Converse
d) Inverse

2) Prove that any point P on the perpendicular bisector of AB is equidistant from both points A and B.



Let D be the point of intersection of segment AB and the perpendicular bisector. Then PD = PD (Reflexive or Same segment) and AD = BD (Def of Bisector). <ADP and <BDP are both right angles and congruent. (Def of Perpendicular) Tri ADP is congruent to Tri BDP (SAS). AP = BP (CPCTC). P is equidistant from the endpoints of AB. (Def of equidistant)

3) LJ and GH are parallel and m∠L = 40°.

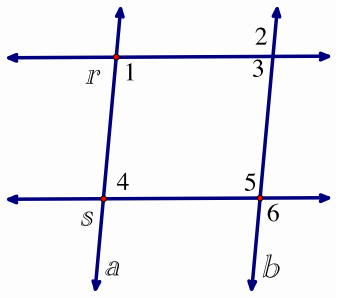


Find the measures of the numbered angles.
m∠1 = **_100°_____**

m∠2 = **_40°_____**

m∠3 = **_140°_____**
Standard: G.2.B (Chapter 2)

4) In the figure below, m ANGLE 3 + m ANGLE 5 = 180 DEGREES. Determine which lines are parallel. Justify your reasoning.



Line *r* is parallel to line *s*.
Justifications may vary. <u>One approach to justification</u>:

m∠3 + m∠5 = 180°	**Given**
m∠3 + m∠2 = 180°	**Linear Pair**
m∠3 + m∠5 = m∠3 + m∠2	**Substitution or Transitive**
m∠5 = m∠2	**Subtraction**
∠5≅∠2	**Def of Congruence**
r* ll *s	**Converse of Corresponding Angles Theorem**

Standard: G.2.B (Chapters 2, 4)

5) The given statement is a valid geometric proposition.

Statement: If a triangle has two congruent angles, then it is an isosceles triangle.

a) Write the contrapositive of this statement:
If a triangle is not isosceles, then the triangle does not have two angles that are congruent.

b) Determine if the contrapositive statement is valid. Explain your reasoning.
The contrapositive statement is valid. The triangle could be equilateral, which is also isosceles. It could also be scalene, with no congruent angles. Also, the contrapositive of a true statement is always true. If a statement is false, its contrapositive will be false also.

6) The given statement is a valid geometric proposition.

Statement: If a quadrilateral is a kite, then its diagonals are perpendicular.

Which of the following is the inverse statement?

a) If a quadrilateral has diagonals that are perpendicular, then it is a kite.
b) If a quadrilateral is not a kite, then its diagonals are not perpendicular. **Standard: G.1.D* (Chapters 2, 5)**
c) If a quadrilateral has diagonals that are not perpendicular, then it is not a kite.
d) If a quadrilateral is a kite, then its diagonals are not perpendicular.

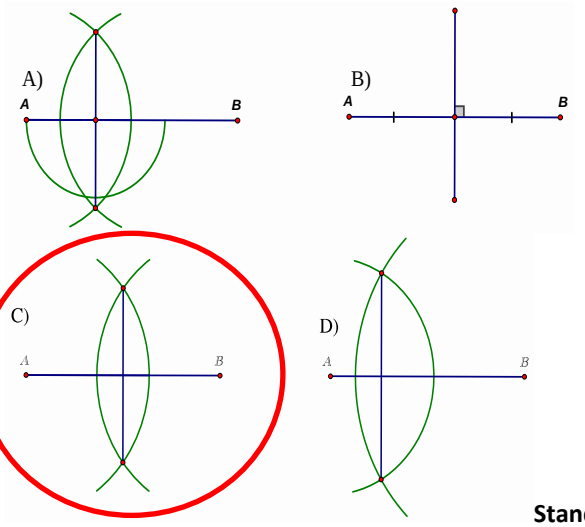
7) Given $\angle ABC \cong \angle PRQ$, $\overline{AB} \cong \overline{PQ}$, $\overline{BC} \cong \overline{QR}$, Elena said that $\Delta ABC \cong \Delta PQR$ by SAS. Which of the following could be an error in her thinking?

a) The triangles are ≅ by ASA.
b) The triangles are ≅ by SSS.
c) $\angle PRQ$ is not between $\overline{PQ}$ and $\overline{RQ}$. **Standard: G.1.E* (Chapter 4)**
d) ΔABC is not an isosceles triangle.

