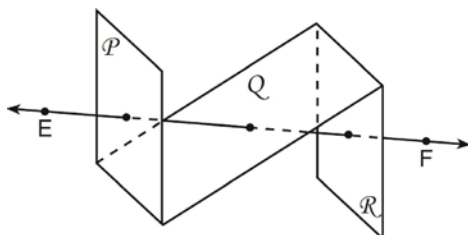


**G.G.9: Planes: Know and apply that if two planes are perpendicular to the same line, they are parallel**

- 1 As shown in the diagram below,  $\overleftrightarrow{EF}$  intersects planes  $\mathcal{P}$ ,  $\mathcal{Q}$ , and  $\mathcal{R}$ .



If  $\overleftrightarrow{EF}$  is perpendicular to planes  $\mathcal{P}$  and  $\mathcal{R}$ , which statement must be true?

- 1) Plane  $\mathcal{P}$  is perpendicular to plane  $\mathcal{Q}$ .
  - 2) Plane  $\mathcal{R}$  is perpendicular to plane  $\mathcal{P}$ .
  - 3) Plane  $\mathcal{P}$  is parallel to plane  $\mathcal{Q}$ .
  - 4) Plane  $\mathcal{R}$  is parallel to plane  $\mathcal{P}$ .
- 2 Line  $k$  is drawn so that it is perpendicular to two distinct planes,  $\mathcal{P}$  and  $\mathcal{R}$ . What must be true about planes  $\mathcal{P}$  and  $\mathcal{R}$ ?
- 1) Planes  $\mathcal{P}$  and  $\mathcal{R}$  are skew.
  - 2) Planes  $\mathcal{P}$  and  $\mathcal{R}$  are parallel.
  - 3) Planes  $\mathcal{P}$  and  $\mathcal{R}$  are perpendicular.
  - 4) Plane  $\mathcal{P}$  intersects plane  $\mathcal{R}$  but is not perpendicular to plane  $\mathcal{R}$ .
- 3 Plane  $\mathcal{R}$  is perpendicular to line  $k$  and plane  $\mathcal{D}$  is perpendicular to line  $k$ . Which statement is correct?
- 1) Plane  $\mathcal{R}$  is perpendicular to plane  $\mathcal{D}$ .
  - 2) Plane  $\mathcal{R}$  is parallel to plane  $\mathcal{D}$ .
  - 3) Plane  $\mathcal{R}$  intersects plane  $\mathcal{D}$ .
  - 4) Plane  $\mathcal{R}$  bisects plane  $\mathcal{D}$ .
- 4 If line  $\ell$  is perpendicular to distinct planes  $\mathcal{P}$  and  $\mathcal{Q}$ , then planes  $\mathcal{P}$  and  $\mathcal{Q}$
- 1) are parallel
  - 2) contain line  $\ell$
  - 3) are perpendicular
  - 4) intersect, but are *not* perpendicular
- 5 Plane  $\mathcal{P}$  is parallel to plane  $\mathcal{Q}$ . If plane  $\mathcal{P}$  is perpendicular to line  $\ell$ , then plane  $\mathcal{Q}$
- 1) contains line  $\ell$
  - 2) is parallel to line  $\ell$
  - 3) is perpendicular to line  $\ell$
  - 4) intersects, but is not perpendicular to line  $\ell$
- 6 If two distinct planes,  $\mathcal{A}$  and  $\mathcal{B}$ , are perpendicular to line  $c$ , then which statement is true?
- 1) Planes  $\mathcal{A}$  and  $\mathcal{B}$  are parallel to each other.
  - 2) Planes  $\mathcal{A}$  and  $\mathcal{B}$  are perpendicular to each other.
  - 3) The intersection of planes  $\mathcal{A}$  and  $\mathcal{B}$  is a line parallel to line  $c$ .
  - 4) The intersection of planes  $\mathcal{A}$  and  $\mathcal{B}$  is a line perpendicular to line  $c$ .

- 7 Plane  $\mathcal{A}$  and plane  $\mathcal{B}$  are two distinct planes that are both perpendicular to line  $\ell$ . Which statement about planes  $\mathcal{A}$  and  $\mathcal{B}$  is true?
- 1) Planes  $\mathcal{A}$  and  $\mathcal{B}$  have a common edge, which forms a line.
  - 2) Planes  $\mathcal{A}$  and  $\mathcal{B}$  are perpendicular to each other.
  - 3) Planes  $\mathcal{A}$  and  $\mathcal{B}$  intersect each other at exactly one point.
  - 4) Planes  $\mathcal{A}$  and  $\mathcal{B}$  are parallel to each other.
- 8 If distinct planes  $\mathcal{R}$  and  $\mathcal{S}$  are both perpendicular to line  $\ell$ , which statement must always be true?
- 1) Plane  $\mathcal{R}$  is parallel to plane  $\mathcal{S}$ .
  - 2) Plane  $\mathcal{R}$  is perpendicular to plane  $\mathcal{S}$ .
  - 3) Planes  $\mathcal{R}$  and  $\mathcal{S}$  and line  $\ell$  are all parallel.
  - 4) The intersection of planes  $\mathcal{R}$  and  $\mathcal{S}$  is perpendicular to line  $\ell$ .
- 9 A support beam between the floor and ceiling of a house forms a  $90^\circ$  angle with the floor. The builder wants to make sure that the floor and ceiling are parallel. Which angle should the support beam form with the ceiling?
- 1)  $45^\circ$
  - 2)  $60^\circ$
  - 3)  $90^\circ$
  - 4)  $180^\circ$

**G.G.9: Planes: Know and apply that if two planes are perpendicular to the same line, they are parallel**

**Answer Section**

1	ANS: 4	REF: 061203ge
2	ANS: 2	REF: fall0806ge
3	ANS: 2	REF: 011109ge
4	ANS: 1	REF: 081323ge
5	ANS: 3	REF: 061401ge
6	ANS: 1	REF: 061108ge
7	ANS: 4	REF: 011306ge
8	ANS: 1	REF: 011404ge
9	ANS: 3	REF: 081002ge