Geometry

SUMMER



ASSIGNMENTS

Montgomery County Public Schools

Greetings and welcome to the Geometry Summer Review Packet!

This summer school packet of mathematics problems aims to review math content you may have learned last year to give you a great start to the upcoming school year.

We encourage you to try some of the problems. You can work on this packet in one sitting, do a few one day, and return to other problems on other days; it is entirely up to you! Our recommendation is to try to do one or two per day.

We hope you have a wonderful summer and look forward to the upcoming school year.

Sincerely,

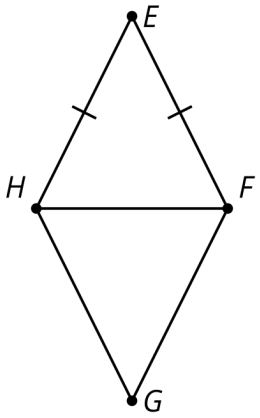
Montgomery County Public Schools Secondary Mathematics Team



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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.

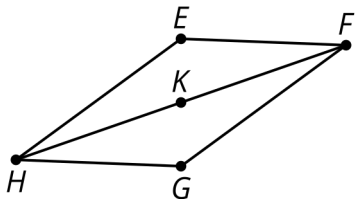
c. Diagonal FH bisects angles EFG and EHG.

d. Diagonal FH is perpendicular to side FE.

e. Angle FEH is congruent to angle FGH.

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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.

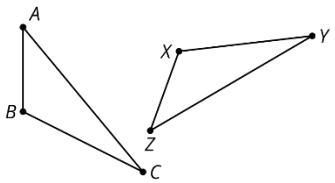
d. Angle GHK is congruent to angle KHE.

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.

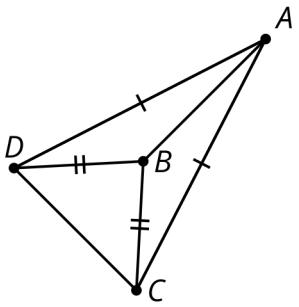
c. Translate XYZ using directed line segment YC. Rotate $X'Y'Z'$ using C as the center so that X' coincides with A. Reflect $X''Y''Z''$ across line CB.

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.

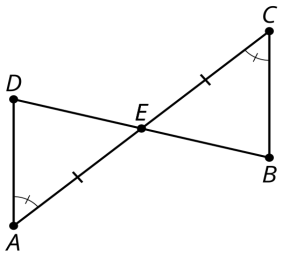
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4. Triangles ACD and BCD are isosceles. Angle BAC has a measure of 18 degrees and angle BDC has a measure of 48 degrees. Find the measure of angle ABD.

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

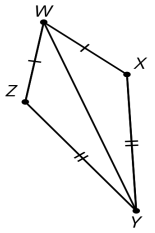


5. What triangle congruence theorem could you use to prove triangle ADE is congruent to triangle CBE?



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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?

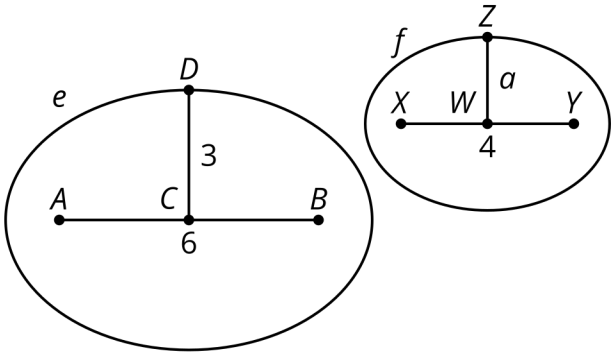


7. Figure f is a scaled copy of Figure e .

We know:

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

Select **all** true equations.



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

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

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

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

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

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

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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. $\frac{3}{5}$

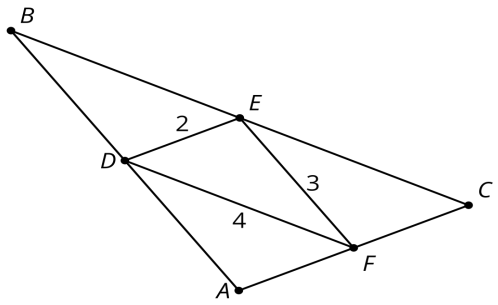
b. $\frac{13}{17}$

c. 1

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

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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?



