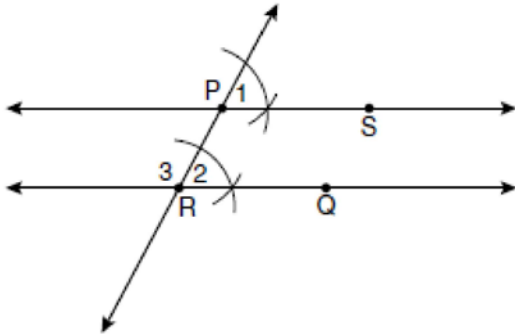


**G.G.19: Constructions: Construct lines parallel (or perpendicular) to a given line through a given point, using a straightedge and compass, and justify the construction**

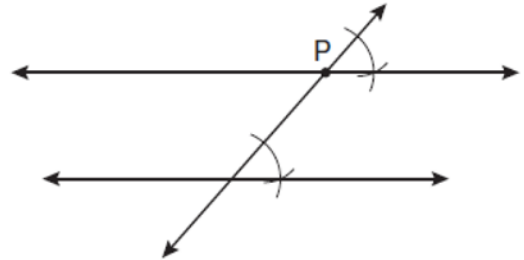
- 1 The diagram below illustrates the construction of  $\overleftrightarrow{PS}$  parallel to  $\overleftrightarrow{RQ}$  through point  $P$ .



Which statement justifies this construction?

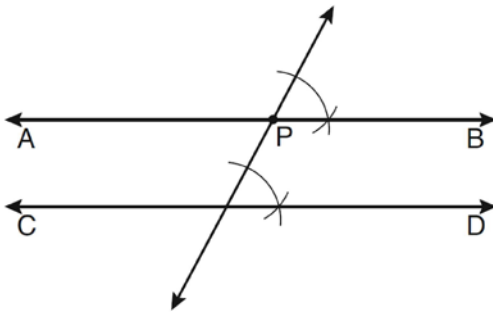
- 1)  $m\angle 1 = m\angle 2$
- 2)  $m\angle 1 = m\angle 3$
- 3)  $\overline{PR} \cong \overline{RQ}$
- 4)  $\overline{PS} \cong \overline{RQ}$

- 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.
- 3) 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.

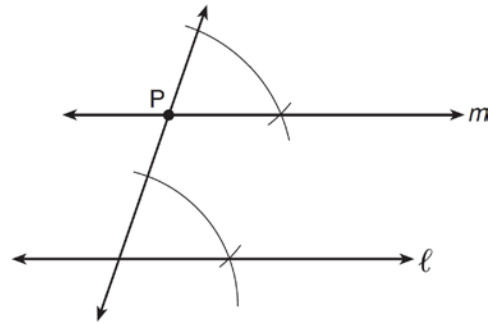
- 3 The diagram below shows the construction of  $\overleftrightarrow{AB}$  through point  $P$  parallel to  $\overleftrightarrow{CD}$ .



Which theorem justifies this method of construction?

- 1) If two lines in a plane are perpendicular to a transversal at different points, then the lines are parallel.
- 2) 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.

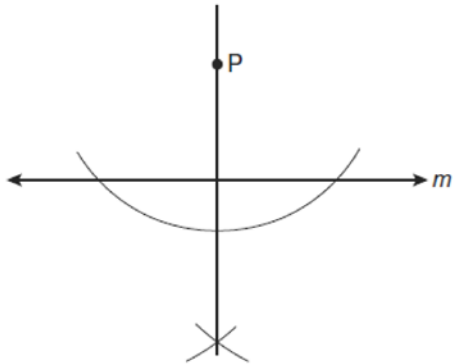
- 4 The diagram below shows the construction of line  $m$ , parallel to line  $\ell$ , through point  $P$ .



Which theorem was used to justify this construction?

- 1) 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.
- 4) If two lines are cut by a transversal and the corresponding angles are congruent, they are parallel.