8) Which of the following kinds of statements cannot be used as a reason in a proof? WRITE NOTE FOR KEY.

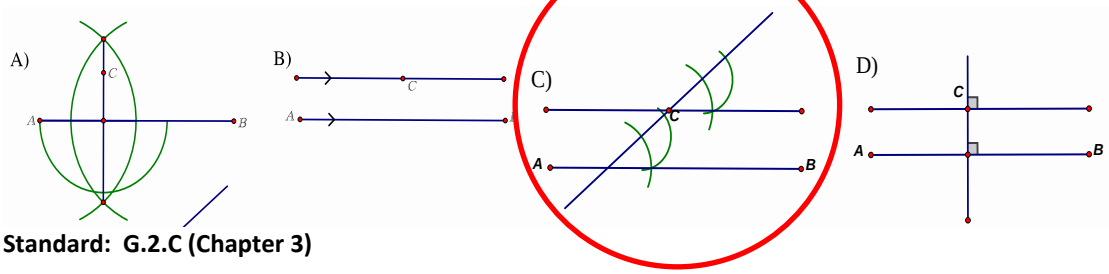
a) Theorems
b) Defined terms
c) Postulates
d) Assumptions **Note: A proof by contradiction <u>could</u> contain assumptions as reasons. However, these types of proofs have not been addressed in this course. Standard: G.1.F* (Chapters 1, 4, 13)**

9) Which is the correct construction of a perpendicular bisector of AB?



Standard: G.2.C (Chapter 3)

10) Which is the correct construction of a line segment parallel to AB passing through point C?



Standard: G.2.C (Chapter 3)

11) Complete the following statements.

a) The ceiling and floor of your kitchen are examples of **parallel**____ planes.

b) A wall and the floor of your kitchen are examples of _**perpendicular**_____ planes. **Standard: G.2.D (Chapter 1)**

12) Complete the following statement: Two lines that do not lie in the same plane are called _____ lines.

a) Coplanar
b) Parallel
c) Skew **Standard: G.2.D (Chapter 1)**
d) Perpendicular

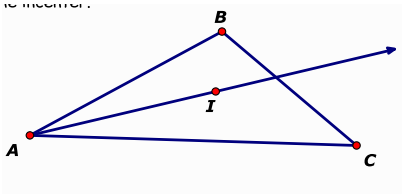
13) Which construction represents the center of a circle that is inscribed in a triangle?

a) The intersection of the three altitudes of the triangle.
b) The intersection of the three medians of the triangle.
c) The intersection of the angle bisectors of each angle of the triangle. **Standard: G.3.A* (Chapter 3)**
d) The intersection of the perpendicular bisectors of each side of the triangle.

14) In ΔABC, point I is the incenter.
$m\angle BAI = \frac{1}{2}x + 4$

$m\angle IAC = \frac{3}{4}x - 6$

Find the value of *x*.

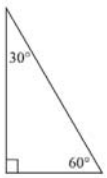


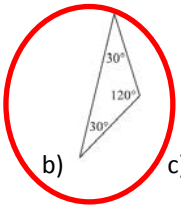
x = 40°

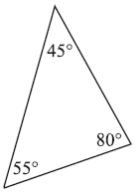
Standard: G.3.A* (Chapter 3)

15) ΔLPT is an obtuse scalene triangle. If $\angle P$ is the obtuse angle in the triangle, which of the following is not a valid conclusion?
a) $m\angle L + m\angle T < m\angle P$
b) $m\angle L + m\angle T < 90°$
c) $m\angle L + m\angle T = 90°$ **Standard: G.3.A* (Chapter 1)**
d) $m\angle L + m\angle T + m\angle P = 180°$

16) Which triangle has an altitude that is also a median?

a) 

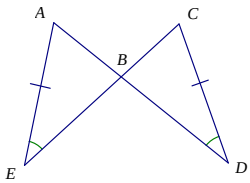
b) 

c) 

d) 

Standard: G.3.A* (Chapter 1)

17) In the diagram below, $\angle E \cong \angle D$ and $\overline{AE} \cong \overline{CD}$. Prove $\overline{AB} \cong \overline{CB}$ using mathematical language and concepts.

