1 The diagram below shows the construction of the bisector of $\angle ABC$.



2 A student used a compass and a straightedge to construct \overline{CE} in $\triangle ABC$ as shown below.

Which statement must always be true for this construction?

- $\begin{array}{ll} 1) & \angle CEA \cong \angle CEB \\ \hline 2) & \angle ACE \cong \angle BCE \end{array}$
- 3) $\overline{AE} \cong \overline{BE}$
- 4) $\overline{EC} \cong \overline{AC}$



3 Based on the construction below, which statement must be true?

1)
$$m \angle ABD = \frac{1}{2} m \angle CBD$$

2) $m \angle ABD = m \angle CBD$
3) $m \angle ABD = m \angle ABC$
4) $m \angle CBD = \frac{1}{2} m \angle ABD$



4 A straightedge and compass were used to create the construction below. Arc *EF* was drawn from point *B*, and arcs with equal radii were drawn from *E* and *F*.

Which statement is *false*?

- 1) $m \angle ABD = m \angle DBC$
- 2) $\frac{1}{2} (m \angle ABC) = m \angle ABD$
- 3) $2(m \angle DBC) = m \angle ABC$
- <mark>4)</mark> 2(m∠ABC) = m∠CBD



5 As shown in the diagram below of $\triangle ABC$, a compass is used to find points D and E, equidistant from point A. Next, the compass is used to find point F, equidistant from points D

and *E*. Finally, a straightedge is used to draw \overrightarrow{AF} . Then, point *G*, the intersection of \overrightarrow{AF} and side \overrightarrow{BC} of $\triangle ABC$, is labeled.





6 Which diagram shows the construction of a 45° angle?



7 Which illustration shows the correct construction of an angle bisector?





- 1 One step in a construction uses the endpoints of \overline{AB} to create arcs with the same radii. The arcs intersect above and below the segment. What is the relationship of \overline{AB} and the line connecting the points of intersection of these arcs?
 - 1) collinear
 - 2) congruent
 - 3) parallel
 - 4) perpendicular
- 2 Line segment *AB* is shown in the diagram below.

Which two sets of construction marks, labeled I, II, III, and IV, are part of the construction of the perpendicular bisector of line segment *AB*?

- 1) land ll
- <mark>2)</mark> I and III
- 3) II and III
- 4) II and IV
- 3 In the construction shown below, \overline{CD} is drawn.



- In $\triangle ABC$, \overline{CD} is the
 - 1) perpendicular bisector of side \overline{AB}
 - 2) median to side AB
 - 3) altitude to side \overline{AB}
 - 4) bisector of ∠ACB
- 4 The diagram below shows the construction of the perpendicular bisector of \overline{AB} .



- 1) AC = CB2) $CB = \frac{1}{2}AB$ 3) AC = 2AB
- $4) \quad AC + CB = AB$



- 5 Based on the construction below, which conclusion is *not* always true?
 - 1) $\overline{AB} \perp \overline{CD}$
 - **2)** $\quad AB = CD$
 - AE = EB
 - $\frac{4}{2} CE = DE$



6 Which diagram shows the construction of the perpendicular bisector of \overline{AB} ?



1 The diagram below illustrates the construction of \overrightarrow{PS} parallel to \overrightarrow{RQ} through point P.

Which statement justifies this construction?

- <mark>1)</mark> m∠1 = m∠2
- 2) $\underline{m} \leq 1 = \underline{m} \leq 3$
- 3) $\overline{PR} \cong \overline{RQ}$
- 4) $\overline{PS} \cong \overline{RQ}$



- 2 Which geometric principle is used to justify the construction below?
 - 1) A line perpendicular to one of two parallel lines is perpendicular to the other.
 - 2) Two lines are perpendicular if they intersect to form congruent adjacent angles.
 - When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel.
 - 4) When two lines are intersected by a transversal and the corresponding angles are congruent, the lines are parallel.



3 The diagram below shows the construction of \overrightarrow{AB} through point P parallel to \overrightarrow{CD} .

Which theorem justifies this method of construction?

- If two lines in a plane are perpendicular to a transversal at different points, then the lines are parallel.
- If two lines in a plane are cut by a transversal to form congruent corresponding angles, then the lines are parallel.
- 3) If two lines in a plane are cut by a transversal to form congruent alternate interior angles, then the lines are parallel.
- 4) If two lines in a plane are cut by a transversal to form congruent alternate exterior angles, then the lines are parallel.



4 The diagram below shows the construction of line m, parallel to line ℓ , through point P.

Which theorem was used to justify this construction?

- If two lines are cut by a transversal and the alternate interior angles are congruent, the lines are parallel.
- 2) If two lines are cut by a transversal and the interior angles on the same side are supplementary, the lines are parallel.
- 3) If two lines are perpendicular to the same line, they are parallel.
- If two lines are cut by a transversal and the corresponding angles are congruent, they are parallel.



5 Which construction of parallel lines is justified by the theorem "If two lines are cut by a transversal to form congruent alternate interior angles, then the lines are parallel"?



6 The diagram below shows the construction of a line through point *P*perpendicular to line .

Which statement is demonstrated by this construction?

- If a line is parallel to a line that is perpendicular to a third line, then the line is also perpendicular to the third line.
- 2) The set of points equidistant from the endpoints of a line segment is the perpendicular bisector of the segment.
- 3) Two lines are perpendicular if they are equidistant from a given point.
- 4) Two lines are perpendicular if they intersect to form a vertical line.
- 7 In the accompanying diagram of a construction, what does \overline{PC} represent?
 - 1) an altitude drawn to \overline{AB}
 - 2) a median drawn to \overline{AB}
 - 3) the bisector of $\angle APB$
 - 4) the perpendicular bisector of \overline{AB}





8 Which diagram illustrates a correct construction of an altitude of $\triangle ABC$?



1 Which diagram shows the construction of an equilateral triangle?



2 Which diagram represents a correct construction of equilateral $\triangle ABC$, given side \overline{AB} ? 1) C 3) C







3 The diagram below shows the construction of an equilateral triangle.

Which statement justifies this construction?

- 1) $\angle A + \angle B + \angle C = 180$
- 2) $\underline{m \angle A} = \underline{m \angle B} = \underline{m \angle C}$
- AB = AC = BC
- $4) \quad \overline{AB + BC > AC}$