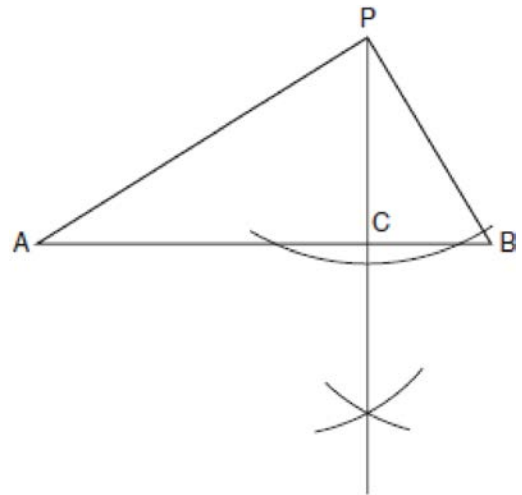
- 5 The diagram below shows the construction of a line through point  $P$  perpendicular to line  $m$ .



Which statement is demonstrated by this construction?

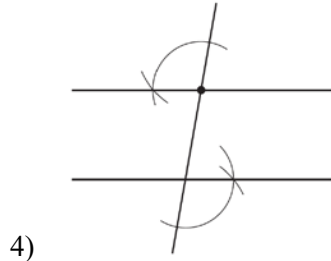
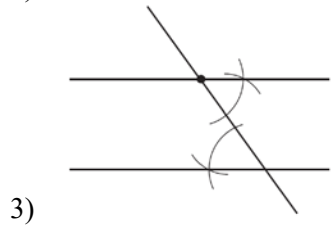
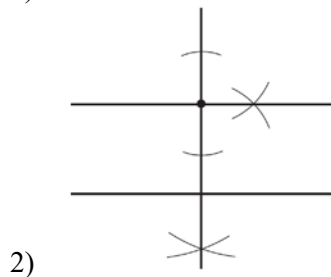
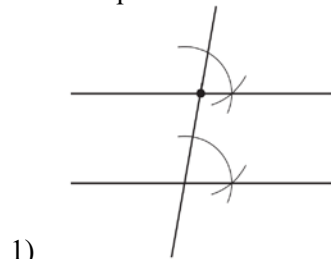
- 1) If a line is parallel to a line that is perpendicular to a third line, then the line is also perpendicular to the third line.
- 2) The set of points equidistant from the endpoints of a line segment is the perpendicular bisector of the segment.
- 3) Two lines are perpendicular if they are equidistant from a given point.
- 4) Two lines are perpendicular if they intersect to form a vertical line.

- 6 In the accompanying diagram of a construction, what does  $\overline{PC}$  represent?

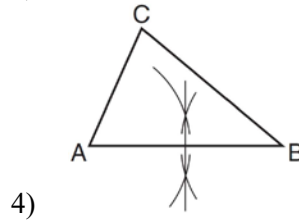
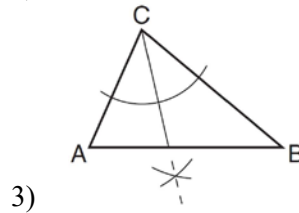
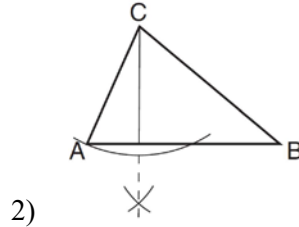
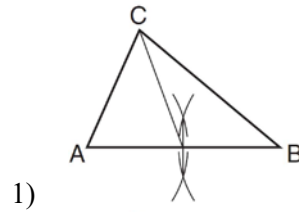


- 1) an altitude drawn to  $\overline{AB}$
- 2) a median drawn to  $\overline{AB}$
- 3) the bisector of  $\angle APB$
- 4) the perpendicular bisector of  $\overline{AB}$

- 7 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"?



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

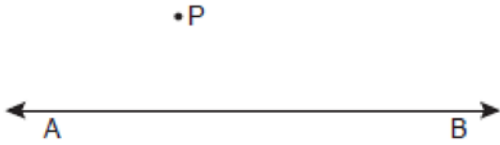


- 9 Using a compass and straightedge, construct a line that passes through point  $P$  and is perpendicular to line  $m$ . [Leave all construction marks.]

