Geometry review

1

All corresponding sides and angles of $\triangle RST$ and $\triangle DEF$ are congruent.

Select all of the statements that must be true.

- ☐ There is a reflection that maps $\overline{RS}$ to $\overline{DE}$.
- ☐ There is a dilation that maps $\triangle RST$ to $\triangle DEF$.
- ☐ There is a translation followed by a rotation that maps $\overline{RT}$ to $\overline{DF}$.
- ☐ There is a sequence of transformations that maps $\triangle RST$ to $\triangle DEF$.
- ☐ There is not necessarily a sequence of rigid motions that maps $\triangle RST$ to $\triangle DEF$.

2

A line segment has endpoints $S(-9, -4)$ and $T(6, 5)$. Point R lies on $\overline{ST}$ such that the ratio of SR to RT is 2:1.

What are the coordinates of point R?

R(☐ , ☐)

3

Steven constructs an equilateral triangle inscribed in circle P. His first three steps are shown.

1. He creates radius $\overline{PQ}$ using a point Q on the circle.
2. Using point Q as the center and the length of $\overline{PQ}$ as a radius, he uses a compass to construct an arc that intersects the circle at R.
3. Using point R as the center and the length of $\overline{PQ}$ as a radius, he uses a compass to construct an arc that intersects the circle at S.

What should be Steven's next step in constructing the equilateral triangle?

- (A) Draw line segments connecting the points Q, R, and S to construct $\triangle QRS$.
- (B) Draw line segments connecting the points P, R, and S to construct $\triangle PRS$.
- ● Construct an arc intersecting the circle by using point S as the center and the length of $\overline{PQ}$ as a radius.
- (D) Construct an arc intersecting the circle by using point P as the center and the length of $\overline{PQ}$ as a radius.

Quadrilateral *RSTU* has vertices *R*(1, 3), *S*(4, 1), *T*(1, −3), and *U*(−2, −1).

Which statement about quadrilateral *RSTU* is true?

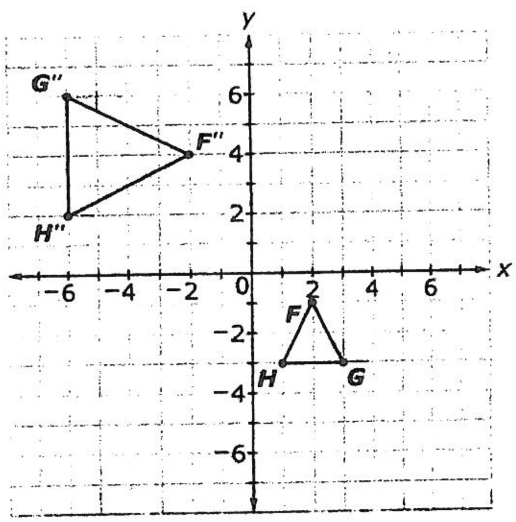
Ⓐ Since the diagonals of quadrilateral *RSTU* are not congruent, it is not a rectangle.

Ⓑ Since the adjacent sides of quadrilateral *RSTU* have equal slopes, it is not a rectangle.

Ⓒ Since the diagonals of quadrilateral *RSTU* are congruent, it is a rectangle.

Ⓓ Since the adjacent sides of quadrilateral *RSTU* have slopes that are negative reciprocals, it is a rectangle.

The coordinate plane shows $\triangle FGH$ and $\triangle F''G''H''$.



Which sequence of transformations can be used to show that $\triangle FGH \sim \triangle F''G''H''$?

