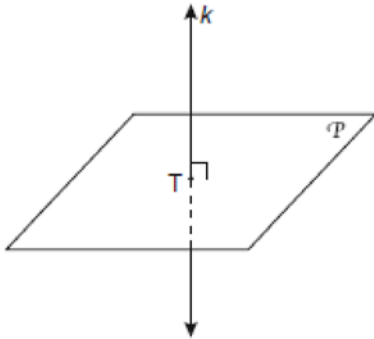


**G.CO.A.1: Planes 1**

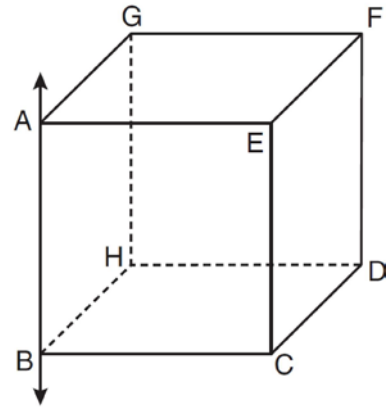
- 1 In the diagram below, line  $k$  is perpendicular to plane  $\mathcal{P}$  at point  $T$ .



Which statement is true?

- 1) Any point in plane  $\mathcal{P}$  also will be on line  $k$ .
- 2) Only one line in plane  $\mathcal{P}$  will intersect line  $k$ .
- 3) All planes that intersect plane  $\mathcal{P}$  will pass through  $T$ .
- 4) Any plane containing line  $k$  is perpendicular to plane  $\mathcal{P}$ .

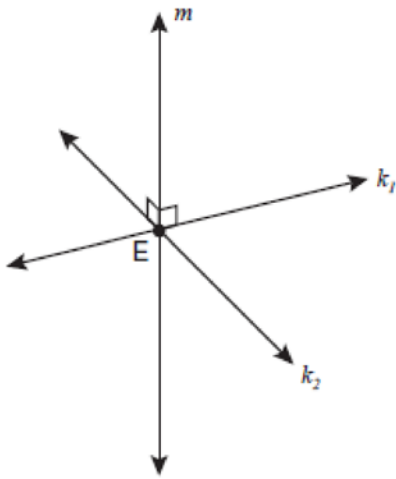
- 2 In the diagram below,  $\overleftrightarrow{AB}$  is perpendicular to plane  $AEFG$ .



Which plane must be perpendicular to plane  $AEFG$ ?

- 1)  $ABCE$
- 2)  $BCDH$
- 3)  $CDFE$
- 4)  $HDFG$

- 3 Lines  $k_1$  and  $k_2$  intersect at point  $E$ . Line  $m$  is perpendicular to lines  $k_1$  and  $k_2$  at point  $E$ .



Which statement is always true?

- 1) Lines  $k_1$  and  $k_2$  are perpendicular.
  - 2) Line  $m$  is parallel to the plane determined by lines  $k_1$  and  $k_2$ .
  - 3) Line  $m$  is perpendicular to the plane determined by lines  $k_1$  and  $k_2$ .
  - 4) Line  $m$  is coplanar with lines  $k_1$  and  $k_2$ .
- 4 If two different lines are perpendicular to the same plane, they are
- 1) collinear
  - 2) coplanar
  - 3) congruent
  - 4) consecutive
- 5 Point  $P$  lies on line  $m$ . Point  $P$  is also included in distinct planes  $Q$ ,  $R$ ,  $S$ , and  $T$ . At most, how many of these planes could be perpendicular to line  $m$ ?
- 1) 1
  - 2) 2
  - 3) 3
  - 4) 4