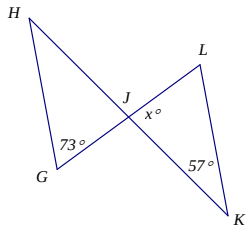


One approach to the proof:

$\angle E \cong \angle D$ and $\overline{AE} \cong \overline{CD}$	Given.
$\angle ABE \cong \angle CBD$	Vertical angles are congruent.
$\Delta ABE \cong \Delta CBD$	AAS
$\overline{AB} \cong \overline{CB}$	Corresponding Pts of Congr. Δs are Congruent

Standard: G.3.B* (Chapter 4)

18) In the figure below, $\overline{HK}$ and $\overline{GL}$ bisect each other. Find the value of *x*. Justify your answer.



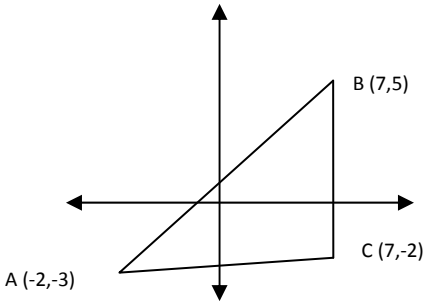
One approach to the justification:

GL ≅ JL; HJ ≅ JK	**Definition of bisection.**
m∠GJF = m∠LJK = *x*°	**Vertical angles are congruent.**
Δ GHJ ≅ Δ LKJ	**SAS**
m∠GHJ = m ∠LKJ = 57°	**Corresponding Pts of Congr. Δs are Congruent**
x **= 180 – (57 + 73); *x*** **= 50°**	**Triangle Sum Theorem**

Standard: G.3.B* (Chapter 4)

19) In the triangle below, how long is $\overline{AC}$?

a) 6
b) 9.1
c) 10
d) 14.1



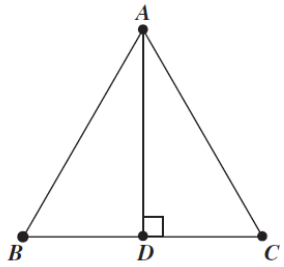
Standard: G.3.D* (Chapter 9)

20) The hypotenuse of a 45°-45°-90° triangle measures 10 inches. What is the area of the triangle?

a) 25 in^2
b) $5\sqrt{2}$ in^2
c) 50 in^2
d) $10\sqrt{2}$ in^2

Standard: G.3.C* (Chapter 9)

21) Triangle ABC is equilateral, with side lengths of 10 inches.

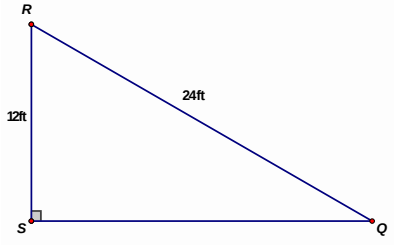


What is the length, in inches, of AD?

a) 5
b) $\frac{10\sqrt{3}}{3}$
c) $5\sqrt{2}$
d) $5\sqrt{3}$

Standard: G.3.C* (Chapter 9)

22) What is the m∠R, to the nearest degree, in the figure below?



a) 60°
b) 36°
c) 30°
d) 27°

Standard: G.3.C* (Chapters 9, 12)

23) ΔABC has a right angle C. AC = 6 m, and altitude $\overline{CD}$ from ∠C to $\overline{AB}$ is 5 m. Find the measure of $\overline{AD}$.

$\sqrt{11}$ meters

Standard: G.3.D* (Chapter 9)

24) At a distance of 20 m from a building, a person who is 3 m tall looks up at an angle of 25° to see the top of the building. How tall is the building to the nearest meter?

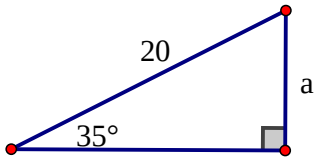
a) 8 m
b) 9 m
c) 12 m
d) 18 m

Standard: G.3.E* (Chapter 12)

25) Find the length of the hypotenuse, to the nearest tenth of a centimeter, of a right triangle if one angle measures 70° and the adjacent leg measures 8 cm.