Ⓐ a dilation about the origin with a scale factor of 2, followed by a 180° clockwise rotation about the origin

Ⓑ a dilation about the origin with a scale factor of 2, followed by a reflection over the line $y = x$

Ⓒ a translation 5 units up and 4 units left, followed by a dilation with a scale factor of $\frac{1}{2}$ about point *F''*

Ⓓ a 180° clockwise rotation about the origin, followed by a dilation with a scale factor of $\frac{1}{2}$ about point *F''*

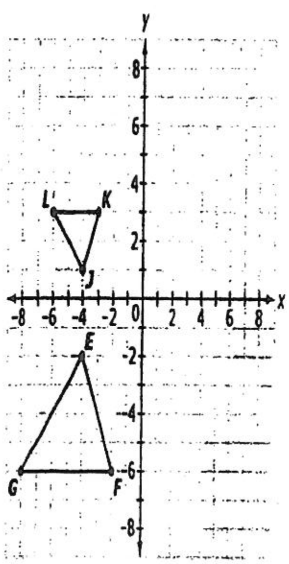
6

Hannah has a cone made of steel and a cone made of granite.

- Each cone has a height of 10 centimeters and a radius of 4 centimeters.
- The density of steel is approximately 7.75 grams per cubic centimeter.
- The density of granite is approximately 2.75 grams per cubic centimeter.

What is the difference, to the nearest gram, of the masses of the cones?

1	2	3
4	5	6
7	8	9
0	.	-



7

Two triangles are shown.

Which sequence of transformations could be performed on $\triangle EFG$ to show that it is similar to $\triangle JKL$?

Ⓐ Rotate $\triangle EFG$ 90° clockwise about the origin, and then dilate it by a scale factor of $\frac{1}{2}$ with a center of dilation at point F'.

Ⓑ Rotate $\triangle EFG$ 180° clockwise about point E, and then dilate it by a scale factor of 2 with a center of dilation at point E'.

Ⓒ Translate $\triangle EFG$ 1 unit up, then reflect it across the x-axis, and then dilate it by a scale factor of $\frac{1}{2}$ with a center of dilation at point E''.

Ⓓ Reflect $\triangle EFG$ across the x-axis, then reflect it across the line $y = x$, and then dilate it by a scale factor of 2 with a center of dilation at point F''.

Eric explains that all circles are similar using the argument shown.

1. Let there be two circles, circle A and circle B.

2. There exists a translation that can be performed on circle A such that it will have the same center as circle B.

3.

4. Thus, there exists a sequence of transformations that can be performed on circle A in order to obtain circle B.

5. Therefore, circle A is similar to circle B.

6. Since circle A and circle B can be any circles, all circles are similar.

Which statement could be step 3 of the argument?

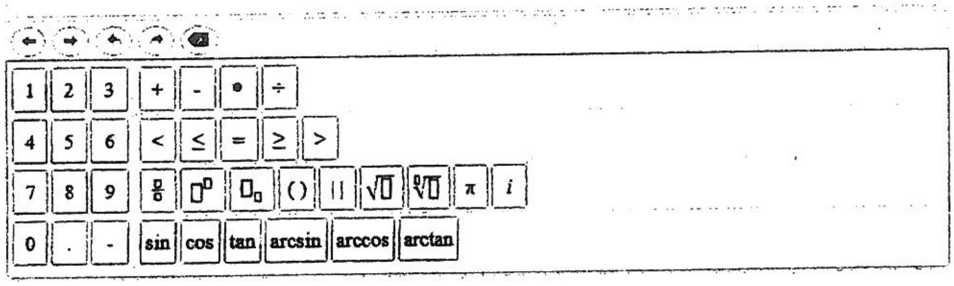
(A) There exists a reflection that can be performed on circle A such that it will have the same radius as circle B.

(B) There exists a dilation that can be performed on circle A such that it will have the same radius as circle B.

(C) There exists a reflection that can be performed on circle B such that it will have the same center as circle A.

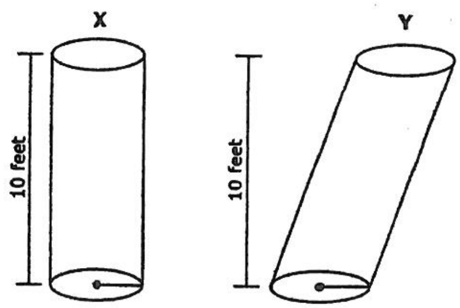
(D) There exists a dilation that can be performed on circle B such that it will have the same center as circle A.