- 6 In plane  $\mathcal{P}$ , lines  $m$  and  $n$  intersect at point  $A$ . If line  $k$  is perpendicular to line  $m$  and line  $n$  at point  $A$ , then line  $k$  is
- 1) contained in plane  $\mathcal{P}$
  - 2) parallel to plane  $\mathcal{P}$
  - 3) perpendicular to plane  $\mathcal{P}$
  - 4) skew to plane  $\mathcal{P}$
- 7 Lines  $j$  and  $k$  intersect at point  $P$ . Line  $m$  is drawn so that it is perpendicular to lines  $j$  and  $k$  at point  $P$ . Which statement is correct?
- 1) Lines  $j$  and  $k$  are in perpendicular planes.
  - 2) Line  $m$  is in the same plane as lines  $j$  and  $k$ .
  - 3) Line  $m$  is parallel to the plane containing lines  $j$  and  $k$ .
  - 4) Line  $m$  is perpendicular to the plane containing lines  $j$  and  $k$ .
- 8 In three-dimensional space, two planes are parallel and a third plane intersects both of the parallel planes. The intersection of the planes is a
- 1) plane
  - 2) point
  - 3) pair of parallel lines
  - 4) pair of intersecting lines
- 9 Line  $k$  is drawn so that it is perpendicular to two distinct planes,  $P$  and  $R$ . What must be true about planes  $P$  and  $R$ ?
- 1) Planes  $P$  and  $R$  are skew.
  - 2) Planes  $P$  and  $R$  are parallel.
  - 3) Planes  $P$  and  $R$  are perpendicular.
  - 4) Plane  $P$  intersects plane  $R$  but is not perpendicular to plane  $R$ .

- 10 Plane  $\mathcal{A}$  is parallel to plane  $\mathcal{B}$ . Plane  $\mathcal{C}$  intersects plane  $\mathcal{A}$  in line  $m$  and intersects plane  $\mathcal{B}$  in line  $n$ . Lines  $m$  and  $n$  are
- 1) intersecting
  - 2) parallel
  - 3) perpendicular
  - 4) skew
- 11 Lines  $m$  and  $n$  intersect at point  $A$ . Line  $k$  is perpendicular to both lines  $m$  and  $n$  at point  $A$ . Which statement *must* be true?
- 1) Lines  $m$ ,  $n$ , and  $k$  are in the same plane.
  - 2) Lines  $m$  and  $n$  are in two different planes.
  - 3) Lines  $m$  and  $n$  are perpendicular to each other.
  - 4) Line  $k$  is perpendicular to the plane containing lines  $m$  and  $n$ .
- 12 Point  $A$  is not contained in plane  $\mathcal{B}$ . How many lines can be drawn through point  $A$  that will be perpendicular to plane  $\mathcal{B}$ ?
- 1) one
  - 2) two
  - 3) zero
  - 4) infinite
- 13 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  $\mathcal{D}$ .
- 14 Through a given point,  $P$ , on a plane, how many lines can be drawn that are perpendicular to that plane?
- 1) 1
  - 2) 2
  - 3) more than 2
  - 4) none
- 15 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  $c$ .
- 16 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)  $180^\circ$
- 17 Point  $P$  is on line  $m$ . What is the total number of planes that are perpendicular to line  $m$  and pass through point  $P$ ?
- 1) 1
  - 2) 2
  - 3) 0
  - 4) infinite

**G.CO.A.1: Planes 1**  
**Answer Section**

1	ANS: 4	REF: 080914ge
2	ANS: 1	REF: 081116ge
3	ANS: 3	REF: fall0816ge
4	ANS: 2	REF: 080927ge
5	ANS: 1	REF: 011128ge
6	ANS: 3	REF: 061017ge
7	ANS: 4	REF: 011012ge
8	ANS: 3	REF: 060928ge
9	ANS: 2	REF: fall0806ge
10	ANS: 2	REF: 081120ge
11	ANS: 4	REF: 061118ge
12	ANS: 1	REF: 081008ge
13	ANS: 2	REF: 011109ge
14	ANS: 1	REF: 011024ge
15	ANS: 1	REF: 061108ge
16	ANS: 3	REF: 081002ge
17	ANS: 1	REF: 060918ge