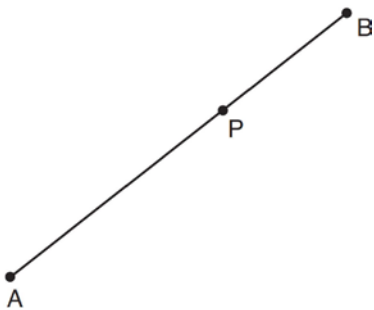
•  $P$



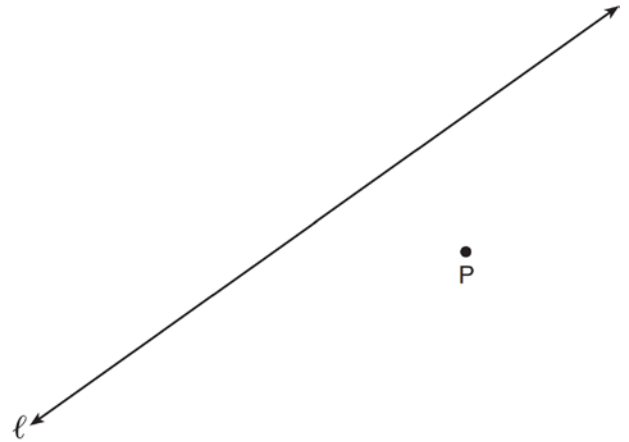
- 10 Using a compass and straightedge, construct the line that is perpendicular to  $\overleftrightarrow{AB}$  and that passes through point  $P$ . Show all construction marks.



- 11 Using a compass and straightedge, construct a line perpendicular to  $\overline{AB}$  through point  $P$ . [Leave all construction marks.]



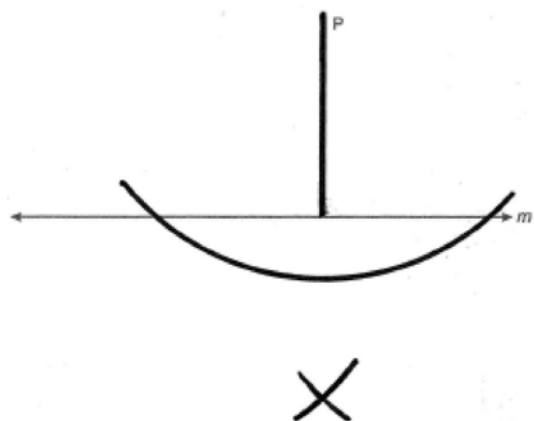
- 12 Using a compass and straightedge, construct a line perpendicular to line  $\ell$  through point  $P$ . [Leave all construction marks.]



**G.G.19: Constructions: Construct lines parallel (or perpendicular) to a given line through a given point, using a straightedge and compass, and justify the construction**

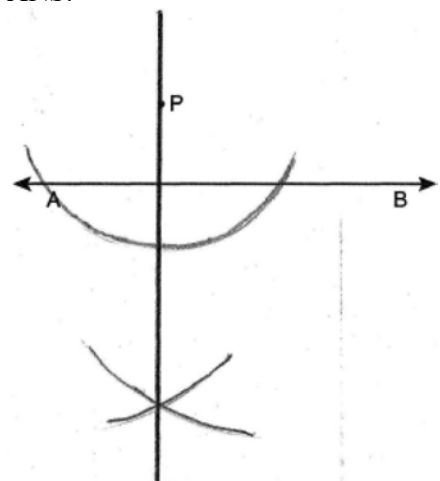
### Answer Section

- |   |        |                 |
|---|--------|-----------------|
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| 2 | ANS: 4 | REF: 011009ge   |
| 3 | ANS: 2 | REF: 061208ge   |
| 4 | ANS: 4 | REF: 081313ge   |
| 5 | ANS: 2 | REF: 061020ge   |
| 6 | ANS: 1 | REF: 010420a    |
| 7 | ANS: 3 | REF: 081512ge   |
| 8 | ANS: 2 | REF: 061512ge   |
| 9 | ANS:   |                 |



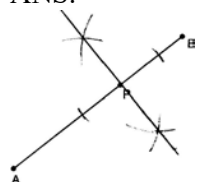
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- 10 ANS:



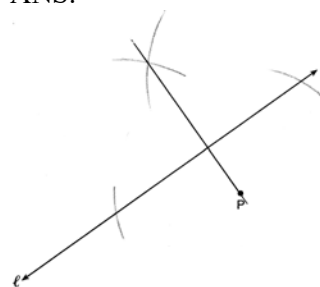
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11 ANS:



REF: 081233ge

12 ANS:



REF: 011333ge