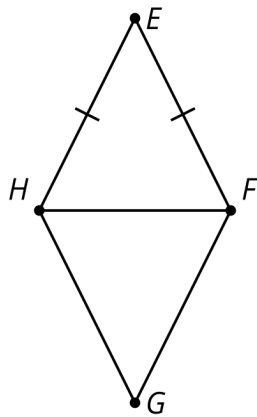


Geometry Summer Review Packet Answer Key

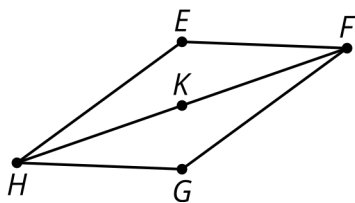
1. Triangle FGH is the image of isosceles triangle FEH after a reflection across line HF . Select **all** the statements that are a result of corresponding parts of congruent triangles being congruent.

$$\overline{FE} \cong \overline{HE}$$

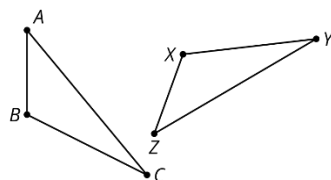


- a. $EFGH$ is a rectangle.
- ☒ b. $EFGH$ has 4 congruent sides.
- ☒ c. Diagonal FH bisects angles EFG and EHG .
- d. Diagonal FH is perpendicular to side FE .
- ☒ e. Angle FEH is congruent to angle FGH .

2. Triangle HEF is the image of triangle FGH after a 180-degree rotation about point K . Select **all** statements that must be true.

	a. Triangle FGH is congruent to triangle FEH. b. Triangle EFH is congruent to triangle GFH. ☒ c. Angle KHE is congruent to angle KFG. d. Angle GKH is congruent to angle KHE. ☒ e. Segment EH is congruent to segment FG. ☒ f. Segment GH is congruent to segment EF.
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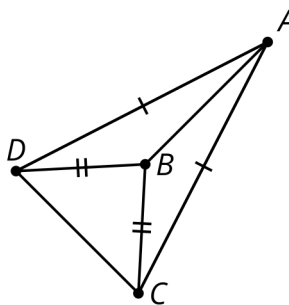
3. The triangles are congruent. Which sequence of rigid motions will take triangle XYZ onto triangle BCA ?



- a. Translate XYZ using directed line segment YC . Rotate $X'Y'Z'$ using C as the center so that X' coincides with B . Reflect $X''Y''Z''$ across line CB .
- b. Translate XYZ using directed line segment YC . Rotate $X'Y'Z'$ using C as the center so that X' coincides with B . Reflect $X''Y''Z''$ across line AC .
- c. Translate XYZ using directed line segment YC . Rotate $X'Y'Z'$ using C as the center so that X' coincides with A . Reflect $X''Y''Z''$ across line CB .
- d. Translate XYZ using directed line segment YC . Rotate $X'Y'Z'$ using C as the center so that X' coincides with A . Reflect $X''Y''Z''$ across line AC .

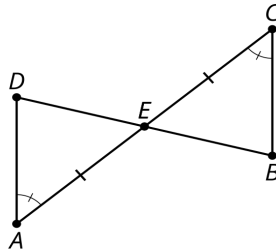
4. Triangles ACD and BCD are isosceles. Angle BAC has a measure of 18 degrees and angle BDC has a measure of 48 degrees. Find the measure of angle ABD .

$$\overline{AD} \cong \overline{AC} \text{ and } \overline{BD} \cong \overline{BC}$$



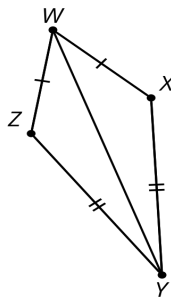
$\angle ABD$ has a measure of 138 degrees.

5. What triangle congruence theorem could you use to prove triangle ADE is congruent to triangle CBE ?



Angle-Side-Angle Triangle Congruence Theorem

6. Mai has proven that triangle WYZ is congruent to triangle WYX using the Side-Side-Side Triangle Congruence Theorem. Why can she now conclude that diagonal WY bisects angles ZWX and ZYX ?



Sample response: Since corresponding parts of congruent triangles are congruent, angle ZWY is congruent to angle XWY , and angle ZYW is congruent to angle XYW . Since the angles are congruent, WY must be the angle bisector.

7. Figure f is a scaled copy of Figure e .

We know:

- $AB = 6$
- $CD = 3$
- $XY = 4$
- $ZW = a$

Select **all** true equations.

a. $\frac{6}{3} = \frac{4}{a}$

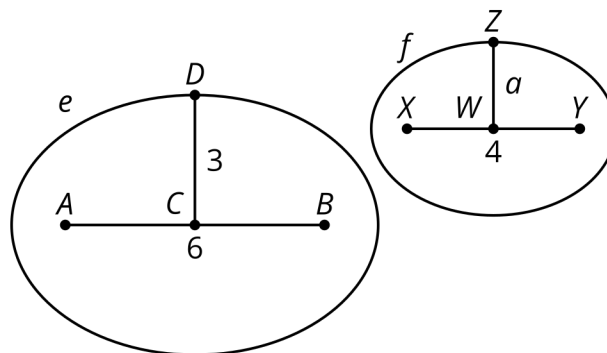
d. $\frac{6}{3} = \frac{a}{4}$

b. $\frac{6}{4} = \frac{3}{a}$

e. $\frac{6}{4} = \frac{a}{3}$

c. $\frac{3}{4} = \frac{6}{a}$

f. $\frac{3}{4} = \frac{a}{6}$



8. A polygon has perimeter 12 units. It is dilated with a scale factor of $\frac{3}{4}$. What is the perimeter of its image?

