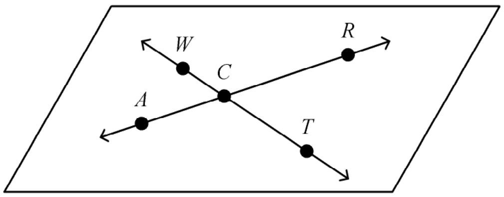
Name: ________________________ Class: ___________________ Date: __________ ID: A

Geometry Chapter 1 Review

Multiple Choice
Identify the choice that best completes the statement or answers the question.

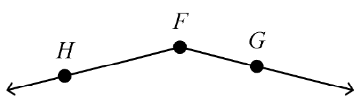
____ 1. Name two lines in the figure.



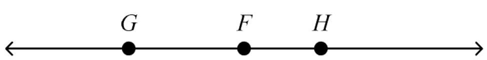
a. *A* and *T*
b. *WCR* and *TRA*
c. $\overleftrightarrow{WC}$ and $\overleftrightarrow{CR}$
d. $\overleftrightarrow{WC}$ and $\overleftrightarrow{WT}$

____ 2. Draw and label a pair of opposite rays $\overrightarrow{FG}$ and $\overrightarrow{FH}$.

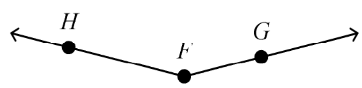
a.



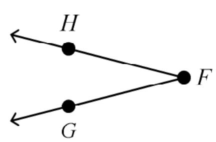
b.



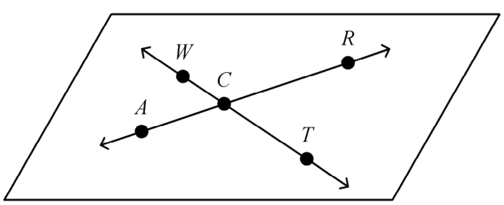
c.



d.



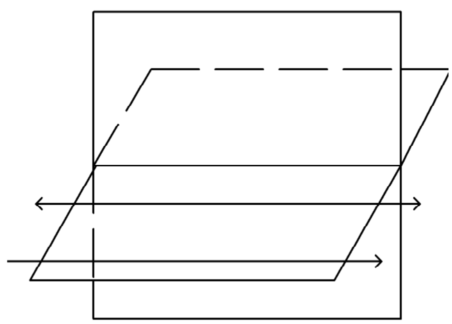
____ 3. Name a plane that contains $\overleftrightarrow{AC}$.



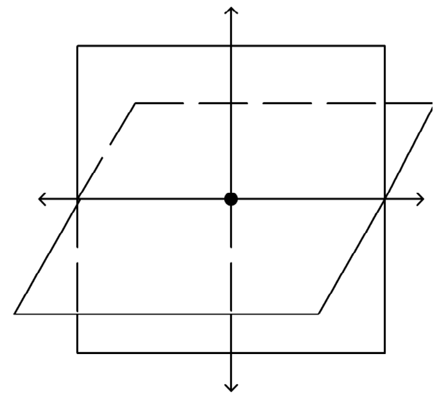
a. plane *ACR*
b. plane *WCT*
c. plane *WRT*
d. plane *RCA*

____ 4. Sketch a figure that shows two coplanar lines that do not intersect, but one of the lines is the intersection of two planes.

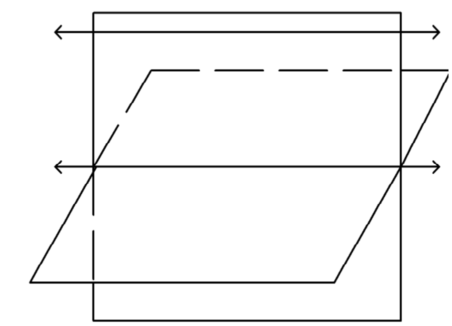
a.



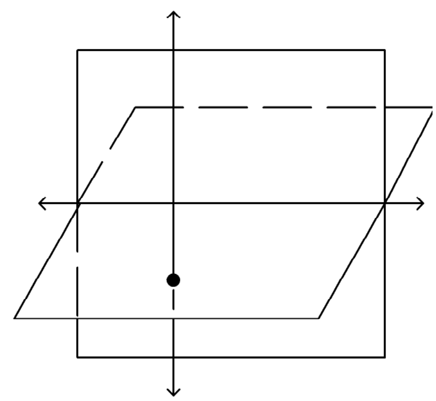
c.



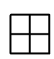
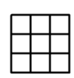
b.



d.

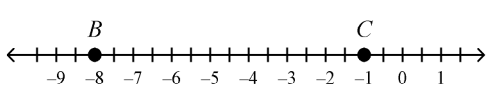


____ 5. Extend the table. What is the maximum number of squares determined by a 7×7 figure?

Figure			
Size of Figure	1×1	2×2	3×3
Maximum Number of Squares	1	5	14

a. 140 squares
b. 125 squares
c. 82 squares
d. 110 squares

____ 6. Find the length of $\overline{BC}$.



a. $BC = -7$
b. $BC = -9$
c. $BC = 7$
d. $BC = 8$

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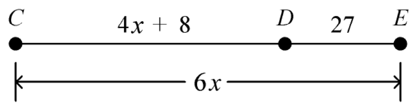
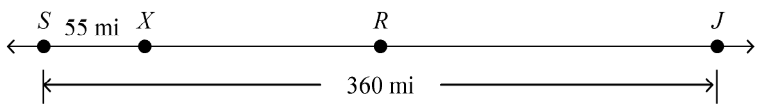
____ 7. D is between C and E. $CE = 6x$, $CD = 4x + 8$, and $DE = 27$. Find CE.



a.	$CE = 17.5$	c.	$CE = 105$
b.	$CE = 78$	d.	$CE = 57$

____ 8. The map shows a linear section of Highway 35. Today, the Ybarras plan to drive the 360 miles from Springfield to Junction City. They will stop for lunch in Roseburg, which is at the midpoint of the trip. If they have already traveled 55 miles this morning, how much farther must they travel before they stop for lunch?

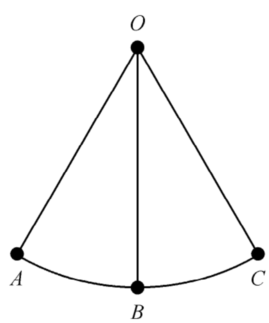


a.	125 mi	c.	180 mi
b.	145 mi	d.	305 mi

____ 9. K is the midpoint of $\overline{JL}$. $JK = 6x$ and $KL = 3x + 3$. Find JK, KL, and JL.

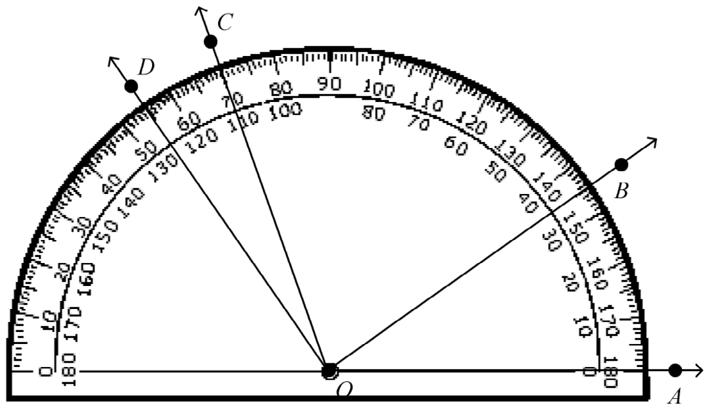
a.	$JK = 1$, $KL = 1$, $JL = 2$	c.	$JK = 12$, $KL = 12$, $JL = 6$
b.	$JK = 6$, $KL = 6$, $JL = 12$	d.	$JK = 18$, $KL = 18$, $JL = 36$

____ 10. The tip of a pendulum at rest sits at point B. During an experiment, a physics student sets the pendulum in motion. The tip of the pendulum swings back and forth along part of a circular path from point A to point C. During each swing the tip passes through point B. Name all the angles in the diagram.



