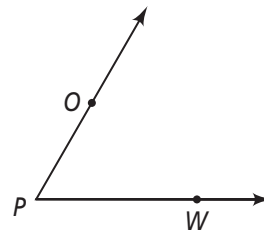# Performance Tasks

Chapter 1

Task 1

Draw and label a figure that meets the following characteristics:

Plane *R* contains points *S, M,* and *Y.* Plane *Z* intersects with plane *R* at $\overleftrightarrow{SM}$. $\overleftrightarrow{AY}$ intersects plane *R* at point *Y.* Point *A* is not in plane *Z* or plane *R.* $\overrightarrow{MY}$ forms a right angle with $\overrightarrow{MS}$.

    a. What is the measure of ∠*SMY?*
    b. Name three points that are noncollinear.
    c. Can you name three points that are noncoplanar in your figure? Explain.

Task 2

Given ∠*OPW* and $\overleftrightarrow{YZ}$, use a straightedge and a compass to construct ∠*ZYX* with measure equal to $90 + \frac{1}{2}m∠OPW$.
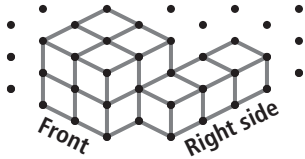
Performance Tasks (continued)

Chapter 1

Task 3

Make an isometric and orthographic drawing for this cube structure.

Task 4

Draw a set of angles that meet the following characteristics:

$\angle SCD$ and $\angle LCM$ are vertical angles. $\angle SCD$ and $\angle LCM$ are both acute.

    a. Classify $\angle LCS$ and $\angle DCM$.

    b. What is $\frac{1}{2}(m\angle SCD + m\angle MCD)$?

    c. Name a straight angle.

Performance Tasks

Chapter 2

Task 1

A car is a vehicle with four wheels.

    a. Explain why the sentence above is not a good definition.

    b. Rewrite the statement as a true conditional with a converse that is false.

    c. Write a similar true conditional with a converse that is true.

Task 2

Write a good definition for a rectangle. Write the definition as a biconditional.
Then write the two conditionals that make up the biconditional.

Performance Tasks (continued)

Chapter 2

Task 3

a. Describe a pair of congruent angles in the diagram at the right and justify how you know they are congruent. Include references to geometric properties of angles formed by intersecting lines.
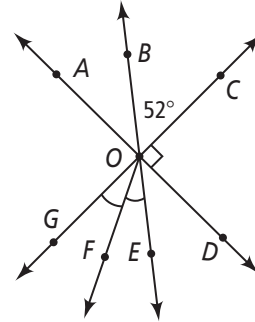
b. Find the measures of two angles in the diagram whose measure is not labeled and explain how you determined the measurements. Include references to geometric properties of angles formed by intersecting lines.

Performance Tasks

Chapter 3

Task 1

a. Finish labeling the figure, given the following: lines *a* and *b* are cut by transversal *t;* ∠3 and ∠8 are same-side interior angles; ∠4 and ∠6 are corresponding angles, as are ∠7 and ∠3; and ∠5 and ∠3 are alternate interior angles.
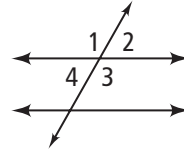
b. Name three different conditions, each involving ∠8 and another angle, any one of which is sufficient to guarantee that *a* ∥ *b*.

c. If *a* ∥ *b* and $m\angle 1 = 105$, give the measures of the other seven angles.

d. Write a flow proof for the following statement: If ∠7 and ∠4 are supplementary, then *a* ∥ *b*.

Task 2

Draw $\overleftrightarrow{AB}$. Construct $\overleftrightarrow{PB} \perp \overleftrightarrow{AB}$.

Then construct $\overleftrightarrow{PQ} \parallel \overleftrightarrow{AB}$.

Performance Tasks (continued)

Chapter 3

Task 3

In a coordinate plane, draw two parallel lines, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$, with $\overline{AB} \cong \overline{CD}$.
   a. Write the equations for $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$. How do the equations show that they are parallel?

   b. Draw $\overline{AC}$ and $\overline{BC}$. Measure each angle in $\triangle ABC$. What is the sum of the angle measures? What should the sum be? Explain any discrepancy.

Task 4
   a. Write the slopes of two perpendicular lines.

   b. Write equations for two parallel lines using the positive slope in part (a).

   c. Write equations for two parallel lines using the negative slope in part (a).

   d. Are both lines in part (b) perpendicular to both lines in part (c)? How do you know?
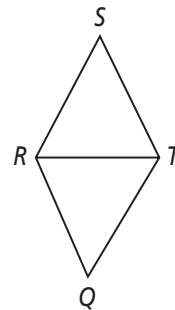
Performance Tasks

Chapter 4

Task 1

Draw and label three pairs of triangles to illustrate the Side-Side-Side, Angle-Side-Angle, and Side-Angle-Side Postulates. One pair of triangles should share a common side. The figures should provide enough information to prove that they are congruent. Write the congruence statements for each pair.

Task 2

A rhombus is a quadrilateral with four congruent sides.

Given: $RSTQ$ is a quadrilateral, $\angle SRT \cong \angle STR \cong \angle RTQ \cong \angle TRQ$.

Prove: $RSTQ$ is a rhombus.

Performance Tasks (continued)

Chapter 4

Task 3

You need to design a company logo. The requirements for the logo are as listed:

- The logo must include at least six triangles.
- Some of the triangles should overlap.
- Some of the triangles should share sides.
- One triangle needs to be isosceles.
- One triangle needs to be equilateral.
- At least two pairs of triangles should be congruent pairs.

Use a straightedge, compass, and protractor to aid in your design.

Label the vertices of the triangles and describe as many congruencies as you can (sides and angles).

Describe two pairs of congruent triangles in your design and justify how you know they are congruent. Include references to geometric theorems and postulates.

Performance Tasks

Chapter 5

Task 1

Draw $\triangle ABC$. Construct the perpendicular bisector of each side. Label the point of concurrency *D*.

Draw $\triangle UVW$. Construct the angle bisectors of each vertex angle. Label the point of concurrency *X*.

Task 2

Terri wants to make a triangular design on her driveway. She wants to paint an 8-ft green line on one side, a 17-ft blue line on the second side, and an 8-ft yellow line on the third side. Write a convincing argument using indirect reasoning to show that Terri's design is not possible.

Performance Tasks (continued)

Chapter 5

Task 3

Draw △*MNO* such that its circumcenter lies outside the triangle. Construct the necessary segments to find the circumcenter. Label the circumcenter *L.* Make a statement about where the orthocenter lies in relation to your triangle. Construct the segments needed to find the orthocenter. Label the orthocenter *K.*

Task 4

Draw an illustration of the Triangle Hinge Theorem. Use two triangles. Be sure to label the triangles in such a way that the important requirements of the Triangle Hinge Theorem can be understood from the diagram.