What is the exact perimeter of a parallelogram with vertices at (3, 2), (4, 4), and (6, 1)?



10

Two cylinders, X and Y, are shown. Each cylinder has a height of 10 feet.



Which statement about these cylinders is true?

Ⓐ The volumes of the two cylinders are always equal because they have the same height.

Ⓑ The volume of cylinder Y is always greater because the slant height of cylinder Y is greater than the height of cylinder X.

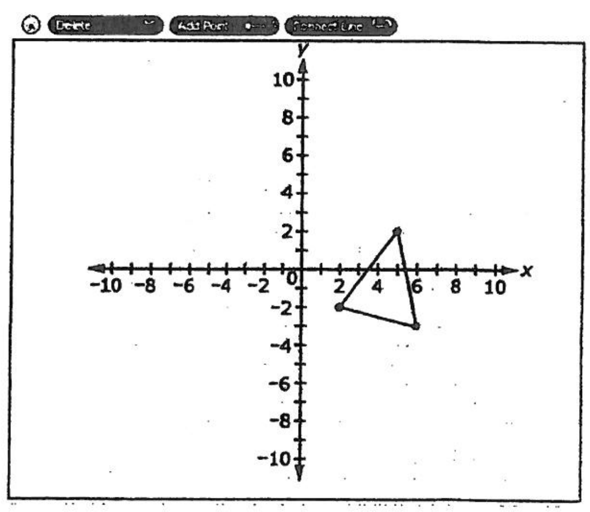
Ⓒ The relationship between the volumes of the two cylinders cannot be determined because the slant height of cylinder Y is not given.

Ⓓ The relationship between the volumes of the two cylinders cannot be determined because the radii of the two cylinders are not given.

11

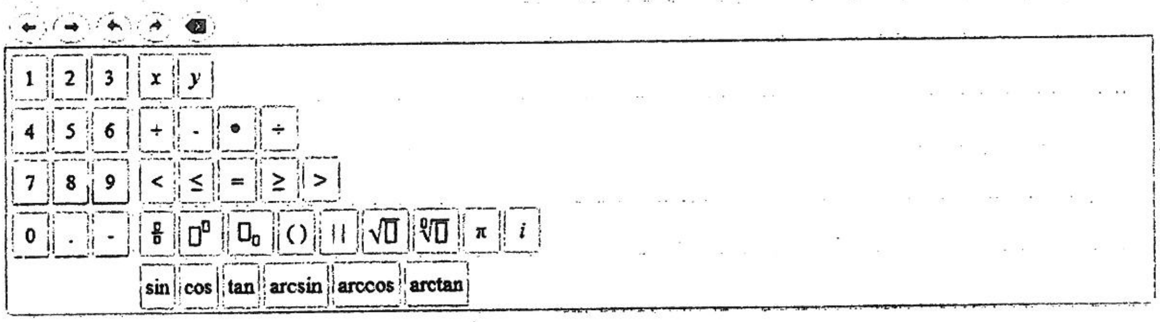
A triangle is shown on the coordinate grid.

Use the Connect Line tool to draw the triangle after a transformation following the rule $(x, y) \rightarrow (x - 4, y + 3)$.



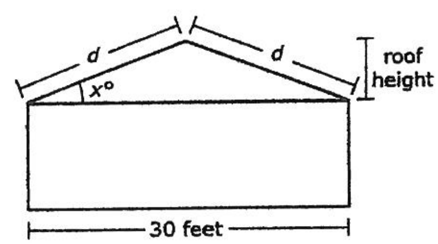
12

Create the equation of a line that is perpendicular to $2y = 14 + \frac{2}{3}x$ and passes through the point $(-2, 8)$.