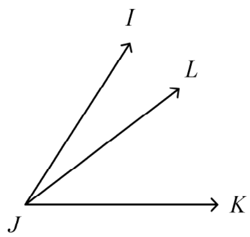
a.	$\angle AOB$, $\angle BOC$	c.	$\angle AOB$, $\angle BOA$, $\angle COB$, $\angle BOC$
b.	$\angle AOB$, $\angle COB$, $\angle AOC$	d.	$\angle OAB$, $\angle OBC$, $\angle OCB$

____ 11. Find the measure of $\angle BOD$. Then, classify the angle as acute, right, or obtuse.



a. m$\angle BOD$ = 125°; obtuse
b. m$\angle BOD$ = 35°; acute
c. m$\angle BOD$ = 90°; right
d. m$\angle BOD$ = 160°; obtuse

____ 12. m$\angle IJK$ = 57° and m$\angle IJL$ = 20°. Find m$\angle LJK$.

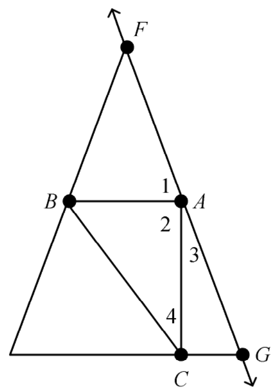


a. m$\angle LJK = -37°$
b. m$\angle LJK$ = 77°
c. m$\angle LJK$ = 37°
d. m$\angle LJK$ = 40°

____ 13. $\overrightarrow{BD}$ bisects $\angle ABC$, m$\angle ABD = (7x - 1)°$, and m$\angle DBC = (4x + 8)°$. Find m$\angle ABD$.

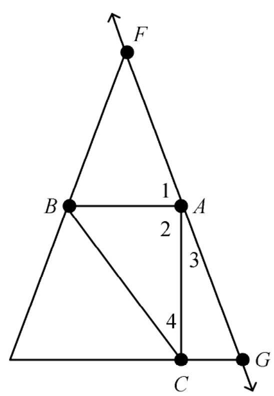
a. m$\angle ABD$ = 22°
b. m$\angle ABD$ = 3°
c. m$\angle ABD$ = 40°
d. m$\angle ABD$ = 20°

____ 14. Tell whether $\angle 1$ and $\angle 2$ are only adjacent, adjacent and form a linear pair, or not adjacent.



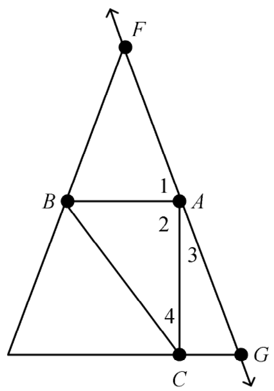
a. only adjacent
b. adjacent and form a linear pair
c. not adjacent

____ 15. Tell whether $\angle 1$ and $\angle 3$ are only adjacent, adjacent and form a linear pair, or not adjacent.



a. not adjacent
b. only adjacent
c. adjacent and form a linear pair

____ 16. Tell whether $\angle FAC$ and $\angle 3$ are only adjacent, adjacent and form a linear pair, or not adjacent.



a. adjacent and form a linear pair
b. only adjacent
c. not adjacent

____ 17. Find the measure of the complement of $\angle M$, where $m\angle M = 31.1°$

a. 58.9° c. 31.1°
b. 148.9° d. 121.1°

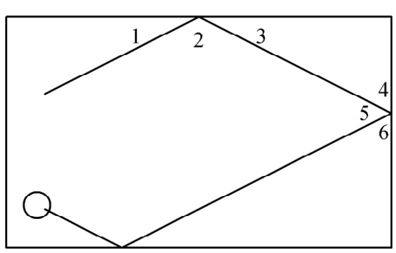
____ 18. Find the measure of the supplement of $\angle R$, where $m\angle R = (8z + 10)°$

a. $(170 - 8z)°$ c. 44.5°
b. $(190 - 8z)°$ d. $(80 - 8z)°$

____ 19. An angle measures 2 degrees more than 3 times its complement. Find the measure of its complement.

a. 68° c. 23°
b. 272° d. 22°

____ 20. A billiard ball bounces off the sides of a rectangular billiards table in such a way that $\angle 1 \cong \angle 3$, $\angle 4 \cong \angle 6$, and $\angle 3$ and $\angle 4$ are complementary. If $m\angle 1 = 26.5°$, find $m\angle 3$, $m\angle 4$, and $m\angle 5$.



a. $m\angle 3 = 26.5°$; $m\angle 4 = 63.5°$; $m\angle 5 = 63.5°$
b. $m\angle 3 = 26.5°$; $m\angle 4 = 63.5°$; $m\angle 5 = 53°$
c. $m\angle 3 = 63.5°$; $m\angle 4 = 26.5°$; $m\angle 5 = 53°$
d. $m\angle 3 = 26.5°$; $m\angle 4 = 153.5°$; $m\angle 5 = 26.5°$

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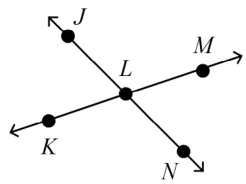
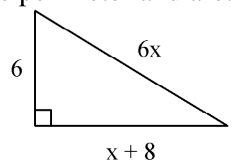
____ 21. Name all pairs of vertical angles.



a. $\angle MLN$ and $\angle JLM$; $\angle JLK$ and $\angle KLN$
b. $\angle JLK$ and $\angle MLN$; $\angle JLM$ and $\angle KLN$
c. $\angle JKL$ and $\angle MNL$; $\angle JML$ and $\angle KNL$
d. $\angle JLK$ and $\angle JLM$; $\angle KLN$ and $\angle MLN$

____ 22. Find the perimeter and area of the figure.

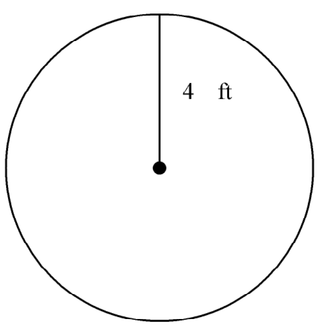


a. perimeter = $6x^2 + 14$; area = $3x + 24$
b. perimeter = $7x + 14$; area = $3x + 24$
c. perimeter = $7x + 14$; area = $6x + 48$
d. perimeter = $7x + 14$; area = $6x^2 + 14$

____ 23. The rectangles on a quilt are 2 in. wide and 3 in. long. The perimeter of each rectangle is made by a pattern of red thread. If there are 30 rectangles in the quilt, how much red thread will be needed?

a. 10 in.
b. 150 in.
c. 180 in.
d. 300 in.

____ 24. Find the circumference and area of the circle. Use 3.14 for π, and round your answer to the nearest tenth.



a. $C = 201.0$ ft; $A = 50.2$ ft^2
b. $C = 50.2$ ft; $A = 25.1$ ft^2
c. $C = 25.1$ ft; $A = 50.2$ ft^2
d. $C = 50.2$ ft; $A = 201.0$ ft^2

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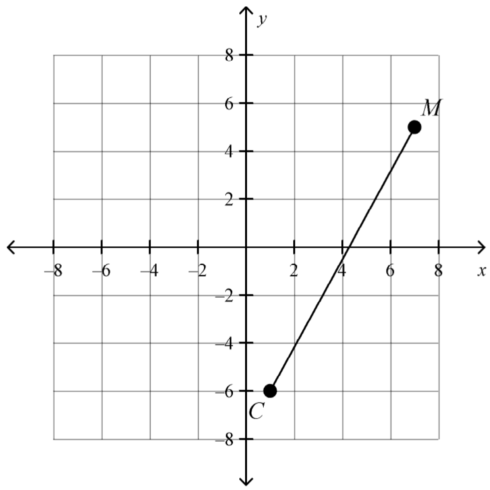
____ 25. The width of a rectangular mirror is $\frac{3}{4}$ the measure of the length of the mirror. If the area is 192 in^2, what are the length and width of the mirror?

a. length = 24 in., width = 8 in.
b. length = 16 in., width = 12 in.
c. length = 48 in., width = 4 in.
d. length = 25 in., width = 71 in.