23.4 cm **Standard: G.3.E* (Chapter 12)**

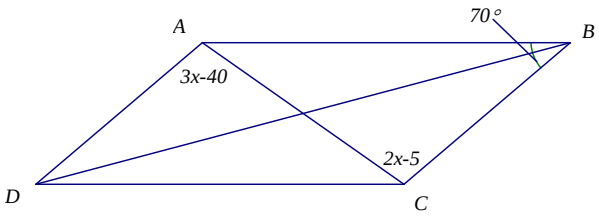
26) Find the value of *a* in the figure below, to the nearest whole number.



a) 10
b) 11
c) 14
d) 16

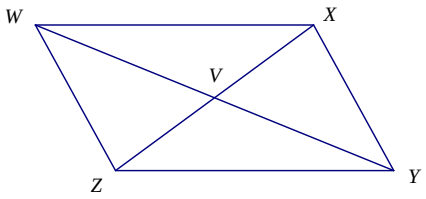
Standard: G.3.E* (Chapter 12)

27) In the parallelogram below, m ∠ ABC = 70°. Find m ∠ ACD.



m ∠ ACD = 45° **Standard: G.3.F* (Chapter 5)**

28) In the parallelogram below, WV = 5*x* + 2 and YV = -*x* + 20. Find WY.

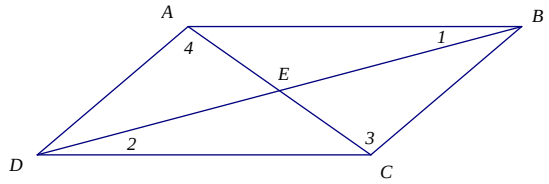


a) 17
b) 20
c) 34
d) 50

Standard: G.3.F* (Chapter 5)

29) Complete the proof of the following statement: If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram.

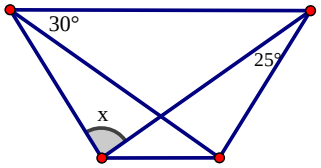
Given: AC and BD bisect each other.
Prove: ABCD is a parallelogram.



1) AC and BD bisect each other.	1) Given
2) $\overline{AE} \cong \overline{CE}$, $\overline{BE} \cong \overline{DE}$	2) Definition of Bisect
3) ∠BEC ≅ ∠DEA, ∠BEA ≅ ∠DEC	3) __**Vertical angles are ≅.**___
4) Δ BEC ≅ ΔDEA, Δ BEA ≅ ΔDEC	4) __**SAS**_____
5) ∠1 ≅ ∠2, ∠3 ≅ ∠4	5) _ **Corresponding Pts of Congruent Triangles are Congruent.**
6) $\overline{AB} \parallel \overline{CD}$, $\overline{AE} \parallel \overline{BC}$	6) Alternate Interior Angles with Parallel Lines Theorem
7) **ABCD is a parallelogram.**	7) Definition of Parallelogram

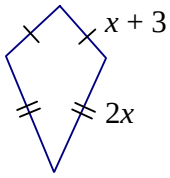
Standard: G.3.F* (Chapters 4, 5, 13)

30) ABCD is an isosceles trapezoid. Find the value of *x*.



***x* = 95°** **Standard: G.3.G* (Chapter 5)**

31) The perimeter of the figure below is 48. Find the value of *x*.



x = 7 **Standard: G.3.G* (Chapter 5)**

32) Tangents $\overline{PA}$ and $\overline{PB}$ are drawn to circle O from external point P, and radii $\overline{OA}$ and $\overline{OB}$ are drawn. If m∠APB = 40°, what is the measure of ∠AOB?

a) 50°
b) 70°
c) 140° **Standard: G.3.H (Chapter 6)**
d) 160°

33) A trapezoidal prism has ____ total faces.

a) 4
b) 5
c) 6 **Standard: G.3.J (Chapter 8)**
d) 7

34) If a plane intersects a cube, the intersection of the plane and cube cannot be a(an) _____.

a) Triangle
b) Square
c) Rectangle
d) Octagon **Standard: G.3.K (Chapter 1)**

35) $\overline{AC}$ starts at point A (1,4), and ends at point C (7, 13). What are the coordinates of the midpoint of $\overline{AC}$?