13

Jeremy is building a garage, as shown. He wants the roof height to be between 3.5 and 5 feet. He must decide the angle measure to use for the pitch, or slant, of the roof when the slant height is d feet.



Which inequality can Jeremy use to ensure that his roof will be within the necessary height range?

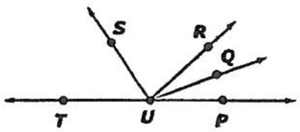
(A) $\frac{3.5}{30} \le \tan(x) \le \frac{5}{30}$

(B) $\frac{3.5}{15} \le \tan(x) \le \frac{5}{15}$

(C) $\frac{3.5}{15} \le \sin(x) \le \frac{5}{15}$

(D) $\frac{3.5}{30} \le \sin(x) \le \frac{5}{30}$

Mikayla is using the following information to prove that $\angle TUS$ and $\angle PUQ$ are complementary angles in the diagram sho



Given: The ray *US* bisects $\angle TUR$ and the ray *UQ* bisects $\angle PUR$.

Part of her proof is shown.

Statements	Reasons
1. $\angle TUR$ and $\angle PUR$ are supplementary angles.	1. *TUP* is a line.
2. $m\angle TUR + m\angle PUR = 180°$	2. Definition of supplementary angles
3. $m\angle TUR = 2 \cdot m\angle TUS$ $m\angle PUR = 2 \cdot m\angle PUQ$	3. Property of angle bisectors
4.	4. Substitution
5.	5. Division property of equality
6. $\angle TUS$ and $\angle PUQ$ are complementary angles.	6. Definition of complementary angles

Which statements could be used to complete Mikayla's proof?

(A) 4. $2 \cdot m\angle TUS = 2 \cdot m\angle PUQ$
5. $m\angle TUS = m\angle PUQ$

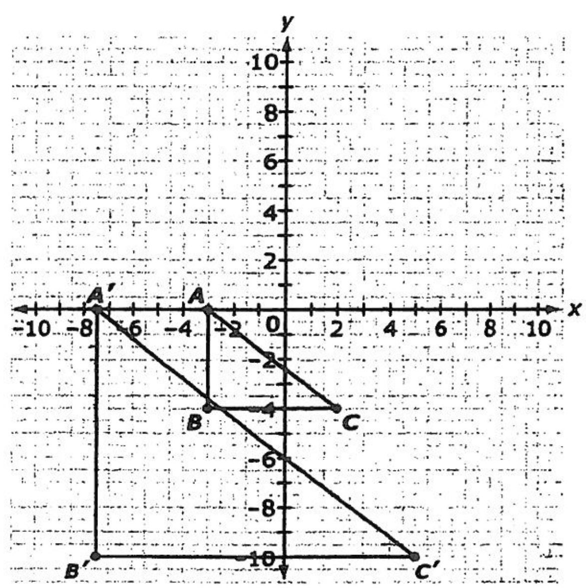
(B) 4. $2 \cdot m\angle TUS = 2 \cdot m\angle PUQ$
5. $m\angle TUS + m\angle PUQ = 90°$

(C) 4. $2 \cdot m\angle TUS + 2 \cdot m\angle PUQ = 180°$
5. $m\angle TUS = m\angle PUQ$

(D) 4. $2 \cdot m\angle TUS + 2 \cdot m\angle PUQ = 180°$
5. $m\angle TUS + m\angle PUQ = 90°$

15

Triangle *ABC* is dilated with a scale factor of *k* and a center of dilation at the origin to obtain triangle *A'B'C'*.



What is the scale factor?

$k =$ ______

16

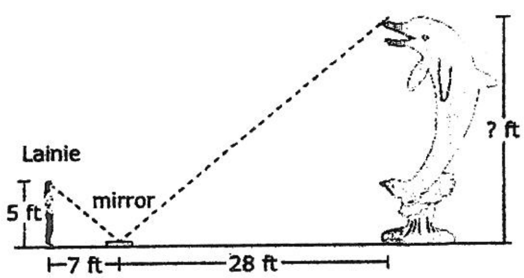
A square is rotated about its center.