____ 26. Find the coordinates of the midpoint of $\overline{CM}$ with endpoints $C(1, -6)$ and $M(7, 5)$.

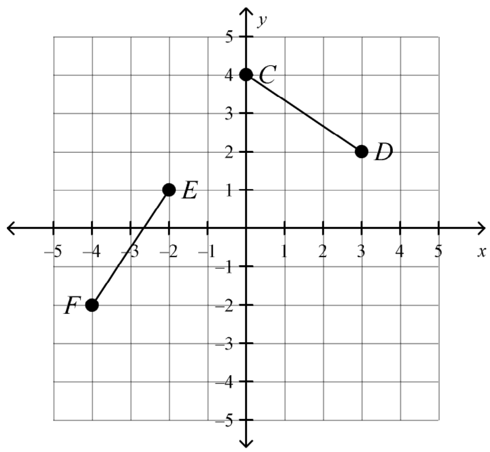


a. $(3, -1)$
b. $(8, -1)$
c. $(4, -\frac{1}{2})$
d. $(4\frac{1}{2}, \frac{1}{2})$

____ 27. M is the midpoint of $\overline{AN}$, A has coordinates $(-6, -6)$, and M has coordinates $(1, 2)$. Find the coordinates of N.

a. $(8, 10)$
b. $(-5, -4)$
c. $(-2\frac{1}{2}, -2)$
d. $(8\frac{1}{2}, 9\frac{1}{2})$

____ 28. Find CD and EF. Then determine if $\overline{CD} \cong \overline{EF}$.

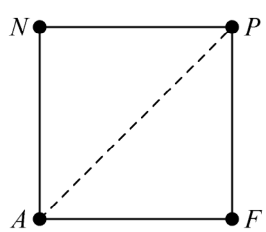


a. $CD = \sqrt{13}$, $EF = \sqrt{13}$, $\overline{CD} \cong \overline{EF}$
b. $CD = \sqrt{5}$, $EF = \sqrt{13}$, $\overline{CD} \ncong \overline{EF}$
c. $CD = \sqrt{13}$, $EF = 3\sqrt{5}$, $\overline{CD} \ncong \overline{EF}$
d. $CD = \sqrt{5}$, $EF = \sqrt{5}$, $\overline{CD} \cong \overline{EF}$

____ 29. Use the Distance Formula and the Pythagorean Theorem to find the distance, to the nearest tenth, from $T(4, -2)$ to $U(-2, 3)$.

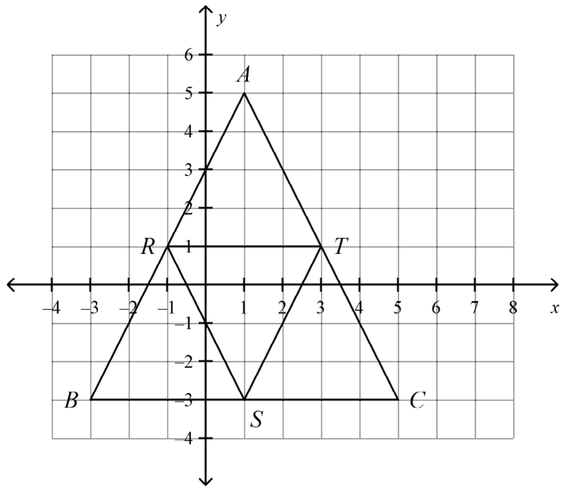
a. –1.0 units
b. 3.4 units
c. 0.0 units
d. 7.8 units

____ 30. There are four fruit trees in the corners of a square backyard with 30-ft sides. What is the distance between the apple tree A and the plum tree P to the nearest tenth?



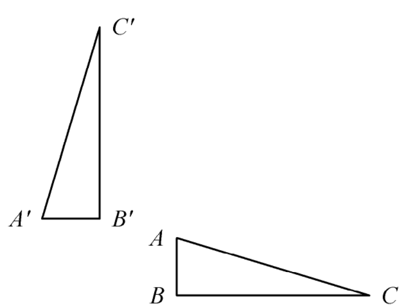
a. 42.4 ft
b. 42.3 ft
c. 30.0 ft
d. 30.3 ft

____ 31. R is the midpoint of $\overline{AB}$. T is the midpoint of $\overline{AC}$. S is the midpoint of $\overline{BC}$. Use the diagram to find the coordinates of T, the area of ΔRST, and AB. Round your answers to the nearest tenth.



a. $T(3, 1)$; area of $\Delta RST = 8$; $AB \approx 17.9$
b. $T(3, 1)$; area of $\Delta RST = 32$; $AB \approx 17.9$
c. $T(3, 1)$; area of $\Delta RST = 16$; $AB \approx 8.9$
d. $T(3, 1)$; area of $\Delta RST = 8$; $AB \approx 8.9$

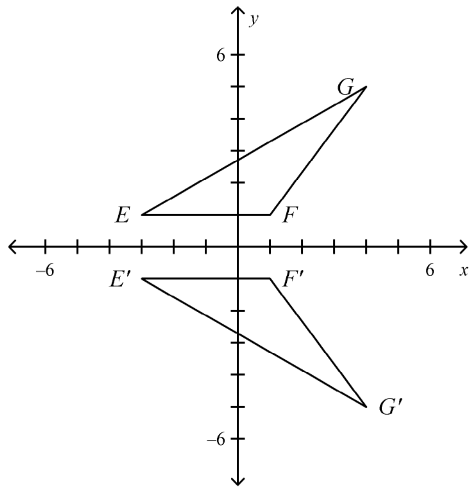
____ 32. Identify the transformation. Then use arrow notation to describe the transformation.



a. The transformation is a 90° rotation. $ABC \rightarrow A'B'C'$
b. The transformation is a 45° rotation. $ABC \rightarrow A'B'C'$
c. The transformation is a reflection. $ABC \rightarrow A'B'C'$
d. The transformation is a translation. $ABC \rightarrow A'B'C'$

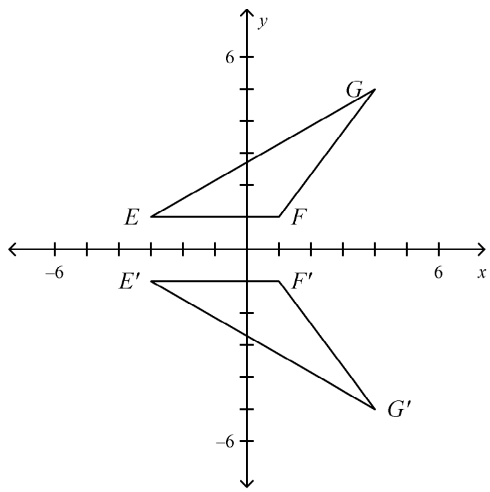
____ 33. A figure has vertices at $E(-3, 1)$, $F(1, 1)$, and $G(4, 5)$. After a transformation, the image of the figure has vertices at $E'(-3, -1)$, $F'(1, -1)$, and $G'(4, -5)$. Draw the preimage and image. Then identify the transformation.

a.



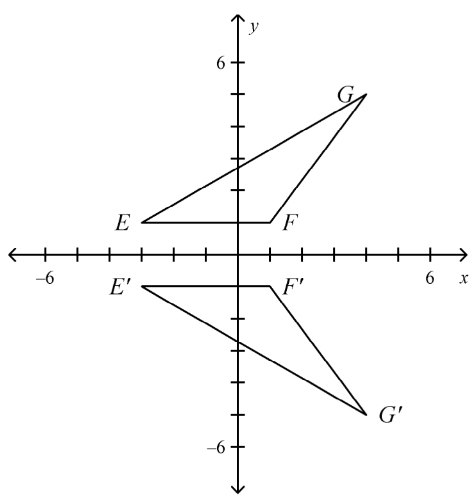
The transformation is a reflection across the *x*-axis.

b.



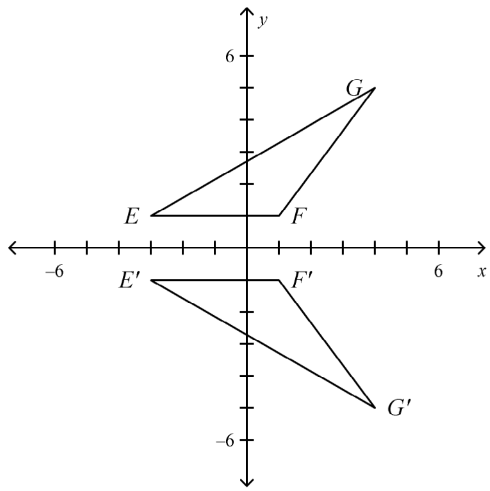
The transformation is a 180° rotation.

c.



The transformation is a 90° rotation.

d.



The transformation is a translation.