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

a. triangle DEF where angle D is 35º and angle E is 20º

b. triangle GHI where angle G is 35º and angle I is 30º

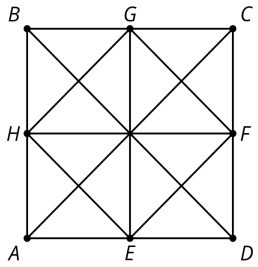
c. triangle JKL where angle J is 35º and angle L is 125º

d. triangle MNO where angle N is 20º and angle O is 125º

e. triangle PQR where angle Q is 20º and angle R is 30º

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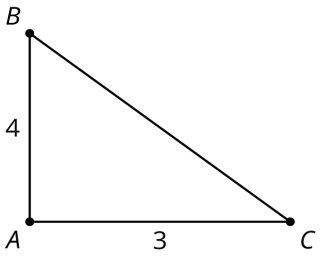
12. The quilt below is made of squares with diagonals. Side length AB is 2.



a. What is the length of BD?

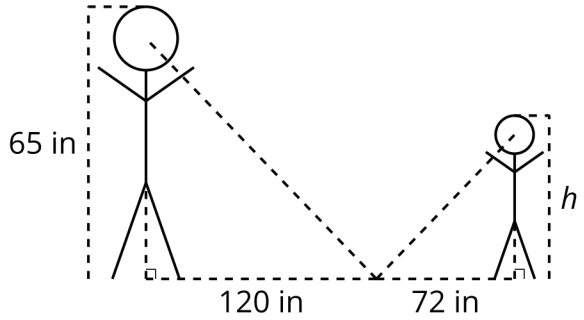
b. What is the area of triangle AEH?

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.



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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!

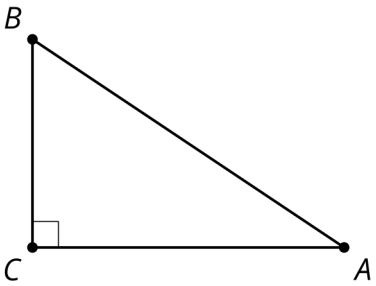


a. How is Mai so accurate?

b. What is the height, h, of the student?

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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

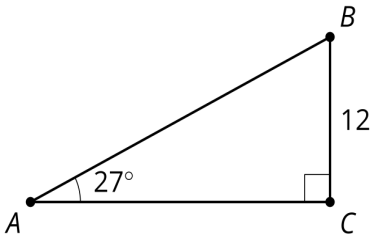
b. AC is 7 units, BC is 3 units

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

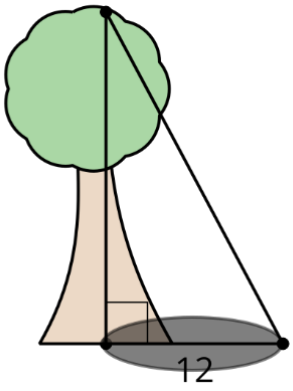
16. Find the missing measurements of the right triangle. Round any sides to the nearest tenth.



$Angle\ B\ =$ _____ $AB\ =$ _____ $AC\ =$ _____

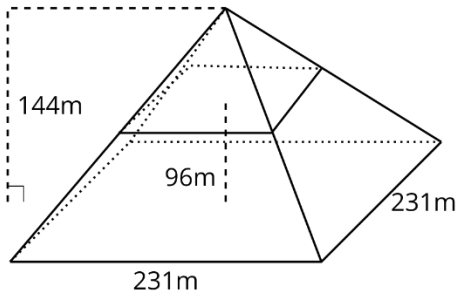
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17. The sun is 62 degrees above the horizon. A tree casts a shadow that is 12 feet long. How tall is the tree? Round your answer to the nearest tenth.



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?

b. What are the dimensions of the cross section?

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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

b. 1 cubic unit

c. 1,000 cubic units

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

b. a cylinder with radius 3 inches and height 4 inches

c. a hexagonal prism whose base has area 30.5 square centimeters and whose height is 6.5 centimeters

d. a prism 5 feet tall whose base is a right triangle with leg lengths 6 feet and 7 feet

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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.

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

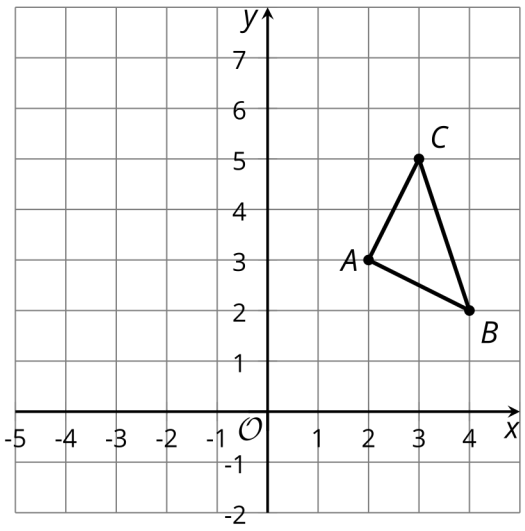
c. A cone and a cylinder have the same height. The cone's radius is 3 times the length of the cylinder's radius.



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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.



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

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

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



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