- a. 9 units
- b. 12 units
- c. 16 units
- d. It cannot be determined.

9. Triangle ABC is taken to triangle $A'B'C'$ by a dilation. Which of these scale factors for the dilation would result in an image that was *larger* than the original figure?

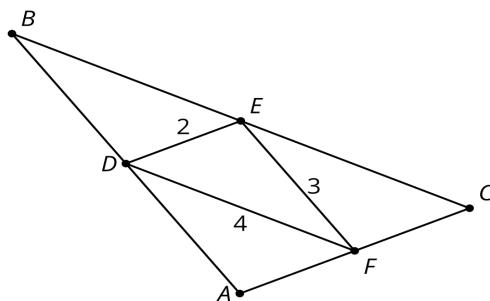
a. $\frac{3}{5}$

b. $\frac{13}{17}$

c. 1

d. $\frac{4}{3}$

10. Triangle DEF is formed by connecting the midpoints of the sides of triangle ABC . The lengths of the sides of DEF are shown. What is the length of AB ?

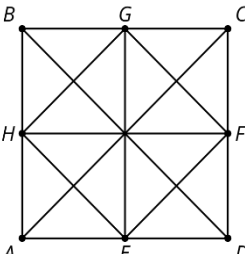


Answer: 6 units

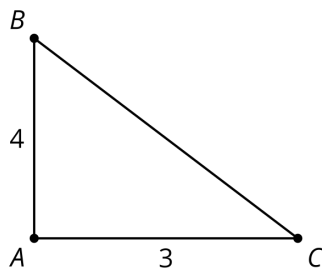
11. In triangle ABC , angle A is 35° and angle B is 20° . Select **all** triangles which are similar to triangle ABC .

- a. triangle DEF where angle D is 35° and angle E is 20°
- b. triangle GHI where angle G is 35° and angle I is 30°
- c. triangle JKL where angle J is 35° and angle L is 125°
- d. triangle MNO where angle N is 20° and angle O is 125°
- e. triangle PQR where angle Q is 20° and angle R is 30°

12. The quilt below is made of squares with diagonals. Side length AB is 2.

	a. What is the length of BD? $\sqrt{8} = 2\sqrt{2} \approx 2.83$ b. What is the area of triangle AEH? $\frac{1}{2}$
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13. Andre says he can find the length of the third side of triangle ABC and it is 5 units. Mai disagrees and thinks that the side length is unknown. Do you agree with either of them? Show or explain your reasoning.

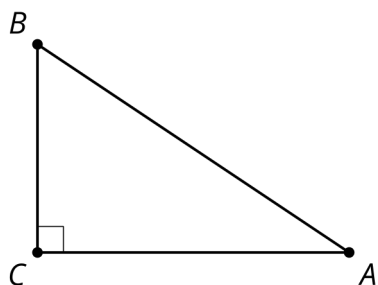


Sample Response: While this looks like a right triangle, there is no evidence it's a right triangle. So, Mai would be correct. However, if angle A is a 90-degree angle, then Andre would be correct.

14. Mai is playing a game with a class of second graders. Mai knows she is exactly 120 inches from the mirror on the floor. She has students stand so that she can just see the top of their heads and then guesses their heights. The students are amazed!

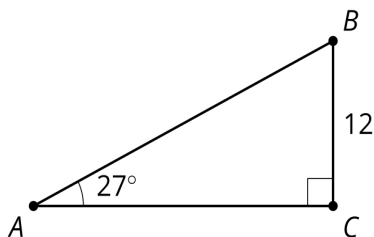
	a. How is Mai so accurate? Sample response: Mai is using similar triangles to determine the heights. She knows that the height of the student must be in the ratio of $\frac{65}{120}$ b. What is the height, h, of the student? The student's height is 39 inches.
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15. Triangle ABC has a right angle at C . Select **all** measurements which would mean it has a hypotenuse with a length of 10 units.



- a. Angle A is 20 degrees, BC is 2 units
- b. AC is 7 units, BC is 3 units
- c. Angle B is 50 degrees, BC is 4 units
- ☒ d. Angle A is 30 degrees, BC is 5 units
- ☒ e. AC is 8 units, BC is 6 units

16. Find the missing measurements of the right triangle.

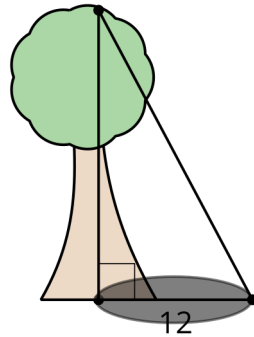


$$\text{Angle } B = 63^\circ$$

$$AB = 26.4 \text{ units}$$

$$AC = 23.6 \text{ units}$$

17. The sun is 62 degrees above the horizon. A tree casts a shadow that is 12 feet long. How tall is the tree? Round your answer to the nearest tenth.