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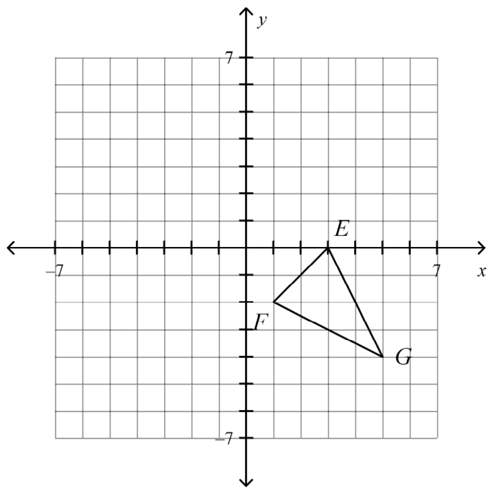
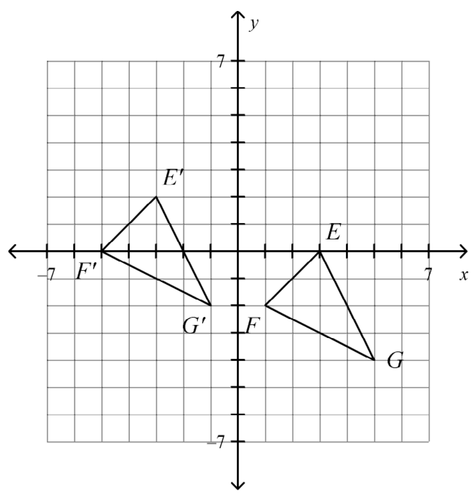
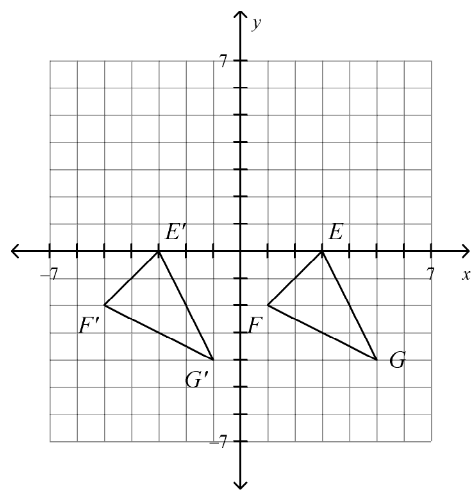
____ 34. Find the coordinates for the image of ΔEFG after the translation $(x, y) \rightarrow (x - 6, y + 2)$. Draw the image.



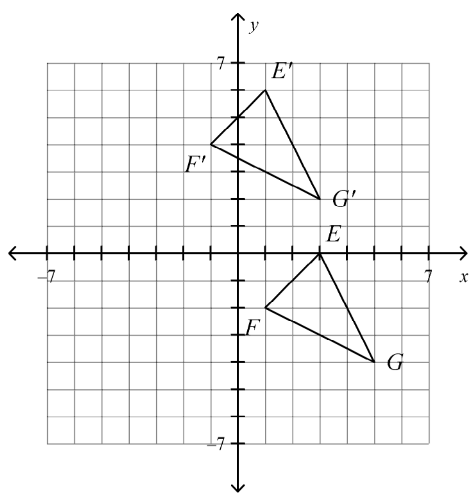
a.



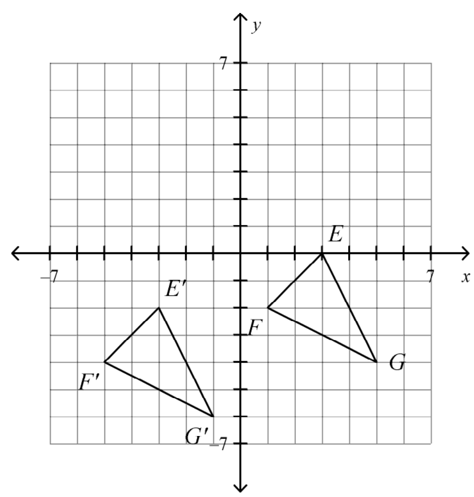
c.



b.



d.



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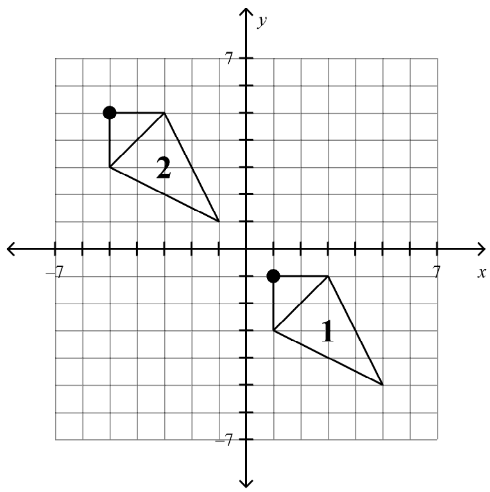
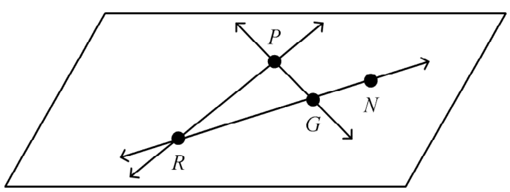
____ 35. An animated film artist creates a simple scene by translating a kite against a still background. Write a rule for the translation of kite 1 to kite 2.



a. $(x, y) \to (x - 6, y + 6)$
b. $(x, y) \to (x + 6, y - 6)$
c. $(x, y) \to (x - 2, y + 2)$
d. $(x, y) \to (x + 2, y - 2)$

____ 36. Name three collinear points.



a. *P*, *G*, and *N*
b. *R*, *P*, and *N*
c. *R*, *P*, and *G*
d. *R*, *G*, and *N*

Matching

Match each vocabulary term with its definition.
a. line
b. opposite rays
c. postulate
d. ray
e. plane
f. vertex
g. endpoint
h. segment

____ 37. a point at an end of a segment or the starting point of a ray

____ 38. a part of a line that starts at an endpoint and extends forever in one direction

____ 39. a statement that is accepted as true without proof, also called an axiom

____ 40. the common endpoint of the sides of an angle

____ 41. two rays that have a common endpoint and form a line

____ 42. a part of a line consisting of two endpoints and all points between them

Match each vocabulary term with its definition.

a. exterior of an angle
b. interior of an angle
c. vertical angles
d. acute angle
e. obtuse angle
f. right angle
g. straight angle
h. complementary angles
i. supplementary angles

____ 43. the nonadjacent angles formed by two intersecting lines

____ 44. an angle formed by two opposite rays that measures 180°

____ 45. an angle that measures greater than 0° and less than 90°

____ 46. an angle that measures 90°

____ 47. the set of all points between the sides of an angle

____ 48. an angle that measures greater than 90° and less than 180°

____ 49. the set of all points outside an angle

Match each vocabulary term with its definition.

a. translation
b. transformation
c. rotation
d. reflection
e. position
f. dimension
g. image
h. preimage

____ 50. a shape that results from a transformation of a figure

____ 51. the original figure in a transformation

____ 52. a transformation across a line

____ 53. a change in the position, size, or shape of a figure

____ 54. a transformation about a point *P*, such that each point and its image are the same distance from *P*

____ 55. a transformation in which all the points of a figure move the same distance in the same direction

Geometry Chapter 1 Review
Answer Section

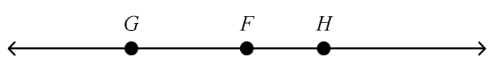
MULTIPLE CHOICE

1. ANS: C
A line is named by any two points on the line.

	Feedback
A	These are names for two points.
B	These are names for the plane.
C	Correct!
D	These are two names for the same line.

PTS: 1 DIF: Basic REF: Page 7
OBJ: 1-1.1 Naming Points, Lines, and Planes NAT: 12.3.4.b
TOP: 1-1 Understanding Points Lines and Planes

2. ANS: B
In the diagram, rays $\overrightarrow{FG}$ and $\overrightarrow{FH}$ share a common endpoint F and form the line $\overleftrightarrow{GH}$.



	Feedback
A	Opposite rays form a line.
B	Correct!
C	Opposite rays form a line.
D	Opposite rays are two rays that have a common endpoint and form a line.

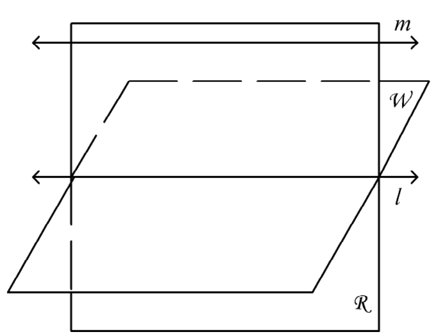
PTS: 1 DIF: Basic REF: Page 7 OBJ: 1-1.2 Drawing Segments and Rays
NAT: 12.3.1.d STA: (G.7)(A) TOP: 1-1 Understanding Points Lines and Planes

3. ANS: C
A plane can be described by any three noncollinear points. Of the choices given, only points *W*, *R*, and *T* are noncollinear. Thus, $\overleftrightarrow{AC}$ lies in plane *WRT*.