(4, 8.5) **Standard: G.4.B* (Chapter 1)**

36) Given points A (0, -3), B (5, 3), Q (-3, -1), which of the following points is a location of P so that $\overleftrightarrow{PQ}$ is parallel to $\overleftrightarrow{AB}$?

a) (0,3)
b) (12,5)
c) (-7,11)
d) (2,5) **Standard: G.4.B* (Chapter 3)**

37) Write an equation for a circle with a radius of 2 units, centered at (1,3).

$(x - 1)^2 + (y - 3)^2 = 4$ **Standard: G.4.D (Chapter 9)**

38) The center of a circle is at (3, -1). One point on the circle is at (6,2). Write the equation of the circle.

$(x - 3)^2 + (y + 1)^2 = 18$ **Standard: G.4.D (Chapter 9)**

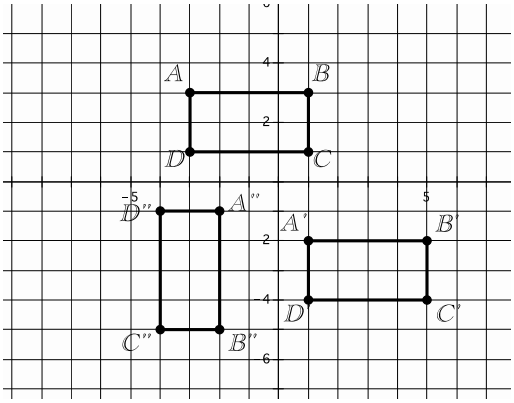
39) The point (-2,-8) is reflected over the line y = -1. What are the coordinates of P'?

a) (-2,8)
b) (2,8)
c) (2,-9)
d) (-2,6) **Standard: G.5.A (Chapter 7)**

40) Suppose triangle ABC has vertices A (-5,-2), B (-6,-2), and C (-6,-6). If triangle ABC is rotated 90° counterclockwise about the origin, what are the coordinates of the vertices of triangle A'B'C'?

a) A' (2,-5), B' (2, -6), C' (6, -6) **Standard: G.5.A (Chapter 7)**
b) A' (-5,2), B' (-6,2), C' (-6,6)
c) A' (5,-2), B' (6,-2), C' (-6,-6)
d) A' (2,-5), B' (-2,-6), C' (-6,-6)

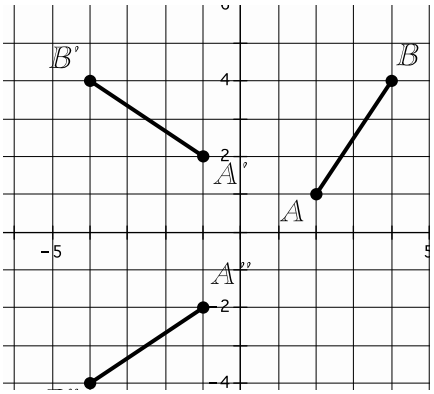
41) Describe the composition of transformations ABCD to A'B'C'D' to A''B''C''D'' in the diagram below.



This transformation is a translation of (x + 4, y – 5) followed by a rotation clockwise 90° about the origin.

Standard: G.5.B (Chapter 7

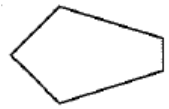
42) Which answer choice shows, in the correct order, the transformations needed to obtain $\overline{A''B''}$?



a) A rotation and a translation
b) A reflection and a rotation
c) A translation and a reflection
d) A rotation and a reflection

Standard: G.5.C (Chapter 9)

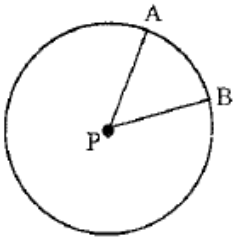
43) How many lines of symmetry does the polygon shown have?



a) 0
b) 1
c) 2
d) 3

Standard: G.5.D (Chapter 7)

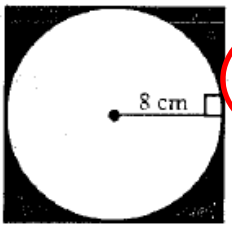
44) Find the area of the sector in circle P if PA = 10 and m ∠APB = 36°.



a) 10π
b) 20π
c) 36π
d) 72π

Standard: G.6.A (Chapter 6)

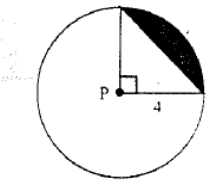
45) Find the area of the shaded region.