Select all of the angles of rotation that will map the square onto itself.

- ☐ 45 degrees
- ☐ 60 degrees
- ☐ 90 degrees
- ☐ 120 degrees
- ☐ 180 degrees
- ☐ 270 degrees

17

Lainie wants to calculate the height of a sculpture. She places a mirror on the ground so that when she looks into the mirror she sees the top of the sculpture, as shown.

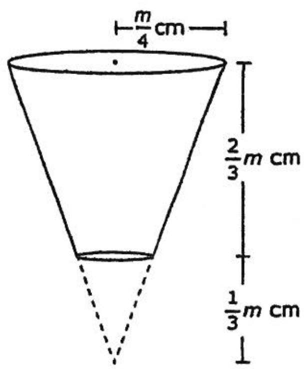


What is the height, in feet, of the sculpture?

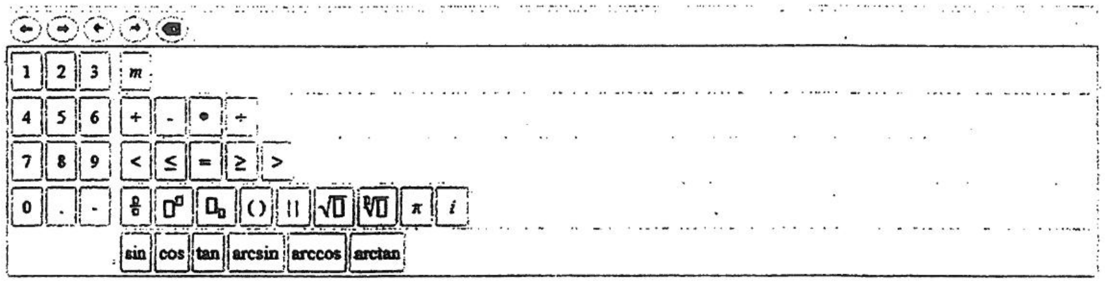
1	2	3
4	5	6
7	8	9
0	.	-

18

A popcorn container is made from a cone with a portion of the cone removed and sealed, as shown. The removed portion of the cone has a height of $\frac{1}{3}m$.

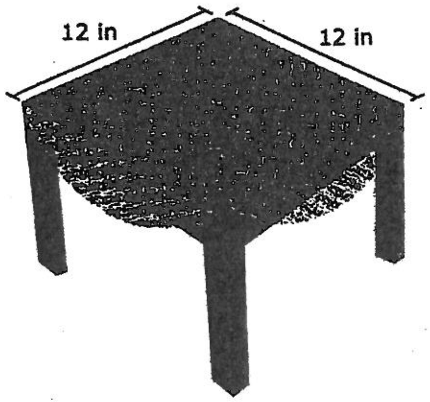


Create an expression, using m, that represents the volume, in cubic centimeters, of the popcorn container.

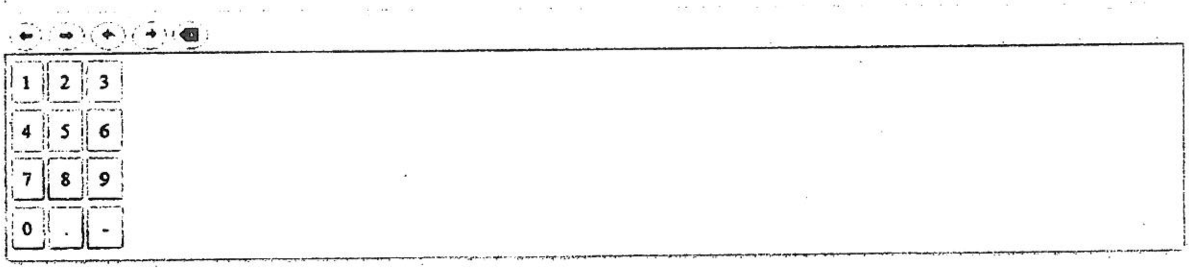


19

Jackson has a table with a square top and he wants to buy a circular piece of lace that will cover the entire top of the table. The top of the table has side lengths of 12 inches, as shown.