	Feedback
A	Points *A*, *C*, and *R* are collinear. A plane can be described by any three noncollinear points.
B	Points *W*, *C*, and *T* are collinear. A plane can be described by any three noncollinear points.
C	Correct!
D	A plane can be described by any three noncollinear points.

PTS: 1 DIF: Basic REF: Page 7
OBJ: 1-1.3 Identifying Points and Lines in a Plane NAT: 12.3.4.b
TOP: 1-1 Understanding Points Lines and Planes

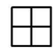
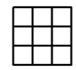
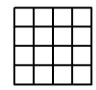
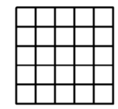
4. ANS: B
In the diagram, lines *m* and *l* both lie in plane *R*, but do not intersect. Moreover, line *l* is the intersection of planes *R* and *W*.



	Feedback
A	Is either of the two lines the intersection of the two planes?
B	Correct!
C	The two lines in this diagram intersect.
D	The two lines in this diagram are not coplanar.

PTS: 1 DIF: Average REF: Page 8 OBJ: 1-1.4 Representing Intersections
NAT: 12.3.4.b STA: (G.1)(A) TOP: 1-1 Understanding Points Lines and Planes

5. ANS: A
Extend the table to notice a pattern.

Figure					
Size of Figure	1×1	2×2	3×3	4×4	5×5
Maximum Number of Squares	1	5	14	30	55

Each figure has the same number of squares as the previous one, plus its size squared.
A 1×1 figure has 1 square.
A 2×2 figure has $1 + 2^2 = 5$ squares.
A 3×3 figure has $5 + 3^2 = 14$ squares.
A 4×4 figure has $14 + 4^2 = 30$ squares.
A 5×5 figure has $30 + 5^2 = 55$ squares.

Continuing the pattern allows you to find the number of squares in a 7×7 figure.
A 6×6 figure has $55 + 6^2 = 91$ squares.
A 7×7 figure has $91 + 7^2 = 140$ squares.

	Feedback
A	Correct!
B	Each figure has same number of squares as the previous one, plus a certain amount.
C	Each figure has same number of squares as the previous one, plus a certain amount.
D	Each figure has same number of squares as the previous one, plus a certain amount.

PTS: 1 DIF: Advanced NAT: 12.5.1.a STA: (G.5)(A)
TOP: 1-1 Understanding Points Lines and Planes

6. ANS: C

$$\begin{aligned} BC &= \left|-8 - (-1)\right| \\ &= \left|-8 + 1\right| \\ &= \left|-7\right| \\ &= 7 \end{aligned}$$

	Feedback
A	The length of a segment is always positive.
B	Find the absolute value of the difference of the coordinates.
C	Correct!
D	Find the absolute value of the difference of the coordinates.

PTS: 1 DIF: Basic REF: Page 13
OBJ: 1-2.1 Finding the Length of a Segment NAT: 12.2.1.e
STA: (G.7)(C) TOP: 1-2 Measuring and Constructing Segments

7. ANS: C

$CE = CD + DE$	Segment Addition Postulate
$6x = (4x + 8) + 27$	Substitute $6x$ for CE and $4x + 8$ for CD.
$6x = 4x + 35$	Simplify.
$2x = 35$	Subtract $4x$ from both sides.
$\frac{2x}{2} = \frac{35}{2}$	Divide both sides by 2.
$x = \frac{35}{2}$ or 17.5	Simplify.

$CE = 6x = 6(17.5) = 105$

	Feedback
A	You found the value of x. Find the length of the specified segment.
B	You found the length of a different segment.
C	Correct!
D	Check your equation. Make sure you are not subtracting instead of adding.

PTS: 1 DIF: Average REF: Page 15
OBJ: 1-2.3 Using the Segment Addition Postulate NAT: 12.3.5.a
STA: (G.3)(B) TOP: 1-2 Measuring and Constructing Segments

8. ANS: A

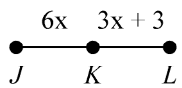
If the Ybarra's current position is represented by X, then the distance they must travel before they stop for lunch is XR.

$SX + XR = SR$	Segment Addition Postulate
$XR = SR - SX$	Solve for XR.
$XR = \frac{1}{2}(360) - 55$	Substitute known values. R is the midpoint of $\overline{SJ}$, so $SR = \frac{1}{2}SJ$.
$XR = 125$	Simplify.

	Feedback
A	Correct!
B	Use the definition of midpoint and the Segment Addition Postulate to find the distance to Roseburg.
C	This is the distance from Springfield to Roseburg. You must subtract the distance they have already traveled.
D	This is the distance to Junction City. Use the definition of midpoint and the Segment Addition Postulate to find the distance to Roseburg.

PTS: 1 DIF: Average REF: Page 15 OBJ: 1-2.4 Application
NAT: 12.2.1.e STA: (G.7)(C) TOP: 1-2 Measuring and Constructing Segments

9. ANS: B



Step 1 Write an equation and solve.

$JK = KL$	K is the midpoint of $\overline{JL}$.
$6x = 3x + 3$	Substitute $6x$ for JK and $3x + 3$ for KL.
$3x = 3$	Subtract $3x$ from both sides.
$x = 1$	Divide both sides by 3.

Step 2 Find JK, KL, and JL.
$JK = 6x = 6(1) = 6$
$KL = 3x + 3 = 3(1) + 3 = 6$
$JL = JK + KL = 6 + 6 = 12$

	Feedback
A	This is the value of x. Substitute this value for x to solve for the segment lengths.
B	Correct!
C	Reverse your answers. The first two segments are half as long as the last segment.
D	Check your simplification methods when solving for x. Use division for the last step.

PTS: 1 DIF: Average REF: Page 16
OBJ: 1-2.5 Using Midpoints to Find Lengths NAT: 12.2.1.e
STA: (G.7)(C) TOP: 1-2 Measuring and Constructing Segments

10. ANS: B
$\angle BOA$ is another name for $\angle AOB$, $\angle BOC$ is another name for $\angle COB$, and $\angle COA$ is another name for $\angle AOC$. Thus the diagram contains three angles.

	Feedback
A	What is the name for the angle that describes the change in position from point A to point C?
B	Correct!
C	Angle BOA is another name for angle AOB, and angle BOC is another name for angle COB. What is the name for the angle that describes the change in position from point A to point C?
D	Point O is the vertex of all the angles in the diagram.

PTS: 1 DIF: Average REF: Page 20 OBJ: 1-3.1 Naming Angles
NAT: 12.2.1.f TOP: 1-3 Measuring and Constructing Angles

11. ANS: C
By the Protractor Postulate, $m\angle BOD = m\angle AOD - m\angle AOB$.
First, measure $\angle AOD$ and $\angle AOB$.
$m\angle BOD = m\angle AOD - m\angle AOB = 125° - 35° = 90°$
Thus, $\angle BOD$ is a right angle.

	Feedback
A	To find the measure of angle *BOD*, subtract the measure of angle *AOB* from the measure of angle *AOD*.
B	The sum of the measure of angle *AOB* and the measure of angle *BOD* is equal to the measure of angle *AOD*.
C	Correct!
D	Use the Protractor Postulate.

PTS: 1 DIF: Average REF: Page 21
OBJ: 1-3.2 Measuring and Classifying Angles NAT: 12.2.1.f
STA: (G.3)(B) TOP: 1-3 Measuring and Constructing Angles

12. ANS: C

$m\angle IJK = m\angle IJL + m\angle LJK$	Angle Addition Postulate
$57° = 20° + m\angle LJK$	Substitute 57° for $m\angle IJK$ and 20° for $m\angle IJL$.
$37° = m\angle LJK$	Subtract 20° from both sides.

	Feedback
A	Use the Angle Addition Postulate.
B	Subtract the smaller angle measure from the larger angle measure.
C	Correct!
D	Subtract the smaller angle measure from the larger angle measure.

PTS: 1 DIF: Basic REF: Page 22
OBJ: 1-3.3 Using the Angle Addition Postulate NAT: 12.2.1.f
STA: (G.3)(B) TOP: 1-3 Measuring and Constructing Angles

13. ANS: D

Step 1 Solve for x.