Area of square = 256 cm^2 (16*16)
Area of circle = 64π cm^2 (8^2)
Area shaded region = 256 - 64π cm^2
or approx. 55.04 cm^2

Standard: G.6.A (Chapter 6)

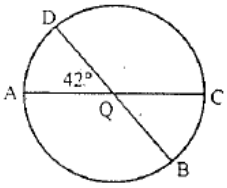
46) In circle P, find the area of the shaded region. Use an approximate value of 3.14 for π.



a) 3.14 square units
b) 4.56 square units
c) 6.28 square units
d) 9.62 square units

Standard: G.6.A (Chapter 6)

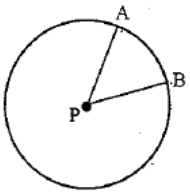
47) In circle Q, find the measure of arc ADB.



a) 42°
b) 138°
c) 222°
d) 318°

Standard: G.6.A (Chapters 1, 6)

48) In circle P, find the length of arc AB if PA = 10 and m ∠APB = 36°.



a) 2 π
b) 0.556 π
c) 10 π
d) 12 π

Standard: G.6.A (Chapter 6)

49) The area of a sector of a circle is 54 π cm^2. If the central angle is 60°, what is the radius of the circle?

***r* = 18 cm** **Standard: G.6.A (Chapter 6)**

50) Two cylinders have the same height. Their radii are 6 cm and 3 cm. What is the ratio of the volume of the cylinder with radius 6 cm to the volume of the cylinder with radius 3 cm?

4:1 **Standard: G.6.C (Chapter 10)**

51) If the volume of a cone is 96 π cm^3 and the base of the cone has a radius of 6 cm, find the height of the cone.

a) 2.55 cm
b) 8 cm
c) 16 cm
d) 48 cm

Standard: G.6.C (Chapter 10)

52) Donna wants to put a ceramic castle whose volume is 350 cm^3 and a plastic scuba diver whose volume is 250 cm^3 in her aquarium as decoration. Her aquarium measures 40 cm X 30 cm X 30 cm high. The water is 2 cm from the top before she begins to decorate. How much will the water rise when she puts the castle and the diver in?

a) 0.5 cm **Standard: G.6.C (Chapter 10)**
b) 1 cm
c) 2 cm
d) 6 cm

53) Cube A has side lengths that are two times as long as the sides of cube B. How many times larger is cube A's volume than that of cube B?

a) 2
b) 4
c) 6
d) 8 **Standard: G.6.C (Chapter 10)**

54) A golden rectangle has a length and width in the golden ratio $\frac{1+\sqrt{5}}{2}$. Give a decimal approximation for the golden ratio that is accurate to six decimal places.

a) 2.118033
b) 1.618034 **Standard: G.6.E* (no chapter)**
c) 2.581138
d) 2.581139

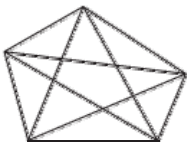
55) A digital camera takes pictures that are 3.2 megabytes in size. If the pictures are stored on a 1-gigabyte card, how many pictures can be taken before the card is full? (There are 1000 megabytes in a gigabyte.)

312 pictures **Standard: G.6.F* (no chapter)**

56) One line divides a plane into two parts. Two distinct parallel lines divide a plane into three parts. Into how many parts will *n* distinct parallel lines divide a plane?

a) *n*
b) *n* + 1 **Standard: G.7.A* (Chapter 2)**
c) *n* - 1
d) 2*n* - 1

57) A pentagon has five diagonals, as shown. The chart below shows the relationship between the number of sides of a polygon and the number of diagonals in a polygon.



Number of Sides	3	4	5	6	7	8	9	10
Number of Diagonals	0	2	5	9	14	20	?	?

Based on this pattern, how many diagonals can be drawn in a 10-sided polygon?

a) 25
b) 27
c) 30
d) 35 **Standard: G.7.A* (Chapter 2)**

58) Two complementary angles have measures of s and t. If t is 9 less than twice s, which system of linear equations can be used to determine the measure of each angle?

a) $t + s = -9$
$t = 2s - 90$

c) $t + s = 90$
$t = 2s - 9$

Standard: G.7.A* (Chapter 1)

b) $t - s = -9$
$t = 2s + 90$

d) $t + s = 90$
$t = -2s - 9$

59) Consider these statements:
Every square is a rhombus.
Quadrilateral ABCD is not a rhombus.