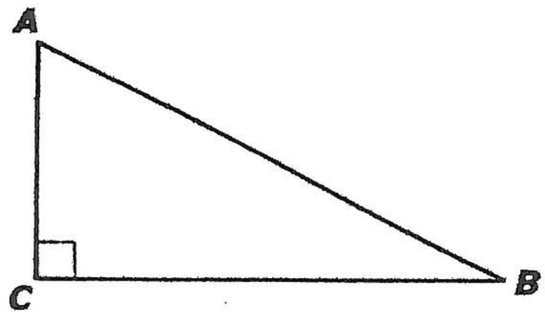


What is the area, in square inches, of the smallest circular piece of lace Jackson could buy? Round your answer to the nearest tenth.



20

Triangle *ABC* is shown.



Which statement must be true?

Ⓐ $\cos(A) = \sin(A)$

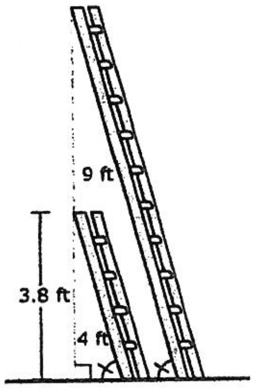
Ⓑ $\cos(A) = \sin(B)$

Ⓒ $\cos(A) = \cos(B)$

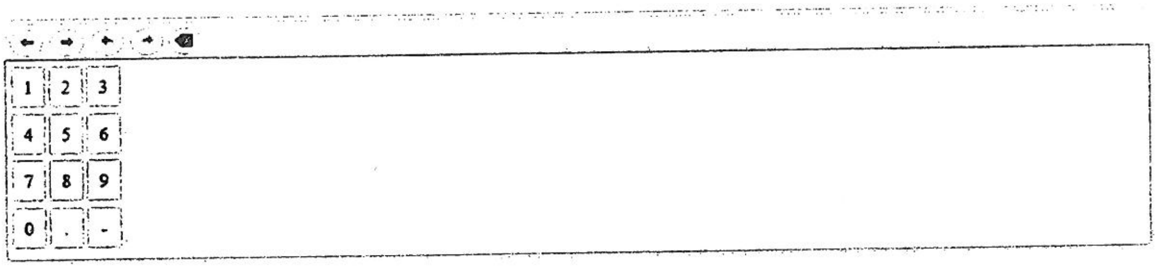
Ⓓ $\sin(A) = \sin(B)$

21

A 9-foot (ft) ladder and a 4-foot ladder are leaning against a house. The two ladders create angles of the same measure with the ground. The 4-foot ladder has a height of 3.8 feet against the house.

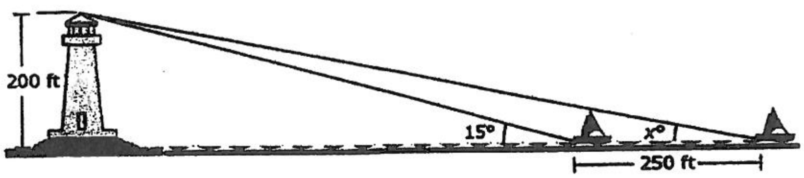


What is the height, in feet, of the 9-foot ladder against the house?



22

Two boats are traveling toward a lighthouse that is 200 feet (ft) above sea level at its top. When the two boats and the lighthouse are collinear, the boats are exactly 250 feet apart and the boat closest to the lighthouse has an angle of elevation to the top of the lighthouse of 15°, as shown.