$m\angle ABD = m\angle DBC$	Definition of angle bisector.
$(7x - 1)° = (4x + 8)°$	Substitute $7x - 1$ for $\angle ABD$ and $4x + 8$ for $\angle DBC$.
$7x = 4x + 9$	Add 1 to both sides.
$3x = 9$	Subtract $4x$ from both sides.
$x = 3$	Divide both sides by 3.

Step 2 Find $m\angle ABD$.

$m\angle ABD = 7x - 1 = 7(3) - 1 = 20°$

	Feedback
A	Check your simplification technique.
B	Substitute this value of x into the expression for the angle.
C	This answer is the entire angle. Divide by two.
D	Correct!

PTS: 1 DIF: Average REF: Page 23
OBJ: 1-3.4 Finding the Measure of an Angle NAT: 12.2.1.f
STA: (G.3)(B) TOP: 1-3 Measuring and Constructing Angles

14. ANS: A

$\angle 1$ and $\angle 2$ have a common vertex, A, a common side, $\overline{AB}$, and no common interior points. Therefore, $\angle 1$ and $\angle 2$ are adjacent angles.

	Feedback
A	Correct!
B	Adjacent angles form a linear pair if and only if their noncommon sides are opposite rays.
C	Two angles are adjacent if they have a common vertex and a common side, but no common interior points.

PTS: 1 DIF: Average REF: Page 28 OBJ: 1-4.1 Identifying Angle Pairs
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

15. ANS: A

$\angle 1$ and $\angle 3$ have a common vertex, A, but no common side. So $\angle 1$ and $\angle 3$ are not adjacent.

	Feedback
A	Correct!
B	Two angles are adjacent if they have a common vertex and a common side, but no common interior points.
C	Adjacent angles form a linear pair if and only if their noncommon sides are opposite rays.

PTS: 1 DIF: Average REF: Page 28 OBJ: 1-4.1 Identifying Angle Pairs
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

16. ANS: A

$\angle FAC$ and $\angle 3$ are adjacent angles. Their noncommon sides, $\overrightarrow{AF}$ and $\overrightarrow{AG}$, are opposite rays, so $\angle FAC$ and $\angle 3$ also form a linear pair.

	Feedback
A	Correct!
B	Adjacent angles form a linear pair if and only if their noncommon sides are opposite rays.
C	Two angles are adjacent if they have a common vertex and a common side, but no common interior points.

PTS: 1 DIF: Average REF: Page 28 OBJ: 1-4.1 Identifying Angle Pairs
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

17. ANS: A
Subtract from 90º and simplify.
$90° - 31.1° = 58.9°$

	Feedback
A	Correct!
B	Find the measure of a complementary angle, not a supplementary angle.
C	Complementary angles are angles whose measures have a sum of 90 degrees.
D	The measures of complementary angles add to 90 degrees.

PTS: 1 DIF: Basic REF: Page 29
OBJ: 1-4.2 Finding the Measures of Complements and Supplements
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

18. ANS: A
Subtract from 180º and simplify.
$180° - (8z + 10)° = 180 - 8z - 10 = (170 - 8z)°$

	Feedback
A	Correct!
B	The measures of supplementary angles add to 180 degrees.
C	Supplementary angles are angles whose measures have a sum of 180 degrees.
D	Find the measure of a supplementary angle, not a complementary angle.

PTS: 1 DIF: Average REF: Page 29
OBJ: 1-4.2 Finding the Measures of Complements and Supplements
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

19. ANS: D
Let $m\angle A = x°$. Then $m\angle B = (90 - x)°$.

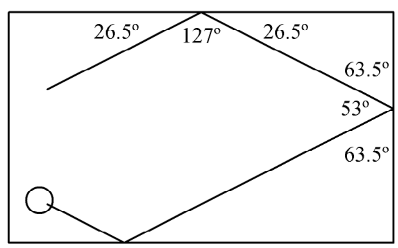
$m\angle A = 3m\angle B + 2$	
$x = 3(90 - x) + 2$	Substitute.
$x = 270 - 3x + 2$	Distribute.
$x = 272 - 3x$	Combine like terms.
$4x = 272$	Add $3x$ to both sides.
$x = \frac{272}{4}$	Divide both sides by 4.
$x = 68$	Simplify.

The measure of $\angle A$ is 68°, so its complement is 22°.

	Feedback
A	This is the original angle. Find the measure of the complement.
B	Simplify the terms when solving.
C	Check your equation. The original angle is 2 degrees more than 3 times its complement.
D	Correct!

PTS: 1 DIF: Average REF: Page 29
OBJ: 1-4.3 Using Complements and Supplements to Solve Problems
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

20. ANS: B
Since $\angle 1 \cong \angle 3$, $m\angle 1 \cong m\angle 3$.
Thus $m\angle 3 = 26.5°$.



Since $\angle 3$ and $\angle 4$ are complementary,
$m\angle 4 = 90° - 26.5° = 63.5°$.

Since $\angle 4 \cong \angle 6$, $m\angle 4 \cong m\angle 6$.
Thus $m\angle 6 = 63.5°$.

By the Angle Addition Postulate,
$180° = m\angle 4 + m\angle 5 + m\angle 6$

$= 63.5° + m\angle 5 + 63.5°$
Thus, $m\angle 5 = 53°$.

	Feedback
A	The measure of angle 5 is 180 degrees minus the sum of the measure of angle 4 and the measure of angle 6.
B	Correct!
C	Angle 1 and angle 3 are congruent. Congruent angles have the same measure.
D	Angle 3 and angle 4 are complementary, not supplementary.

PTS: 1 DIF: Average REF: Page 30 OBJ: 1-4.4 Problem-Solving Application
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

21. ANS: B

The vertical angle pairs are $\angle JLK$ and $\angle MLN$, and $\angle JLM$ and $\angle KLN$. These angles appear to have the same measure.

	Feedback
A	These angles are adjacent, not vertical.
B	Correct!
C	Vertical angles share a common vertex, the point of intersection of the two lines. The vertex is the middle letter in the angle's name.
D	These angles are adjacent, not vertical.

PTS: 1 DIF: Basic REF: Page 30 OBJ: 1-4.5 Identifying Vertical Angles
NAT: 12.3.3.g STA: (G.2)(B) TOP: 1-4 Pairs of Angles

22. ANS: B

Solve for the perimeter of the triangle.

$$P = a + b + c$$
$$= 6 + (x + 8) + 6x$$
$$= 7x + 14$$

Solve for the area of the triangle.

$$A = \frac{1}{2}bh$$
$$= \frac{1}{2}(x + 8)(6)$$
$$= 3x + 24$$

	Feedback
A	Check your algebra when adding like terms.
B	Correct!
C	The triangle's area is half of its base times its height.
D	The triangle's area is half of its base times its height.

PTS: 1 DIF: Average REF: Page 36
OBJ: 1-5.1 Finding the Perimeter and Area NAT: 12.2.1.h
STA: (G.8)(A) TOP: 1-5 Using Formulas in Geometry

23. ANS: D

The perimeter of one rectangle is $P = 2l + 2w = 2(2) + 2(3) = 4 + 6 = 10$ in.

The total perimeter of 30 rectangles is $30(10) = 300$ in.

300 in. of red thread will be needed.

	Feedback
A	This is the perimeter of one rectangle. What is the perimeter of all 30 rectangles?
B	To find the perimeter add 2(length) + 2(width).
C	To find the perimeter add 2(length) + 2(width).
D	Correct!

PTS: 1 DIF: Average REF: Page 37 OBJ: 1-5.2 Application
NAT: 12.2.1.h STA: (G.8)(A) TOP: 1-5 Using Formulas in Geometry

24. ANS: C

$C = 2\pi r = 2\pi\,(4) \approx 25.1$ ft

$A = \pi r^2 = \pi\,(4)^2 \approx 50.2$ ft^2

	Feedback
A	Use the radius, not the diameter, in your calculations.
B	The circumference of a circle is 2 times pi times the radius. The area of a circle is pi times the radius squared.
C	Correct!
D	Use the radius, not the diameter, in your calculations.

PTS: 1 DIF: Average REF: Page 37
OBJ: 1-5.3 Finding the Circumference and Area of a Circle NAT: 12.2.1.h
STA: (G.8)(A) TOP: 1-5 Using Formulas in Geometry

25. ANS: B

The area of a rectangle is found by multiplying the length and width. Let l represent the length of the mirror. Then the width of the mirror is $\frac{3}{4}l$.