Which of these conclusions can be made using both statements?

a) ABCD is not a parallelogram.
b) ABCD is a rectangle.
c) ABCD is not a square.
d) ABCD is a trapezoid.

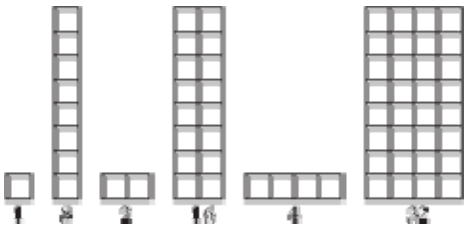
Standard: G.7.A* (Chapters 1, 2)

60) Melanie, Nikki, and Donny are three students in a geometry class. Melanie is younger than Nikki, and Donny is older than Nikki. Which of these must be true?

a) Donny is the youngest of the three students.
b) Melanie is the youngest of the three students.
c) Nikki is the oldest of the three students.
d) Melanie is the oldest of the three students.

Standard: G.7.B* (Chapter 2)

61) If the pattern shown below continues, how many squares will be in the next figure?



a) 6
b) 8
c) 16
d) 64

Standard: G.7.B* (Chapter 2)

62) Look at the pattern below.

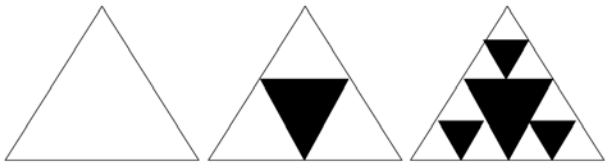
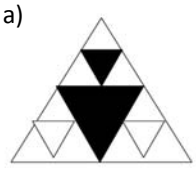
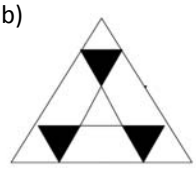
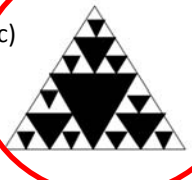


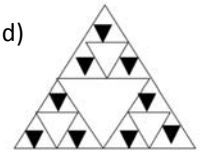
Figure 1 Figure 2 Figure 3

If the pattern continues, which of these would be next in the pattern?

a) 

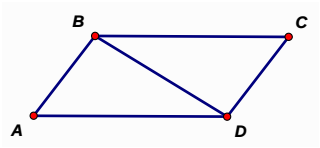
b) 

c) 

d) 

Standard: G.7.B* (Chapter 2)

63) In the figure below, ΔABD and ΔCDB are isosceles triangles. The vertex angles, ∠ADB and ∠CBD, are congruent.

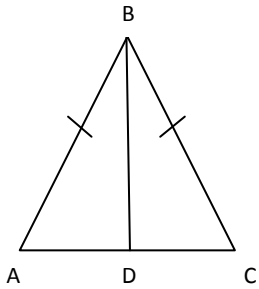


Prove that quadrilateral ABCD is a parallelogram.

One approach to the proof: **Standard: G.7.C* (Chapter 4)**

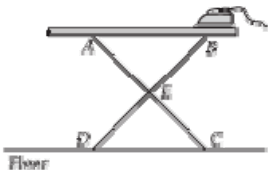
∠ADB ≅ ∠CBD	Given
AB ll CD	Alternate interior angles
AB ≅ CD	Definition of isosceles
Δ ADB≅ Δ CBD	SAS
$\overline{AD} \cong \overline{BC}$	Corresponding Pts of Congr. Δs are Congruent
ABCD is a parallelogram.	Def of parallelogram (opp. sides are ≅.)

64) Isosceles triangle ABC is shown below. BD is an angle bisector of ∠ABC. Prove that $\overline{BD}$ bisects $\overline{AC}$.



One approach to the proof:
If triangle ABC is isosceles, then $\overline{AB}$ is congruent to BC. If $\overline{BD}$ bisects angle ABC, then angle ABD and angle CBD are congruent. Since $\overline{BD}$ is congruent to itself (reflexive), triangles ABD and CBD are congruent (SAS). If the two triangles are congruent, then AD is congruent to CD, because corresponding parts of congruent triangles are congruent. If $\overline{AD}$ is congruent to $\overline{CD}$, then $\overline{BD}$ bisects $\overline{AC}$, because a bisector divides the bisected segment into two equal parts. **Standard: G.7.C* (Chapter 4)**

65) The legs of an ironing board are congruent and bisect each other.



a) Prove that the ironing board is parallel to the floor.

b) Use mathematics to justify that ABCD is a rectangle.