Answer: 22.6 feet

18. The Pyramid of Khufu in Giza, Egypt was the world's tallest free-standing structure for more than 3,500 years. Its original height was about 144 meters. Its base is approximately a square with a side length of 231 meters.

The diagram shows a cross section created by dilating the base using the top of the pyramid as the center of dilation. The cross section is at a height of 96 meters.

	a. What scale factor was used to create the cross section? $\frac{1}{3}$ or $0.\overline{3}$ or 0.333333 b. What are the dimensions of the cross section? 77 m x 77 m
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19. A solid with volume 8 cubic units is dilated by a scale factor of k to obtain a solid with volume V cubic units. Find the value of k which results in an image with each given volume.

- a. 216 cubic units **Answer: 3**
- b. 1 cubic unit **Answer: $\frac{1}{2}$**
- c. 1,000 cubic units **Answer: 5**

20. Find the volume of each solid. Keep any answers with π in terms of π . Make sure you include proper units.

- a. a cylinder with radius 4 inches and height 3 inches **Answer: $48\pi \text{ in}^3$**
- b. a cylinder with radius 3 inches and height 4 inches **Answer: $36\pi \text{ in}^3$**
- c. a hexagonal prism whose base has area 30.5 square centimeters and whose height is 6.5 centimeters **Answer: 198.25 cm^3**
- d. a prism 5 feet tall whose base is a right triangle with leg lengths 6 feet and 7 feet **Answer: 105 ft^3**



21. A prism has a height of 5 inches and a volume of 80 cubic inches. Select **all** figures that could be the base for this prism.

- ☒ a. a square with side length 4 inches
- ☒ b. a 2 inch by 8 inch rectangle
- c. a circle with radius 2 inches
- d. a right triangle with legs 4 inches long
- ☒ e. a heart-shaped base with an area of 16 square inches

22. For each pair of solids, determine if their volumes are the same or different. If the volumes are different, identify the solid with the greatest volume. Explain your reasoning.

- a. A prism and a pyramid have the same height. The pyramid's base has 3 times the area of the prism's base.

Sample Answer: The solids have the same volume. Use B to denote the area of the prism base and h its height. For the prism, $V = Bh$. For the pyramid, $V = \frac{1}{3}(3B)h$.

Multiply the $\frac{1}{3}$ and the 3 and we also get $V = Bh$.

- b. A pyramid and a cylinder have bases with the same area. The cylinder's height is 3 times that of the pyramid.

Sample Answer: The cylinder's volume is greater. Even if the two solids had the same height, the cylinder would have a volume of Bh compared to the pyramid's $\frac{1}{3}Bh$. The increased height of the cylinder makes its volume greater still.

- c. A cone and a cylinder have the same height. The cone's radius is 3 times the length of the cylinder's radius.

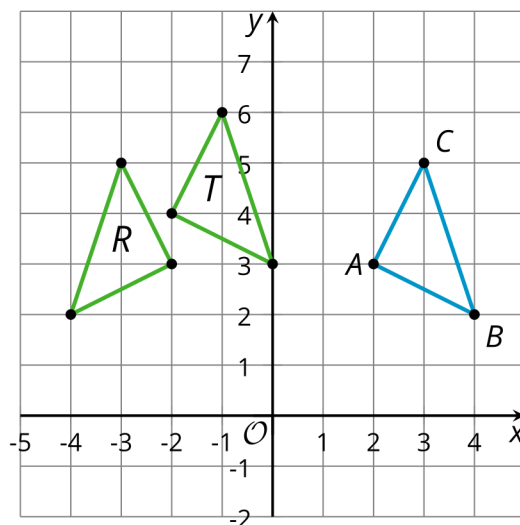
Sample Answer: The cone's volume is greater. Let r denote the radius of the cylinder and h its height. For the cylinder, the volume is $\pi r^2 h$. For the cone, the radius is $3r$.

The area of the cone's base is $\pi(3r)^2$ or $9\pi r^2$. Its volume is $3\pi r^2 h$, because $\frac{1}{3}Bh = \frac{1}{3}9\pi r^2 h$. The cone's volume is 3 times that of the cylinder's



23. a. Draw the image of triangle ABC under the transformation $(x, y) \rightarrow (x - 4, y + 1)$.
Label the result T .
- b. Draw the image of triangle ABC under the transformation $(x, y) \rightarrow (-x, y)$.
Label the result R .

Answer:



24. Write an equation of a circle that is centered at $(-3, 2)$ with a radius of 5.

Answer: $(x + 3)^2 + (y - 2)^2 = 25$

25. Find the center and radius of the circle represented by the equation:

$$x^2 + y^2 + 4x - 10y + 20 = 0.$$

Answer: center: $(-2, 5)$, **radius:** 3 units