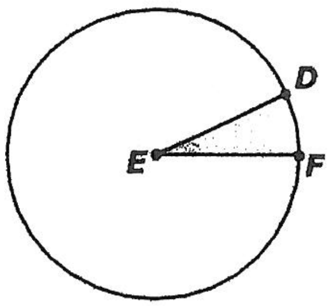


What is the value of x, rounded to the nearest hundredth?

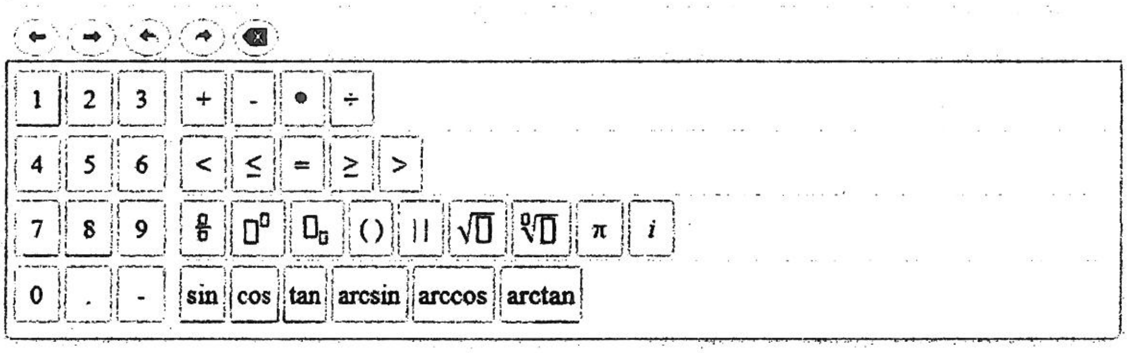
1	2	3
4	5	6
7	8	9
0	.	-

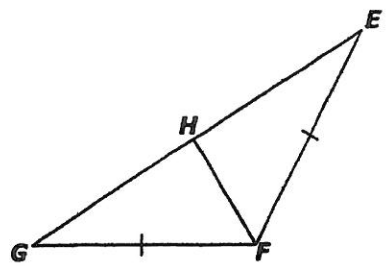
23

Circle E is shown, where $\angle E$ measures 0.44 radians and EF = 7 inches.



What is the area of the shaded region, to the nearest hundredth of a square inch?





Drag statements and reasons to the table to complete the proof that the base angles of the isosceles triangle are congruent.

Statements	Reasons
1. $\overline{FG} \cong \overline{EF}$ and $\overline{FH}$ bisects $\angle EFG$.	1. Given
2. $\angle GFH \cong \angle EFH$	2. Definition of an angle bisector
3.	3.
4.	4.
5. $\angle E \cong \angle G$	5. Corresponding angles of congruent triangles are congruent.

$\overline{FH} \cong \overline{FH}$	Reflexive property
$\overline{EG} \cong \overline{EG}$	$\angle FHG \cong \angle FHE$
Transitive property	SAS theorem
Substitution	SSS theorem
$\triangle GFH \cong \triangle EFH$	AA theorem
$\angle GFH \cong \angle EFH$	

Geometry Practice Answers

1. 3,4
2. (1,2)
3. C
4. A
5. B
6. 838
7. C
8. B
9. $2 \cdot \sqrt{10} + 2 \cdot \sqrt{5}$
10. D
11. (-2,10); (2,0); (1,5)
12. $Y = -3x + 2$
13. B
14. D
15. $K = 2.5$
16. 90°, 180°, 270°
17. 20
18. $1/3m(m/4)^2\pi - 1/3(m/12)^2(m/3)\pi$
19. 226.2
20. B
21. 8.55
22. 11.35
23. 10.78
24. 3. $\overline{FH} \cong \overline{FH}$ 3. Reflexive Property
    4. $\triangle GFH \cong \triangle EFH$ 4. SAS Therem