One approach to the proof of part a):
If $\overline{AC}$ and $\overline{BD}$ are congruent and bisect each other, then $\overline{AE} \cong \overline{EC}$ and $\overline{BD} \cong \overline{ED}$. Angles AEB and CED are ≅ because the two segments form vertical angles. If the two sides and included angles are ≅, then the triangles AEB and CED are ≅. If the triangles are ≅, then angle ABE and CDE are ≅, and BAE and DCE are ≅, as corresponding parts of congruent triangles. If the alternate interior angles are ≅, then the two segments are parallel.

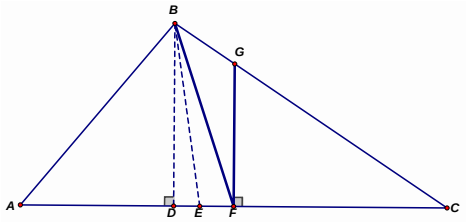
One approach to the justification of part b):
$\overline{AC}$ and $\overline{BD}$ are diagonals of quadrilateral ABCD. The diagonals bisect each other and are congruent, thus by definition, ABCD is a rectangle. **Standard: G.7.C* (Chapter 5)**

66) The two statements below are true.
All simkos are temas.
All bollies are simkos.

Using deductive reasoning, which of these statements must also be true?

a) All temas are bollies.
b) All simkos are bollies.
c) All temas are simkos.
d) All bollies are temas. **Standard: G.7.C* (Chapter 2)**

67) Given: $\overline{AF} \cong \overline{FC}$



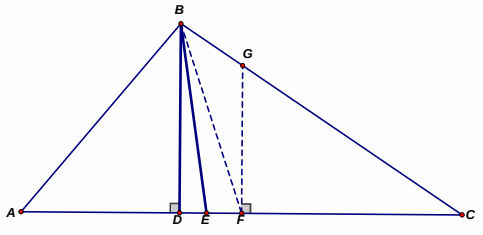
Use the word bank below the triangle to name each special segment in ΔABC.

Word Bank: Median, Angle Bisector, Perpendicular Bisector, Altitude

$\overline{BF}$: **Median**

$\overline{FG}$: **Perpendicular Bisector** **Standard: G.7.E* (Chapter 3)**

68) Given: ∠ABE ≅ ∠EBC. Use the word bank below the triangle to name each special segment in ΔABC.



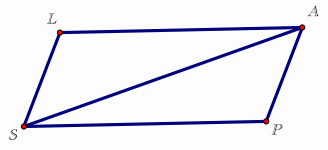
Word Bank: Median, Angle Bisector, Perpendicular Bisector, Altitude

$\overline{BD}$: **Altitude**

$\overline{EB}$: **Angle Bisector** **Standard: G.7.E* (Chapter 3)**

69) Jennifer has created a two-column proof as a response to the following question. Evaluate her argument to determine if you support or contradict her conclusion.

Given: $\overline{LA} \cong \overline{PS}$, $\overline{LS} \cong PA$ Prove: $\overline{LA}$ ll PS



Statement	**Reason**
1) $\overline{LA} \cong \overline{PS}$	1) Given
2) $\overline{SL} \cong \overline{AP}$	2) Given
3) SA ≅AS	3) Same Segment/Reflexive
4) ΔLAS ≅ΔPSA	4) SSS
5) ∠PSA ≅∠LSA	5) Corresponding Parts of Congruent Triangles are Congruent
6) Prove: $\overline{LA}$ ll $\overline{PS}$	6) Alternate Interior Angles

Determine if Jennifer's argument is valid. Explain your reasoning. Support your answer with evidence from the diagram or Jennifer's proof.

Jennifer's argument is not valid. On step 5 of her proof, she states that ∠PSA ≅∠LSA. This would indicate that LS ll PA and not LA ll PS. Jennifer should have stated that ∠LAS ≅ ∠PSA.

Standard: G.7.G* (Chapter 4)