$A = lw$

$192 = l(\frac{3}{4}l)$

$192 = \frac{3}{4}l^2$

$256 = l^2$

$16 = l$

The length of the mirror is 16 inches. The width of the mirror is $\frac{3}{4}(16) = 12$ inches.

	Feedback
A	First, find the length. Then, use substitution to find the width.
B	Correct!
C	First, find the length. Then, use substitution to find the width.
D	The formula for the area of a rectangle is length times width.

PTS: 1 DIF: Advanced NAT: 12.2.1.h STA: (G.8)(A)
TOP: 1-5 Using Formulas in Geometry

26. ANS: C

$$M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{1+7}{2}, \frac{-6+5}{2}\right) = (4, -\tfrac{1}{2})$$

	Feedback
A	The *x*- and *y*-coordinates of the midpoint are the averages of the *x*- and *y*-coordinates of the endpoints.
B	The *x*- and *y*-coordinates of the midpoint are the averages of the *x*- and *y*-coordinates of the endpoints.
C	Correct!
D	The *x*- and *y*-coordinates of the midpoint are the averages of the *x*- and *y*-coordinates of the endpoints.

PTS: 1 DIF: Basic REF: Page 43
OBJ: 1-6.1 Finding the Coordinates of a Midpoint NAT: 12.2.1.e
STA: (G.7)(C) TOP: 1-6 Midpoint and Distance in the Coordinate Plane

27. ANS: A

Step 1 Let the coordinates of *N* equal (*x*, *y*).
Step 2 Use the Midpoint Formula.

$$(1, 2) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = \left(\frac{-6+x}{2}, \frac{-6+y}{2}\right)$$

Step 3 Find the *x*- and *y*-coordinates.

$1 = \frac{-6+x}{2}$	$2 = \frac{-6+y}{2}$	Set the coordinates equal.
$2(1) = 2\left(\frac{-6+x}{2}\right)$	$2(2) = 2\left(\frac{-6+y}{2}\right)$	Multiply both sides by 2.
$2 = -6+x$	$4 = -6+y$	Simplify.
$x = 8$	$y = 10$	Solve for *x* or *y*, as appropriate.

The coordinates of *N* are (8, 10).

	Feedback
A	Correct!
B	Let the coordinates of *N* be (*x*, *y*). Substitute known values into the Midpoint Formula to solve for *x* and *y*.
C	This is the midpoint of line segment *AM*. If M is the midpoint of line segment *AN*, what are the coordinates of *N*?
D	Let the coordinates of *N* be (*x*, *y*). Substitute known values into the Midpoint Formula to solve for *x* and *y*.

PTS: 1 DIF: Average REF: Page 44
OBJ: 1-6.2 Finding the Coordinates of an Endpoint NAT: 12.2.1.e
STA: (G.7)(C) TOP: 1-6 Midpoint and Distance in the Coordinate Plane

28. ANS: A
Step 1 Find the coordinates of each point.
$C(0, 4)$, $D(3, 2)$, $E(-2, 1)$, and $F(-4, -2)$

Step 2 Use the Distance Formula.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\begin{aligned} CD &= \sqrt{(3-0)^2 + (2-4)^2} \\ &= \sqrt{3^2 + (-2)^2} \\ &= \sqrt{9+4} = \sqrt{13} \end{aligned}$$

$$\begin{aligned} EF &= \sqrt{(-4-(-2))^2 + (-2-1)^2} \\ &= \sqrt{(-2)^2 + (-3)^2} \\ &= \sqrt{4+9} = \sqrt{13} \end{aligned}$$

Since $CD = EF$, $\overline{CD} \cong \overline{EF}$.

	Feedback
A	Correct!
B	The square of a negative number is positive.
C	Subtracting a negative number is the same as adding the number. –(–2) = 2.
D	Use the distance formula after finding the coordinates of each point.

PTS: 1 DIF: Average REF: Page 44 OBJ: 1-6.3 Using the Distance Formula
NAT: 12.2.1.e STA: (G.7)(C) TOP: 1-6 Midpoint and Distance in the Coordinate Plane

29. ANS: D

Method 1 Substitute the values for the coordinates of T and U into the Distance Formula.

$$TU = \sqrt{\left(x_2 - x_1\right)^2 + \left(y_2 - y_1\right)^2}$$

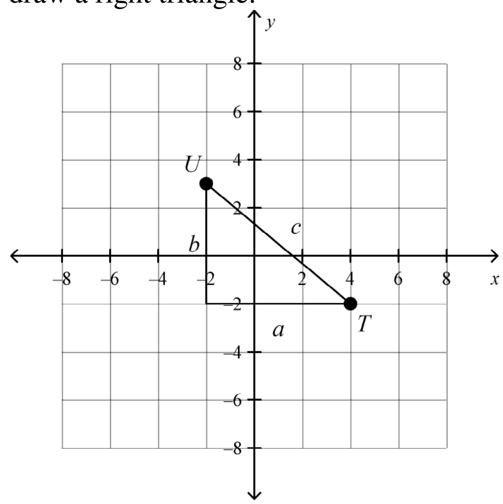
$$= \sqrt{(-2-4)^2 + (3--2)^2}$$

$$= \sqrt{(-6)^2 + (5)^2}$$

$$= \sqrt{61}$$

$$\approx 7.8 \text{ units}$$

Method 2 Use the Pythagorean Theorem. Plot the points on a coordinate plane. Then draw a right triangle.



Count the units for sides a and b. $a = 6$ and $b = 5$. Then apply the Pythagorean Theorem.

$c^2 = a^2 + b^2 = 6^2 + 5^2 = 36 + 25 = 61$

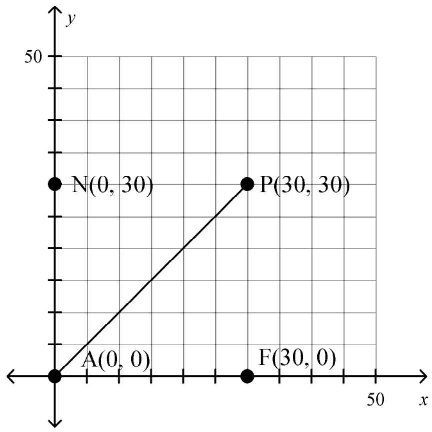
$c \approx 7.8$ units

	Feedback
A	The distance is the square root of the quantity $(x2 - x1)$^2 + $(y2 - y1)$^2.
B	The distance is the square root of the quantity $(x2 - x1)$^2 + $(y2 - y1)$^2.
C	The distance is the square root of the quantity $(x2 - x1)$^2 + $(y2 - y1)$^2.
D	Correct!

PTS: 1 DIF: Average REF: Page 45
OBJ: 1-6.4 Finding Distances in the Coordinate Plane NAT: 12.2.1.e
STA: (G.8)(C) TOP: 1-6 Midpoint and Distance in the Coordinate Plane

30. ANS: A

Set up the yard on a coordinate plane so that the apple tree *A* is at the origin, the fig tree *F* has coordinates (30, 0), the plum tree *P* has coordinates (30, 30), and the nectarine tree *N* has coordinates (0, 30).



The distance between the apple tree and the plum tree is *AP*.

$$AP = \sqrt{\left(x_2 - x_1\right)^2 + \left(y_2 - y_1\right)^2} = \sqrt{(30-0)^2 + (30-0)^2} = \sqrt{30^2 + 30^2} = \sqrt{900+900} = \sqrt{1800} \approx 42.4 \text{ ft}$$

	Feedback
A	Correct!
B	Check your calculations and rounding.
C	Set up the yard on a coordinate plane so that the apple tree *A* is at the origin. Then use the distance formula to find the distance.
D	Set up the yard on a coordinate plane so that the apple tree *A* is at the origin. Then use the distance formula to find the distance.

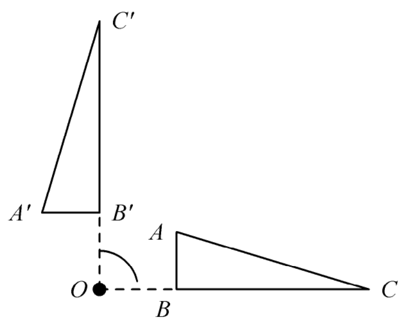
PTS: 1 DIF: Average REF: Page 46 OBJ: 1-6.5 Application
NAT: 12.2.1.e STA: (G.7)(C) TOP: 1-6 Midpoint and Distance in the Coordinate Plane

31. ANS: D
Using the given diagram, the coordinates of T are (3, 1).
The area of a triangle is given by $A = \frac{1}{2}bh$.
From the diagram, the base of the triangle is $b = RT = 4$.
From the diagram, the height of the triangle is $h = 4$.
Therefore the area is $A = \frac{1}{2}(4)(4) = 8$.
To find AB, use the Distance Formula with points $A(1,5)$ and $B(-3,-3)$.
$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(-3-1)^2 + (-3-5)^2} = \sqrt{16+64} = \sqrt{80} \approx 8.9$

	Feedback
A	Use the distance formula to find the measurement of *AB*.
B	The area of a triangle is one half the measure of its base times the measure of its height.
C	The area of a triangle is one half times the measure of its base times the measure of its height.
D	Correct!

PTS: 1 DIF: Advanced NAT: 12.2.1.e STA: (G.7)(B)
TOP: 1-6 Midpoint and Distance in the Coordinate Plane

32. ANS: A

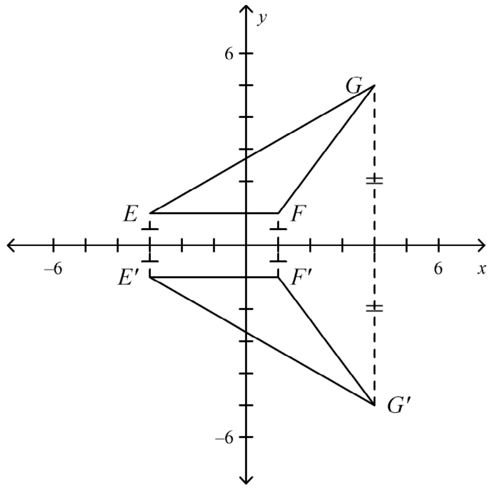


The transformation is a 90° rotation with center of rotation at point O.
To be a reflection, each point and its image are the same distance from a line of reflection.
To be a translation, each point of ΔABC moves the same distance in the same direction.

	Feedback
A	Correct!
B	What happens to one of the segments in the triangle? Is *B'C'* an image of *BC* after a rotation of 45 degrees?
C	The transformation is not a reflection because each point and its image are not the same distance from a line of reflection.
D	The transformation is not a translation because each point of the triangle *ABC* does not move the same distance in the same direction.

PTS: 1 DIF: Average REF: Page 50 OBJ: 1-7.1 Identifying Transformations
NAT: 12.3.2.b STA: (G.10)(A) TOP: 1-7 Transformations in the Coordinate Plane

33. ANS: A



Plot the points. Then use a straightedge to connect the vertices.

The transformation is a reflection across the *x*-axis because each point and its image are the same distance from the *x*-axis.

	Feedback
A	Correct!
B	The transformation is not a rotation of 180 degrees. After a rotation of *EF* 180 degrees, the vertices *E*' and *F*' in the image would be reversed.
C	The transformation is not a rotation of 90 degrees. For example, is *E*'*F*' an image of *EF* after a rotation of 90 degrees?
D	The transformation cannot be a translation because each point of the triangle *EFG* does not move the same distance in the same direction.

PTS: 1 DIF: Average REF: Page 51
OBJ: 1-7.2 Drawing and Identifying Transformations NAT: 12.3.2.c
STA: (G.10)(A) TOP: 1-7 Transformations in the Coordinate Plane

34. ANS: A

Step 1 Find the coordinates of Δ*EFG*.
The vertices of Δ*EFG* are $E(3, 0)$, $F(1, –2)$, and $G(5, –4)$.

Step 2 Apply the rule to find the vertices of the image.
$E'(3 – 6, 0 + 2) = E'(–3, 2)$
$F'(1 – 6, –2 + 2) = F'(–5, 0)$
$G'(5 – 6, –4 + 2) = G'(–1, –2)$

Step 3 Plot the points. Then finish drawing the image by using a straightedge to connect the vertices.

	Feedback
A	Correct!
B	To find coordinates for the image, add -6 to the *x*-coordinates of the preimage, and add 2 to the *y*-coordinates of the preimage.
C	To find the *y*-coordinates for the image, add 2 to the *y*-coordinates of the preimage.
D	To find the *y*-coordinates for the image, add 2 to the *y*-coordinates of the preimage.

PTS: 1 DIF: Average REF: Page 51
OBJ: 1-7.3 Translations in the Coordinate Plane NAT: 12.3.2.c
STA: (G.10)(A) TOP: 1-7 Transformations in the Coordinate Plane

35. ANS: A

Step 1 Choose 2 points.
Choose a point *A* on the preimage (kite 1) and a corresponding point *A′* on the image.
A has coordinates (1, –1), and *A′* has coordinates (–5, 5).

Step 2 Translate.
To translate *A to A′*, 6 units are subtracted from the *x*-coordinate and 6 units are added to the *y*-coordinate.
Therefore, the translation rule is $(x, y) \rightarrow (x – 6, y + 6)$.

	Feedback
A	Correct!
B	This is a rule for the translation of kite 2 to kite 1.
C	To find the translation rule, choose a point *A* on the preimage (kite 1) and a corresponding point *A*' on the image.
D	To find the translation rule, choose a point *A* on the preimage (kite 1) and a corresponding point *A*' on the image (kite 2).

PTS: 1 DIF: Average REF: Page 52 OBJ: 1-7.4 Application
NAT: 12.3.2.c STA: (G.5)(C) TOP: 1-7 Transformations in the Coordinate Plane

36. ANS: D
Collinear points are points that lie on the same line.
R, *G*, and *N* are three collinear points.

	Feedback
A	Collinear points are points that lie on the same line.
B	Collinear points are points that lie on the same line.
C	Points *R*, *P*, and *G* are noncollinear.
D	Correct!

PTS: 1 DIF: Basic REF: Page 6
OBJ: 1-1.1 Naming Points, Lines, and Planes NAT: 12.3.1.c
STA: (G.1)(A) TOP: 1-1 Understanding Points Lines and Planes

MATCHING

37. ANS: G PTS: 1 DIF: Basic REF: Page 7
TOP: 1-1 Understanding Points Lines and Planes
38. ANS: D PTS: 1 DIF: Basic REF: Page 7
TOP: 1-1 Understanding Points Lines and Planes
39. ANS: C PTS: 1 DIF: Basic REF: Page 7
TOP: 1-1 Understanding Points Lines and Planes
40. ANS: F PTS: 1 DIF: Basic REF: Page 20
TOP: 1-3 Measuring and Constructing Angles
41. ANS: B PTS: 1 DIF: Basic REF: Page 7
TOP: 1-1 Understanding Points Lines and Planes
42. ANS: H PTS: 1 DIF: Basic REF: Page 7
TOP: 1-1 Understanding Points Lines and Planes

43. ANS: C PTS: 1 DIF: Basic REF: Page 30
TOP: 1-4 Pairs of Angles
44. ANS: G PTS: 1 DIF: Basic REF: Page 21
TOP: 1-3 Measuring and Constructing Angles
45. ANS: D PTS: 1 DIF: Basic REF: Page 21
TOP: 1-3 Measuring and Constructing Angles
46. ANS: F PTS: 1 DIF: Basic REF: Page 21
TOP: 1-3 Measuring and Constructing Angles
47. ANS: B PTS: 1 DIF: Basic REF: Page 20
TOP: 1-3 Measuring and Constructing Angles
48. ANS: E PTS: 1 DIF: Basic REF: Page 21
TOP: 1-3 Measuring and Constructing Angles
49. ANS: A PTS: 1 DIF: Basic REF: Page 20
TOP: 1-3 Measuring and Constructing Angles

50. ANS: G PTS: 1 DIF: Basic REF: Page 50
TOP: 1-7 Transformations in the Coordinate Plane

51. ANS: H PTS: 1 DIF: Basic REF: Page 50
TOP: 1-7 Transformations in the Coordinate Plane
52. ANS: D PTS: 1 DIF: Basic REF: Page 50
TOP: 1-7 Transformations in the Coordinate Plane
53. ANS: B PTS: 1 DIF: Basic REF: Page 50
TOP: 1-7 Transformations in the Coordinate Plane
54. ANS: C PTS: 1 DIF: Basic REF: Page 50
TOP: 1-7 Transformations in the Coordinate Plane
55. ANS: A PTS: 1 DIF: Basic REF: Page 50
TOP: 1-7 Transformations in the Coordinate Plane